STUDENTS' PERCEPTIONS OF MENTORING IN A UNIVERSITY COOPERATIVE EDUCATION PROGRAM

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ABSTRACT

The purpose of this study was to examine students' perceptions of mentoring in a university cooperative education (co-op) program. Within this setting, students report to a supervisor. This supervisor has direct responsibility for the student and may influence the quality of the co-op experience by providing a mentoring role. A need existed to examine the interactions between students and supervisors during this transitional phase between school and work. Results from this study could be used as a source of information for enhancing student-supervisor interactions in co-op and for increasing awareness of the role mentoring may play in shaping the co-op experience.

The design of the study utilized both quantitative and qualitative methods. In the quantitative component, a web-based version of Raymond Noe's (1988) *Mentoring Functions Scales* was used to examine the psychosocial and career-related functions of mentoring. Factorial ANOVA and one-way ANOVA techniques were used to test the null hypotheses and to determine interactions between the independent variables of gender, ethnicity, and length of time in the co-op program and the dependent variables of the psychosocial and career-related functions of mentoring. In the qualitative phase, interviews were conducted to illuminate the findings from the quantitative phase. Data analysis was conducted using content analysis and emergent themes. The six themes that

emerged included psychosocial support, career-related support, time as a factor, differing experiences by gender and ethnicity, explanation of scores, and others as mentors.

Data analysis revealed that most participants experienced a moderate level of psychosocial and career-related mentoring from their supervisors. Within the interviews, students spent more time reflecting on the quality of their relationships with their supervisors and co-workers than the variables of gender and ethnicity. There were, however, several accounts by female students that highlighted the challenges of working in male-dominated work environments. All of the students identified at least one individual, other than their supervisor, who had served as a mentor for them throughout their placement. A model was presented to help participants better understand the interdependent concepts of relationship, task, and readiness. Additionally, an expanded version of mentoring beyond student-supervisor interactions was recommended.

DEDICATION

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CHAPTER 1

INTRODUCTION

Background

In ancient Greek mythology, Odysseus entrusted the care and education of his son Telemachus to his close friend Mentor while Odysseus left to fight in the Trojan War (Bell, 1996; Penner, 2001). Over time, the idea of "mentoring" has come to describe an individual who is a "wise person," "guide," and "friend" (Bierema & Merriam, 2002). Mentoring can occur in many different organizational arenas and is often depicted in the educational and business settings. Participation in a mentoring relationship has long been considered an accepted and advisable practice for new professionals in their search for academic, career, and personal success (McCormick, 1991).

In light of its mission as an educational program that prepares students for professional careers by combining academic training with practical work experience (Kerka, 1999); the notion of mentoring may reflect the ideal relationship between student and supervisor in cooperative education. At the beginning of a cooperative education assignment, students are assigned a supervisor at their sponsoring organization. This individual is typically a full-time, seasoned professional who oversees the work of the student throughout his/her time in the organization. While the student will work with other professionals in the field, the supervisor is the student's primary point of contact within the company. Since its inception at the University of Cincinnati in 1906, the potential for "mentoring" within the context of cooperative education (co-op) has had

great potential for connecting students to their work assignments through informal interactions with their professional supervisors (Apostolides, 1995).

Theoretical Framework

As early as 1897, John Dewey purported that education outside of the traditional walls of the classroom could produce higher level knowledge and intellectual growth. As suggested by Dewey and Vygotsky (1986), experiential education (cooperative education) coupled with meaningful interaction with a more seasoned colleague (mentoring) could be the necessary components for transformative learning. Additional theories that are useful in examining the intersection of mentoring and cooperative education include identity theory (Chickering, 1971; Erikson, 1968), cognitive-structural theory (Gilligan, 1982; Kohlberg, 1981; Perry, 1970); human development theory (Kegan, 1982), adult learning theory (English, 1999; Knowles, 1970), and organizational behavior (Hersey, Blanchard, & Johnson, 2000). The potential for mentoring in cooperative education begins to emerge as these theories coalesce in describing the intra- and interpersonal benefits for both mentors and mentees.

Models for Mentoring

As noted by Ricks and Van Gyn (1997), previous research regarding the concepts of mentoring and cooperative education has focused primarily on the roles of mentors, characteristics of participants and mentors, career development, academic success, and work satisfaction. Additionally, previous investigators have presented models for identifying and implementing formal mentoring programs in the cooperative education work setting (Gibson & Angel, 1993; Labonty & Stull, 1993).

In the Weyerhaeuser Information Technology (IT) Intern Program, program coordinators established a mentor program in which students were paired with a mentor in a formal structure. For this program, mentors were recruited by the students' supervisors based on a set of desired characteristics for mentoring including interest, availability, and expertise. The student, mentor, and supervisor worked closely together and were provided training for the experience, but the roles were kept separate. Supervisors focused on managing job responsibilities and monitoring job performance and mentors focused on student growth and development.

In contrast to this differentiation of roles, LaBonty and Stull (1993) advocated for the re-conceptualization of the traditional hierarchical role of supervisors in which students received both support and instruction from the same individual. The authors noted that in practice, it is not uncommon for a student's supervisor to be his/her mentor as well. Despite the differing perspectives of who should do the actual mentoring, both the Weyerhaeuser model and Gray's model of mentoring as adapted by Labonty and Stull (1993) shared common characteristics. The areas of overlap included carefully selecting mentors, providing training for mentors and students, monitoring the mentoring, and evaluating the program. Gibson and Angel (1993) also recommended piloting the mentoring program and providing specific guidelines.

Conceptual Framework for Mentorship Relationships

In reviewing mentoring relationships for co-op and non-co-op students, Ricks and Van Gyn (1997) developed a conceptual framework for mentorships based on curriculum orientations and teacher/student relationships posited by Miller and Seller (1985). This framework included three categories of relationships based on the levels of interaction

and information between students and mentors: (a) transmission, (b) transaction, and (c) transformative relationships. Transmission was described as a one-way relationship in which the mentor models or simply provides the mentee with knowledge, values, and skills. Transaction was a two-way relationship that was "interactional" and focused on the mentee developing independent problem-solving skills. Transformational relationships were described as collaborative partnerships between the mentor and mentee in which both individuals participated in shared goal-setting and the pursuit of a shared vision (Ricks & Van Gyn, 1997). These authors noted that most mentoring relationships fall into the transaction category. In order to maximize the potential for mentorships, Ricks and Van Gyn advocated for a shift in focus away from maximizing roles to fostering relationships within cooperative education. In so doing, the authors suggested that more students and mentors would experience the benefits of a transformational relationship. This conceptual framework will be further described in Chapter 2 of this study.

Demographic Characteristics of Participants

The mentoring literature revealed considerable differences regarding characteristics within the mentoring relationship. Many researchers acknowledged that there may be certain limitations for women and minorities within traditional mentoring systems (Bauer, 1999; Kalbfleisch & Davies, 1991; McCormick, 1991), but they disagreed on the extent and the consequence of such differences. The literature tended to be divided with regards to same-gender vs. cross-gender and same-race vs. cross-race pairings. Identifying potential mentors and sustaining these relationships may pose a significant barrier for women, especially in traditionally male-dominated fields (Dipboye,

1987; Kalbfleisch & Davies, 1991; Ragins, 1989; Wallace & Haines, 2004). From an historical perspective, the literature suggested that the length of time in a mentoring relationship may occur within a single encounter (Phillips-Jones, 1982) to as long as 10 years (Levinson, Carrow, Klein, Levinson, & McKee, 1978, Kram, 1983).

While the mentoring literature examined these characteristics within traditional workplace settings, there has been little research to capture the mentoring experience from students who are participating in the cooperative education program. Specifically, there was scarce information about students' perceptions of their supervisors in cooperative education based on specified demographic characteristics.

Statement of the Problem

Despite the prevalence of cooperative education programs on college and university campuses, there was a paucity of research regarding students' perceptions of their interactions with their supervisors. A need existed to study students' perceptions of the psychosocial and career-related mentoring functions in the cooperative education setting. Additionally, previous research relied heavily on the use of solely quantitative methods in gathering and interpreting data (Coll & Chapman, 2000). By utilizing a mixed methods approach to research, the researcher for this study suggested that both the quality and transferability of research findings would be enhanced. Teddlie and Tashakkori (2003) described this assumption as the *gestalt principle* in which the "whole is greater than the sum of its parts" (p. 42).

Purpose

The purpose of this two-phase, sequential explanatory mixed methods study was to examine students' perceptions of mentoring in a university cooperative education program. In the quantitative phase, mentoring was divided into two primary domains; the psychosocial and career-related functions of mentoring. Students' perceptions of the extent of each domain were assessed based on the following independent variables: gender, ethnicity, and length of time in the co-op program. This assessment was based on a sample of students in one cooperative education program in the southeast. In the qualitative phase, interviews with nine participants were conducted in an effort to illuminate the findings from the quantitative phase. Participants were selected using a purposeful sampling technique to ensure that the representative distribution of scores reflected a cross section of the independent variables, gender, ethnicity, and length of time in the co-op program.

Research Questions and Null Hypotheses

Quantitative Data

To address the issue of students' perceptions of mentoring in the cooperative education setting, research questions were used for both the quantitative and qualitative phases of research. The following research questions were used to guide the formation of hypotheses:

1. To what extent do students perceive their supervisors provide psychosocial support in the cooperative education placement?

2. To what extent do student perceive their supervisors provide career-related support in the cooperative education placement?

Null Hypothesis One.

There is no significant interaction between the variables of gender, ethnicity, and length of time in the cooperative education program with regard to the perceived psychosocial function as reported by cooperative education students using the *Mentoring Functions Scales*.

Null Hypothesis Two.

There is no significant interaction between the variables of gender, ethnicity, and length of time in the cooperative education program with regard to the perceived career-related function as reported by cooperative education students using the *Mentoring Functions Scales.*

Qualitative Data

In the qualitative phase, the central phenomenon of students' perceptions of their mentoring experiences was explored. Results from the quantitative phase informed the qualitative phase. The researcher developed additional qualitative sub-questions after the completion of the quantitative phase in order to explore the statistical results.

Qualitative Central Phenomenon.

What are students' perceptions of mentoring in cooperative education?

Qualitative Sub-questions.

1. In what ways do students describe the frequency and quality of their interactions with their supervisors?

2. To what extent has the role of gender and ethnicity been a factor in the frequency and quality of students' interactions with their supervisors?
3. In what ways has length of time in the co-op program influenced students' perceptions of mentoring in cooperative education?

Significance

The results of this research were intended to provide valuable information to a number of audiences. The primary audience included administrators, faculty, cooperative education employers, supervisors, and participating students. By examining the nature of student-supervisor interactions in cooperative education programs, these individuals may gain meaningful insights into the development of their programs and a greater understanding of the role mentoring may play in shaping the cooperative education experience for students during the transitional time between school and work. Participating students may also benefit from the opportunity to reflect on their cooperative education experiences as it relates to their perceptions of their supervisors within this learning context. Secondary audiences included prospective students and parents as they carefully weighed admissions decisions between colleges and universities that may or may not offer cooperative education opportunities.

Definition of Terms

1. Career-related function of mentoring: The domain that addresses career- and professional development dimensions including sponsorship, exposure and

visibility, coaching, protection, and challenging assignments (Kram, 1983; Russell & Adams, 1997).

2. Cooperative Education: Cooperative education (co-op) will be generally defined as a collaborative partnership between the university and employer in which students work full- or part-time in an area related to their major while they are attending college. Cooperative education programs are designed to provide practical application of theory learned in the classroom by combining academic education with hands-on work experience (Weston, 1986).
3. Ethnicity: For the purposes of this study, ethnicity refers to a category of people who share a common heredity or ancestry. While there is evidence to suggest that the terms *race* and *ethnicity* may not be used interchangeably, ethnicity is used in the broadest sense to identify the following groups of people: African American, Asian American, Caucasian, Hispanic, Pacific Islander, and Other.
4. Mentee: A person who is the recipient of the experience, expertise, or wisdom of the mentor (Sortor, 2004). In the literature, this person may also be referred to as a "protégé."
5. Mentor: A person with experience, expertise, wisdom, and/or power who teach, guide, counsel, and help a less experienced or less knowledgeable person to develop personally and professionally (Skrtic, 1985).
6. Mentoring: Traditionally, mentoring has been defined as, "an intense interpersonal exchange between a senior experienced colleague (mentor) and a less experienced junior colleague (protégé) in which the mentor provides

support, direction, and feedback regarding career plans and personal development" (Kram, 1983; Russell & Adams, 1997).

7. Psychosocial function of mentoring: The domain that addresses the interpersonal dimensions of the mentoring relationship including role modeling, acceptance and confirmation, counseling, and friendship (Kram, 1983; Russell & Adams, 1997).
8. Spam-blocker: A filter for unsolicited commercial e-mail.

Delimitations

1. The study was delimited to the students participating in cooperative education at a four-year public institution in the southeast.
2. This investigation concentrated exclusively on the perceptions of students participating in the program. Perceptions of supervisors, administrators, and faculty were beyond the scope of this investigation.

Limitations

This study had several potential limitations that may have implications for the generalizability of and confidence in the findings and that may be useful in informing areas of future research:

1. Due to the nature of cooperative education within a single program, gender and racial distributions were heavily skewed toward white male participants. Future researchers are encouraged to evaluate cooperative

education programs using a more diverse population. A national sample could produce different results.

2. While participation in the study was voluntary, individuals who chose to complete the web-based survey instrument may demonstrate higher levels of motivation and commitment to cooperative education and the concept of mentoring. The “selection” of participants for the study represented a potential threat to internal validity as participants may be predisposed and/or more responsive to the concept of mentoring within cooperative education than those who chose not to participate.
3. Cooperative education programs are typically comprised of career-oriented, technical curricula, e.g., engineering and computer science. Students tend to enter these professions because they are traditionally high-paying and attractive fields. Mentoring relationships may be different between students and supervisors in non-technical oriented curricula. A national sample with a broader representation of academic programs and majors could produce different results.
4. This study was limited to the relationship between student and supervisor in cooperative education. In reality, students may identify multiple mentors within their cooperative education organization as well as mentors among their peers.

Organization of the Study

This study was organized in five chapters. Chapter one includes an overview of the investigation including a statement of the problem, the purpose of the study, research questions, theoretical framework, significance of the study, definition of terms, delimitations, limitations, and a summary. Chapter two includes a review of relevant literature regarding the topic. Chapter three provides the methodological framework for the study including philosophical assumptions, design elements, data collection, data analysis, assurances of validity and reliability, and ethical considerations. Chapter four presents the findings of the research and chapter five discusses conclusions and directions for future research.

Summary

While rooted in classical literature, the concept of mentoring has as much to tell us today about the potential for positive relationships as it has in ancient days. Previous research in the area of mentoring in cooperative education has utilized primarily a quantitative approach to assess the effects of cooperative education post graduation. In contrast, the goal of this two-phase, sequential explanatory study was to assess students' perceptions of mentoring in co-op through a mixed methods design. Follow-up interviews were used in the second phase of research to help illuminate the findings of the quantitative data and to explore the quality of student-supervisor relationships in this setting. Results from the research were intended to provide rich information about students' experiences to inform the practice of mentoring in cooperative education.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

The purpose of this literature review is to address issues regarding students' perceptions of mentoring in the cooperative education setting. Mentoring will be divided into two primary domains; the psychosocial and career-related functions of mentoring (Kram, 1983). In the literature review, theories regarding human growth and development, identity, adult learning, and organizational behavior will be explored and current research in the areas of mentoring and cooperative education will be examined. A conceptual framework for mentorships (Van Gyn & Ricks, 1997) will be considered and special attention will be given to mentoring literature that relates to demographic characteristics of gender, ethnicity, and length of time in the mentoring relationship. A visual representation of the three bodies of literature regarding mentoring, cooperative education, and the theoretical framework for the study can be seen in Appendix A. For the purpose of this study, cooperative education will be defined as an educational program that prepares students for professional careers by combining academic training with practical work experience (American Society for Engineering Education, 2006).

Theoretical Framework

The theoretical framework for this study was comprised of the related concepts of experiential education, professional development theory, identity theory, human development theory, adult learning theory, and organizational behavior.

Experiential Education

In order to understand the concept of mentoring and to build a framework for mentoring in cooperative education, it is necessary to first reflect on the writings of John Dewey and Jean Piaget as seminal writers in the fields of experiential education and cognitive development. As a leader in educational progressivism, John Dewey (1938) espoused the value of experience-based learning. In contrast to the prevailing views regarding traditional education, Dewey proposed that higher level knowledge could be achieved by providing an environment outside of the classroom that would be conducive to intellectual growth. As early as 1897, it was Dewey's assertion that "the only true education comes through the stimulation of the child's (learner's) powers by the demands of the social situations in which he finds himself" (p. 77). It is the social situation then that becomes the "filter" or context for the learning to occur. For the purpose of this study, the context for learning is the cooperative education placement and mentoring is the way in which students and supervisors make sense of their world. From a developmental perspective, it is not enough for a student to simply go through the activity (cooperative education) without actively reflecting on what he or she has learned. In order for an experience to have meaning, the student must process the experience. With this as a premise, mentoring is the vehicle through which students engage with their supervisors to transform their experiences by making relevant conceptual connections between what they are trying to learn and what they have already learned or experienced (Bruner, 1961; Flavell, 1986). In this way, mentoring in cooperative education helps students learn how to learn.

Constructivism

The writings of Piaget (1967) can be useful in interpreting the actions and internal processes of individuals who are involved in this type of experiential education opportunity. From a constructivist's perspective, learners create their own cognitive structures rather than merely receiving them from others. As learning occurs, an individual's cognitive structures are challenged or confronted by new, or slightly different, conditions. Learners can either refuse to acknowledge the difference or confront the difference and attempt to make sense of it. The condition represents a partial discrepancy between existing cognitive structures and the new experience. Learning occurs at the resolution of this discrepancy in a process that Piaget referred to as achieving equilibrium (Kelehear & Heid, 2002). From a mentoring perspective, the process of experiencing and overcoming something new has been described as "transformative learning" (Mezirow, 1991). Transformative or transformational learning represents the highest level of interaction in the conceptual framework on cooperative education as outlined by Ricks and Van Gyn (1997).

Professional Development Theory

As an extension of Piaget's work on context and meaning, Vygotsky's (1986) zone of proximal development (ZPD) delves deeper into the potential benefits of mentoring within the cooperative education setting. It was Vygotsky's belief that children (learners) perform at a more advanced level through social interaction than what they might do when acting alone. For example, students in cooperative education may have few skills for problem solving on their own. By working with an older or more experienced person, the potential for identifying a solution to the problem greatly

improves. The mentor can help the student "explore different, and often new, ways to solve problems through trial and error or through approximations of existing schema" (Kelehear & Heid, 2002, p. 70). By entering into a dialectic relationship with a mentor, mentees trade in their bounded and limited perspectives in favor of a world of ever increasing possibilities of knowing (Vygotsky, 1986).

To fully appreciate the development and growth of students involved in mentoring in cooperative education, it is necessary to look briefly at identity and human development theories and their application to experienced-based learning. In their seminal collection of research, Pascarella and Terenzini (1991) described the idea of development as having "a presumption of 'growth,' or the potential for growth toward maturity, toward greater complexity through differentiation and integration" (p. 16). The theoretical paradigms designed by Erikson, Chickering, Perry, Kohlberg, and Gilligan can help illustrate this movement towards development.

Identity Theory

According to Russell and Adams (1997), identification with a mentor can be considered "a major developmental task of the early career" (p. 3). This type of relationship is supported in the literature on identity theory in which stages of development are defined. Erikson (1968) identified stages of ego development in which individuals come to understand themselves through a series of crises and resolutions. Drawing heavily upon Erikson's work, Johnson, Geroy, and Griego (1999), suggested that in traditional mentoring relationships mentees are typically in Erikson's stage of intimacy versus isolation while mentors are predominately in Erikson's stage of generativity versus stagnation. While the focus for the mentees tends to be on forming

intimate relationships with others, the focus for mentors is on caring for others. The benefit of mentoring is the way in which it can support both mentor and mentee needs within this supportive relationship.

Psychosocial Theory

Building on this model of identity, Chickering (1971) established a psychosocial theory based on seven vectors or stages of student development. Of the seven vectors, Weston (1986) suggested that four of the seven, competence, autonomy, purpose, and identity, were closely connected to establishing career identity through a cooperative education program. In *Education and Identity*, Chickering (1969) identified the following five major experiences or tasks that were central to the developmental process for students:

1. Engaging students in making choices
2. Requiring interaction with diverse individuals and ideas
3. Involving students in direct and varied experiences
4. Involving students in solving complex intellectual and social problems without the demands for conformity to an authority's view
5. Involving students in receiving feedback and making objective self-assessment.

On the face of it, student involvement in cooperative education combined with the encouragement and support of a mentoring relationship would provide opportunity for students to experience each of the five developmental tasks as recommended by Chickering.

Cognitive-Structural Theory

Based to some extent on Piagetian theories of stage development, William Perry (1970) presented a cognitive-structural schema depicting nine stages of development. For practical use, the stages can be collapsed into three primary categories of dualism, multiplicity, and relativism. As students progress through the hierarchical stages they move from an absolute reliance on "experts" who present the "truth" to choosing among many "experts" in a context of uncertainty and confusion to finally becoming an "expert" and acknowledging that answers are bound to contextual relevance. In addition to presenting a conceptual "map" for student growth and development, this schema suggests that the more students engage in activities that challenge their conventional understanding of how the world works; the greater the opportunities will exist for them to be changed by their experiences. By exposing students to new ideas and providing an outlet for processing their new information, developmental activities (mentoring) can help students make sense of the world in ways that retain their own sense of meaning yet respect its diversity (Daloz, 1999).

Cognitive-Structural Theory and Moral Reasoning

Similar to Perry's model of stage development, Kohlberg's (1981) cognitive structural theory focused on the moral development and reasoning of students. The primary "voice" that emerged in Kohlberg's moral development theory was that of Justice which represented fairness with regards to moral decision-making. The six hierarchical stages were divided into three levels: pre-conventional, conventional, and post-conventional. On one end of the continuum is self-protecting behavior which is based on a rigid set or rules. In the pre-conventional stages, the punishment is the

deterrent. On the opposite end of the continuum is a set of universal principles that transcend the "self" and recognizes a greater good.

As a graduate assistant to Kohlberg, Gilligan (1982) rejected the notions of autonomy and separateness embedded in previous theories and defined a theory that emphasized Care as opposed to Justice. Her departure from the traditional, male-centered vision of "hierarchy of power" emphasized a "web of relationships," or "interconnectedness" among individuals. Gilligan's work on moral reasoning and development highlighted a sense of interdependence in which caring for self and caring for others were of paramount concern. She re-conceptualized the idea of responsibility by incorporating the notions of compassion and mercy as a balance to justice. In examining mentoring relationships in cooperative education, the disparate themes of "care" versus "justice" may continue to influence perceptions of the workplace as experienced by women and men.

Human Development Theory

Drawing upon the influences of Kohlberg and Piaget, Kegan (1982) described a developmental process in *The Evolving Self* in which individuals move among stages or "balances" within an upward spiraling helix. Within this model, the balances begin with impulsive and self-centered responses of individuals and transition to more interpersonal and other-centered stances. Daloz (1999) described the transitions between balances as "a swinging outward, away from the familiar world into the strange, a leaning into uncertainty, a risk" (p. 67). Kegan's work focused on the quality of the transitions between stages and took into consideration the environment in which these transitions were occurring. The highest position in the schema was "interindividual balance" which

depicted a reconciliation of the self and the other. On route to this final position, Daloz indicated that students, especially adult learners, tended to be moving between stages three and four, interpersonal balance and institutional stance. This may be a transition that students experience in cooperative education as they begin to experience a sense of autonomy, active involvement, and altruism. With the assistance of a mentor, students may even begin to comprehend a sense of "calling" within their profession (Hettich & Helkowski, 2005).

Adult Learning Theory

As a visionary leader in the fields of adult learning and human resource development, Malcolm Knowles (1970) recognized that the teaching of adults and the teaching of children should be different since the two populations are existentially different (Tweedell, 2000). Knowles borrowed the term "andragogy" from a German educator to differentiate it as a teaching methodology uniquely different from pedagogy and provided a set of assumptions about how adults learn. Knowles (1989) contended that adults (a) are self-directed in their learning, (b) have a vast wealth of experience to bring to their learning, (c) are interested in learning to solve real-life dilemmas, (d) want to apply what they have learned to their personal and professional lives, (e) need to know why they are learning something before they learn it, and (f) respond more to intrinsic motivators (increased self-esteem and quality of work-life) than to extrinsic motivators better wages, promotions). Based on these six basic premises, English (1999) developed a plan to better prepare mentors and mentees for the mentoring relationship and suggested that andragogy has implications for the process, the content, the structure, and the overall philosophy of mentoring.

Organizational Behavior

While much has been written about successful organizational leadership, Hersey, Blanchard, and Johnson (2001) proposed a leadership model that was based on the quality of interactions between the leader and follower within the organization. The authors termed this model "Situational Leadership" and indicated that the leadership style employed by a leader should be based upon the readiness level of his/her followers and the situation at hand. The authors suggested that the leadership style of a leader should move back and forth along the curvilinear path of the Situational Leadership Model© (Appendix B) as he/she adapts appropriately to each individual situation.

The Situational Leadership Model used a quadrant-style layout to depict relationships and priorities of the leader in an organization. The two primary considerations for the model include "relationship" and "task". The four distinct leadership styles outlined by Hersey, Blanchard, and Johnson are based on the sum of the relationship, task, and readiness level of the follower. Task behavior was defined as:

> The extent to which the leader engages in spelling out the duties and responsibilities of an individual or group. These behaviors include telling people what to do, how to do it, when to do it, where to do it, and who is to do it. (p. 173).

Relationship behavior was defined as "the extent to which the leader engages in two-way or multiway communication. The behaviors include listening, facilitating, and supportive behaviors" (p. 173). Readiness was defined as "the extent to which a follower demonstrates the ability and willingness to accomplish a specific task" (p. 175).

The four styles of leadership that result from the interplay of these variables are summarized as follows:

1. High Task/Low Relationship "Telling" (S1)

Characterized by one-way communication in which the leader defines the roles of the followers and tells them what, how, when, and where to do various tasks.

2. High Task/High Relationship "Selling" (S2)

Most of the direction is still provided by the leader. The leader also attempts, through two-way communication and socioemotional support, to get the followers psychologically to buy into decisions that have already been made.

3. High Relationship/Low Task "Participating" (S3)

The leaders and followers share in decision-making through two-way communication. Much facilitating behavior from the leader is appropriate since the followers have the ability and knowledge to do the task.

4. Low Relationship/Low Task "Delegating" (S4)

The leader lets the followers "run their own show" through delegation and general supervision since the followers are high in both task and psychological maturity (p. 174.)

Overview of Mentoring

The term "mentor" originated in Greek mythology in Homer's *The Odyssey*. Mentor was a tutor entrusted with the care, education, and protection of Odysseus' son, Telemachus. Mentor was described as "providing both wise and sensitive counsel to the son to groom his as king" (Russell & Adams, 1997, p. 1). At critical times in the epic

adventure, Athena, goddess of wisdom, speaks to Telemachus through the forms of Mentor and Odysseus. Based on the multiplicity of forms, Mentor has been described as "both male and female, mortal and immortal – an androgynous demigod, half here, half there. Wisdom personified" (Daloz, 1999, p. 20). Throughout the ages, mentors have offered hope by transmitting wisdom to individuals at critical turning points in their lives. Indeed, ancient and modern literature is replete with examples of mentor figures including the spider woman in Native American lore, Gandalf in Tolkien, Charlotte in *Charlotte's Web*, Utnapishtim in the Gilgamesh epic, Shazam in Captain Marval comics, the little old lady *Babar*, Tireisas in Greek legend, the skin horse in *The Velveteen Rabbit* (Daloz, 1999). Carl Jung (as quoted in Daloz, p. 17) described the archetype of mentor as either sex or both and representing "knowledge, reflection, insight, wisdom, cleverness, and intuition."

Over time, the special connection between two individuals, as illustrated by the relationship between Telemachus and Mentor, has been adapted and codified for the purposes of corporate and educational training (Bell, 1996). Traditionally, mentoring has been described as "an intense interpersonal exchange between a senior experienced colleague (mentor) and a less experienced junior colleague (protégé) [mentee] in which the mentor provides support, direction, and feedback regarding career plans and personal development" (Russell & Adams, 1991, p. 3). According to English (2000), "Mentoring is the personal and professional assistance that one adult (the mentor) provides to another, less experienced adult (the mentee)" (p. 30). This interpersonal exchange between the mentor and the mentee may involve counseling, psychological support, protection, promotion, sponsorship, skill-development, and involvement in professional

organizations (Cargill, 1989). In a symbolic sense, mentoring represents a passing of the torch from one generation to the next (English, 2000).

In a critical review of mentoring literature, Jacobi (1991) compiled a cross section of operational definitions of mentoring from the fields of higher education, psychology, and management/organizational behavior. Jacobi noted that most of the definitions described mentors or mentoring in terms of the functions provided by a mentor or the roles played by a mentor in relation to a mentee. An overview of mentoring functions by author can be seen in Table 1. Jacobi selected these specific definitions based on their broad descriptions, originality based on observations, interviews, or survey data, and level of detail including at least three distinct functions or roles.

Mentor roles have typically been categorized into either the psychosocial or career-related functions of mentoring, although some research has identified role modeling as a potential third distinct function (Jacobi, 1991; Russell & Adams, 1997; Scandura & Ragins, 1993). Thomas and Kram (1988) identified two types of developmental relationships in the workplace (sponsor-protégé [mentee] relationships and mentor-protégé [mentee] relationships) and distinguished between the two based on their emphasis on solely career-development and career and psychosocial development, respectively.

TABLE 1
Mentoring Functions

Functions	Blackwell, 1989	Burke, 1984	Nieva & Gutek, 1981	Kanter, 1977	Kram, 1985	Levinson et al, 1978	Phillips-Jones, 1982	Zey, 1984
Acceptance/support/encouragement	X				X	X	X	X
Advice/guidance	X		X		X	X	X	X
Bypass bureaucracy/access to resources			X	X				X
Challenge/opportunity/"plum assignments"		X			X		X	
Clarify Values/clarify goals	X							
Coaching		X		X	X			
Information	X	X	X	X				
Protection	X				X			X
Role model	X		X		X	X	X	
Social status/reflected credit			X	X				
Socialization/"host and guide"	X					X	X	X
Sponsorship/advocacy	X	X		X	X	X		X
Stimulate acquisition of knowledge	X							
Training/instruction	X		X	X		X	X	X
Visibility/exposure				X	X		X	

Note. From "Mentoring and undergraduate success: A literature review," by M. Jacobi, 1991, *Review of Educational Research, 61*, p. 509 Adapted with permission.

In an effort to derive a common definition of mentoring from the vast array of mentor roles and functions, Jacobi (1991) identified five characteristics of mentoring that tended to be consistent across the vast array of possibilities:

1. Mentoring relationships are helping relationships focused on achievement
2. Mentoring may include any or all of three broad categories including: (a) emotional and psychological support, (b) direct assistance with career and professional development, and (c) role-modeling
3. Mentoring relationships are reciprocal relationships
4. Mentoring relationships are personal…most would agree that mentorship requires direct interaction between the mentor and the protégé [mentee]
5. Relative to their protégé [mentee], mentors show greater experience, influence, and achievement within a particular organization (p. 513).

Types of Mentoring Relationships

Mentorships have traditionally been classified as either formal or informal relationships. While informal mentoring relationships tend to be more spontaneous and lack the external involvement from the organization (Russell & Adams, 1997), formal mentoring relationships are managed and sanctioned by the organization and may involve selection and assignment procedures (Chao, Walz, & Gardner, 1992; Russell & Adams, 1997). In contrast to the prescriptive "formal" mentoring program, as described by Gibson and Angel (1993, 1995) and LaBonty and Stull (1993), Van Gyn and Ricks (1997) indicated the following:

> A true developmental and supportive relationship implies a degree of interpersonal commitment on the part of both the protégé [mentee] and the mentor

> which may be more likely to arise out of a mutually voluntary relationship as opposed to one that is formal and imposed (p. 81).

In this study, relationships that develop informally in the cooperative education setting between students and their supervisors were examined. As noted by Bauer (1997), one rationale for looking specifically at informal mentoring is that formal programs tend to vary greatly in what they offer and how mentees are selected. Additionally, a majority of mentoring relationships are informal (Phillips-Jones, 1983).

Phases of Mentoring

In her seminal work, Kram (1983) proposed four separate phases in the development of a mentoring relationship. The four phases included initiation, cultivation, separation, and redefinition. The first phase, initiation, is the start of the relationship and spans a period of six months to a year. It is a marked as a period of high expectation by mentees and mentors regarding the possibility of a developmental relationship. If the relationship matures into a mentorship, it then progresses to the second phase, cultivation. The cultivation stage lasts between two to five years and it is a time in which the relationship between the mentees and the mentor strengthens. It is during this time that mentorship functions are maximized; the cultivation phase is marked by promotion, protection and visibility for the mentee within the organization. The third phase, separation, lasts approximately six months to two years and represents a psychological and structural shift in the relationship. This dramatic shift in the relationship is manifest by a decrease in functions provided by the mentor and an increase in independence by the mentee. The catalyst for the separation phase may include a physical separation by the environment or a decrease in expectations by mentors or mentees. According to Chao

(1997), the separation phase may be “emotionally stressful as either one or both mentorship partners perceive the break-up with anxiety or defiance” (p. 16). The final phase, redefinition, may occur over an indefinite period of time and marks the termination of the mentor-mentee relationship. At this point, the relationship is either not re-established or is redefined in favor of an informal peer-peer partnership of mutual respect.

Overview of Cooperative Education

Historically, the cooperative system of education was founded in 1906 at the University of Cincinnati by Dean of Engineering, Herman Schneider, to bridge the gap between theory in the classroom and practice in the field (Barbeau, 1985). It was Dean Schneider’s contention that engineers, like doctors and lawyers, must be trained for practice. In his own words, “Judgment based upon experience must supplement theory” (Schneider, 1910, p. 148). In its first year at the University of Cincinnati, 60 applications were received for the cooperative program, 45 students were accepted and 28 students participated in the program after enduring a rigorous pre-service commitment prior to their freshman year. The program received 800 inquiries and applications in the second year and approximately 2,000 inquiries the following year (Barbeau, 1985).

In practice, cooperative education programs are developed through collaborative partnerships between the university and employers in order to provide students with work opportunities that complement their academic areas of interest. Cooperative education students work on either an alternating or parallel schedule. On the alternating schedule, students rotate a semester of academic coursework with an equal amount of time in paid

employment, repeating the cycle several times until graduation. On the parallel schedule, students split their time between school and work in back-to-back semesters. Many cooperative education programs include “connecting activities” such as seminars and teacher-coordinator worksite visits in order to help students successfully connect school and work (Weston, 1996). Proponents of cooperative education have identified benefits for students (including motivation, career clarity, enhanced employability, vocational maturity) and employers (labor force flexibility, recruitment/retention of trained workers, input into curricula) as well as educational institutions and society (Kerka, 1999).

Principles of Cooperative Education

In their seminal review of the cooperative education literature, Ricks, Cutt, Branton, Loken, and Van Gyn (1993) identified seven basic principles that characterize most cooperative education programs in higher education. The authors derived these seven principles by deconstructing Wilson and Lyon’s 1961 definition of cooperative education. The seven principles included the following:

1. Integration of classroom experiences and practical work experiences
2. Work experience constitutes a regular and essential element in the educative process
3. Minimum amount of work covers at least two different periods of work totaling at least 16 weeks
4. Minimum standards of performance are included in the requirements of the institution for a degree
5. Must be a liaison between institution and employing firm
6. Work experience must be considered an integral part of the educational process

7. Institution takes a definite responsibility for this integration

Mentoring in Cooperative Education

The Weyerhaeuser Information Technology (IT) Intern Program was established in 1976 to ostensibly train and recruit IT graduates prior to graduation. According to program coordinators, the experience involved challenging assignments, developmental activities, professional development activities, and skills-based seminars. Based on student feedback, the Weyerhaeuser program added a formal mentoring component to the program in 1991 to enhance the overall experience. In describing the establishment of the formal mentoring process, Gibson and Angel (1993) presented a six-step model that included piloting the program, selecting mentors, providing guidelines, orienting and training the participants, monitoring the program, and evaluating the program.

These researchers advocated for a separation of supervisor/mentor roles so that the supervisor could focus on the current job of the student while the mentor focused on the students' overall development. Interviews with participants in the Weyerhaeuser IT Program further revealed that students perceived the roles of mentors and supervisors to be different. Students indicated that their mentors were available to provide additional perspectives, advice, encouragement, and support while they were becoming familiar with their new responsibilities and environment. Supervisors, on the other hand, were more concerned with the completion of tasks and evaluation of student performance. Through this supervisor/mentor/student model, students could maximize the benefits of the program while minimizing any threats to their viability as potential hires upon

graduation. Priorities and expectations for this triad relationship were established through a formal mentoring agreement form and mentoring goals worksheet.

In contrast to this separation of roles, Labonty and Stull (1993) supported the notion of supervisors serving this dual role within the cooperative education setting and suggested that the key elements in establishing the mentoring role included proper selection and training of key personnel. The authors identified the four primary roles of mentors in cooperative education as *induction*, *training*, *evaluation*, and *career counseling* (Labonty & Stull, 1993, p. 16). According to Eby (1997), a supervisor-mentor may be in the best position to provide support for a subordinate-mentee by providing role modeling and facilitating the mentees' learning of technical and interpersonal skills necessary for advancement within the organization.

In their description of students' experiences with mentoring in cooperative education, Gibson and Angel (1995) examined established programs including the Weyerhaeuser Information Technology (IT) Intern Program, Hughes Aircraft Company, and Jet Propulsion Lab in which structured mentoring programs had become a formal part of the working environment. Based on their investigation, Gibson and Angel reported the following positive outcomes for students in technical fields who had been mentored, "faster integration into the work place, improved co-op job satisfaction, and increased productivity and retention of co-op employees" (p. 49). The authors identified the differences between "students" and "employees" and advanced the notion that mentors could help students through this period of transition from classroom to workplace. By teaching students both the technical skills as well as the informal processes of the organization, mentors could help students learn "the way of doing

things" within a specific work setting. From classic organizational theory, Schein (1993) referred to this process as learning the "rules of the game," in order to be fully accepted as a member of the organization.

Students Attitudes Towards Mentoring

As part of an extensive study on mentoring by the Cooperative Education Research Team, Ricks and Van Gyn (1997) conducted an investigation to examine students' attitudes towards mentoring and learning skills to identify changes in the mentoring process that affected students' work success. Ricks and Van Gyn (1997) advanced the following hypothesis for their study:

> The effect of being mentored over a three year period by a collection of persons (co-op coordinators, faculty and work term supervisors) who know the current education and work systems may result in greater educational and career success for cooperative education students (p. 42)

To examine this hypothesis, a sample for the study consisted of 388 undergraduates (172 co-op and 216 non-co-op students) and 233 (80 co-op and 153 non-co-op) graduates from a Canadian university. Additionally, in the study 233 current work supervisors (80 of co-op graduates, 153 of non-co-op sample) were used. A longitudinal design was used to determine any change in the incidence and experiences of mentoring, attitudes toward mentoring, and learning skills which could affect work success. A cross-sectional design provided information regarding incidence and characteristics of mentoring, attitudes toward mentoring, skills learned and work success after graduation. The study used The Mentoring Questionnaire (a modified version of Mentors in Organizations, Burke, 1990),

Work Setting Questionnaire, Self-monitoring Scale (Snyder & Gangestad, 1986), and Functional Flexibility Scale (Leary & Kolwalski, 1990; Paulus & Martin, 1987).

Findings suggested a lack of differences between the co-op and non-co-op, graduate and undergraduate populations in how they experienced mentoring or how they thought about mentoring. Study participants highlighted the importance of the psychosocial aspects of mentoring over career-related aspects. This was congruent with the authors' emphasis on relationships instead of roles within the cooperative education setting.

To orient this study, Ricks and Van Gyn (1997) created a conceptual framework for "mentorships" based on curriculum orientations and teacher/student relationships by Miller and Seller (1985). This multi-level framework consisted of three levels of interaction which were labeled transmission, transaction, and transformation. The conceptual framework, as presented by Van Gyn and Ricks (1997), is shown in Table 2.

TABLE 2

A Conceptual Framework for the Classification of Mentorships

Types of Membership	Process	Mentorship Characteristics	Outcome
Transmission	Modeling, concrete explication, unidirectional	Hierarchical, respectful formal relationship, low level of interpersonal interaction	Learning skills, knowledge and values
Transaction	Addressing dilemmas, dialogue, knowledge and values reconstruction, bi-directional	Identification, mutual admiration, increased interpersonal interaction	Learning a process of independent problem solving
Transformation	Creating a vision, internalization, collaborative interaction	Equalizing of relations, genuine mutual affection, high interpersonal component	Personal and social change

Note. From "Proteges' perception of the characteristics of the mentoring relationship and its impact" by G. H. Van Gyn and F. Ricks, 1997, *Journal of Cooperative Education, 32*(3), p. 84. Adapted with permission.

Based on the transformational aspect of mentoring, as reported by participants, it was suggested that fostering developmental relationships (mentoring) requires careful attention in selecting appropriate people followed by training in relationship skills.

Perceptions of Mentoring in Cooperative Education

As a follow-up to a larger, normative study on students' experiences with mentoring, Van Gyn and Ricks (1997) conducted "biographical reports" or focus group interviews. The purpose of this study was to determine if differences were apparent in the types of mentorships experienced by co-op and regular students. The conceptual

framework as used in this research study is presented in Figure 2. Forty-two participants were selected randomly for this study from a total population of 621 from two gender pools. Participants included current students as well as students who had graduated from the program. Participants were drawn from a larger normative study by the Cooperative Education Research Team. There were seven groups of six participants reported to have a gender balance. Sessions were videotaped and audio taped, participants signed informed consent forms and received $20.00 as compensation for the 1.5 to 2.0 hour sessions. Sessions were led by two facilitators and data were analyzed by an independent research assistant. Participants were asked to provide a definition of a mentor, to identify characteristics and contexts in which mentoring occurred, to provide examples of previous mentors, and to discuss their most influential mentors. The authors cited several potential advantages to mentoring relationships including an enhancement to the pedagogical effectiveness of cooperative education and a "helping relationship," that moves beyond the scope of simply preparing new professionals (Van Gyn & Ricks).

Findings of the studies indicated a great deal of consensus among the students in their description of mentors. A recurrent theme in their investigation was that the mentees' definition of a "mentor" was influenced by the number and quality of the relationships they had experienced in different settings. Based on students' experiences, the concept of "mentor" would change in order to include new relationships and exclude others. Mentors were identified as "wise and experienced with regard to the needs of the protégé [mentee], accepting of alternate views, flexible in their behavior, patient and unbiased" (p. 88). Of utmost importance, the students indicated that the autonomy of the mentee was accepted and encouraged by the mentor. Students described effective

mentorships as “protégé [mentee]-centered” (Van Gyn & Ricks, 1997), and indicated that it was ultimately the student’s decision whether or not to assign the label of mentor to their supervisor or advisor. Additionally, students described mentoring situations as “effective” when the experience resulted in a personal discovery or direction in life not previously considered by the student (Van Gyn & Ricks). It was important to the students that mentors viewed them as whole persons rather than just pre-professional employees, that the mentoring relationship was centered on the interests of the student, and that the mentors acknowledged the uniqueness of each student. According to Van Gyn and Ricks (1997):

> It was made clear by the participants that the term ‘mentor’ was reserved for a relationship that they regarded as unique and that had a significant impact. In the discussion of the use of structured mentorships in education and the workplace, the majority of the participants saw this as a misuse of the term since they described a mentorship as developmental and requiring time and an interaction that culminates in a personal, mutually respectful relationship (p. 92).

Demographic Characteristics of Participants

Gender and Ethnicity

McCormick (1991) identified several key limitations within traditional mentoring programs that might limit opportunities for mentoring among minority and women faculty in higher education. Limitations included lack of access to information, fixed power structures, and an absence of visible minority and female role models. In addition to the limited availability of role models, specifically black role models in senior

positions, Kalbfleisch and Davies (1991) noted that perceived cross-cultural taboos may further reduce potential mentors for blacks in junior positions. Results from a log-linear analysis involving 26 members of a group of black systems analysts in a larger urban area suggested that race had a significant impact in mentoring relationships involving blacks as indicated by predicting patterns among participants. According to participants who identified themselves as having been mentored, black mentors had served as the predominate role model in these relationships. Black mentors also indicated a higher tendency to select same-race mentees over cross-race partnerships (Kalbfleisch & Davies, 1991). In a survey of more than 300 developmental relationships, Thomas (1990) found that cross-race relationships provided significantly less psychosocial support than same-race relationships.

Previous research regarding gender and mentoring has examined issues of advancement for women in organizations (Dreher & Ash, 1990; Morrison, White, & Van Velsor, 1987); career success and salaries (Johnson & Scandura, 1994); perceptions of fairness (Bauer, 1999); and job satisfaction and work alienation (Koberg, Boss, Chapel, & Ringer, 1997). Some investigators have found that men and women differ in their experiences with mentoring (Bauer, 1997), and have reported that women perceive themselves as receiving less overall mentoring than their male counterparts in male-dominated occupations (Goh, 1991; Ragins, 1989, Ragins & Cotton, 1991). Additional research has shown that mentoring may be particularly important for women entering male-dominated occupations (Dipboye, 1987; Ragins, 1989). In examining potential benefits of mentoring relationships among managerial and professional women, Burke and McKeen (1997) found that women received more mentor functions (career-related

and psychosocial support) from mentors with direct supervisory responsibilities, in longer relationships, and in organizations that supported developmental relationships.

In looking at the potential benefits of mentoring for female and male engineering students, Wallace and Haines (2004) reported that few students identified psychosocial benefits from being mentored, although female protégés [mentees] reported more if they had female mentors. Drawing from a pool of 1,069 Engineering students at a major institution in Canada, the authors found that male and females tended to benefit more from male mentors than female mentors with respect to the career development function of mentoring. This finding may be explained by previous research that shows that female mentors are generally less senior and in less powerful positions than their male counterparts and may be less able to provide their protégés [mentees] with the necessary resources and career information (Ragins, 1989; Wallace & Haines, 2004). Research also suggests that the under-representation of female managers in technical fields affects who may be available for mentoring.

According to Jacobi (1991), the literature is divided about the importance of matching students with mentors of the same gender or ethnicity. While many mentoring relationships tend to be cross-sex and/or cross-race pairings, literature in the fields of management and education highlights problems inherent in establishing and maintaining these types of relationships including difficulty in identifying potential mentors, issues of sustainability, and perceptions of fairness in traditional one-on-one dyads (Bauer, 1999; Jacobi, 1991). Additionally, Bauer (1999) reported that mentoring may be less accessible for women than men in organizations where mentoring is informal. This assumption is

based on self-interest theory that describes the tendency for individuals to surround themselves with people like themselves (Tsui & O'Reilly, 1989).

Length of Time in Mentoring Experiences

There is equivocal data reported in the literature about the duration of the mentoring relationship (Jacobi, 1991). Traditional mentoring relationships have been characterized as lasting between two and ten years (Levinson, Carrow, Klein, Levinson, & McKee, 1978), although Phillips-Jones (1982) suggested that a mentoring relationship may occur within a single encounter. According to Penner (2001), mentoring relationships may be time limited, lifelong or open-ended.

Summary

Over the past 30 years, the concept of mentoring has evolved within the fields of education, psychology, and management/organizational behavior. Despite this growth, mentor roles can still be categorized into the two primary domains of psychosocial and career-related functions of mentoring (Kram, 1983). The career-related function describes promotion and advancement of a junior colleague while the psychosocial function depicts support and encouragement throughout the mentoring process. As early as 1983, Kram identified four phases in the development of a mentoring relationship including: initiation, cultivation, separation, and redefinition. While there is equivocal data reported in the literature about the duration of the mentoring relationship, researchers have suggested that the length of time in a mentoring relationship may occur within a single encounter (Phillips-Jones, 1982) to as long as 10 years (Levinson, Carrow, Klein, Levinson, & McKee, 1978, Kram, 1983).

Previous research on mentoring, specifically mentoring in cooperative education, has focused on roles and characteristics of mentors and mentees as well as best practices for establishing programs (Gibson & Angel, 1993; Gibson & Angel, 1995; Labonty & Stull, 1993). More recently, the focus of research on mentoring in cooperative education has shifted to identifying levels of interaction as demonstrated by relationship patterns among supervisors and students (Ricks & Van Gyn, 1997). Additionally, research has shown that the variables of gender, ethnicity, and length of time in the mentoring relationship may influence the mentoring relationship (Bauer, 1997; Kalbfleisch & Davies, 1991; Penner, 2001; Thomas, 1990).

The overlap of mentoring and cooperative education has a broad base of support in the areas of experiential learning, social and cognitive development, and professional development theory. As suggested by Piaget (1967) and Vygotsky (1986), individuals who encounter challenges and overcome them with the assistance of a more experienced colleague may have a greater pool of resources and enhanced ability to anticipate and resolve problems in the future. Mentoring in cooperative education has the potential to provide this type of transformative learning experience. The research literature on identity, psychosocial, cognitive and human development theory is replete with support for intra- and interpersonal growth through engagement activities such as mentoring in cooperative education. Finally, adult learning theory highlights the differences between pedagogy (teaching children) and andragogy (teaching adults) and suggests that the latter may be more appropriate to bring about meaningful, transformative learning.

CHAPTER 3

METHODOLOGY

The purpose of this study was to examine students' perceptions of mentoring in a university cooperative education (co-op) program. Quantitative and qualitative methods were used in the data collection and analysis process. The results of this study may be used as a source of information for enhancing student-supervisor interactions in co-op and for increasing awareness of the role mentoring may play in shaping the co-op experience.

Researcher Positionality

As the primary investigator for this study, I acknowledge that my work in higher education supports the possibility of mentoring as an enhancement to the educational experiences of students. As the Assistant Director for Experiential Education in Career Services at the University of Alabama at Birmingham (UAB), I work with faculty, employers and students to identify opportunities that are designed to help students define their educational goals and prepare for their professional roles after graduation. Since the population for the study was similar to the students that I work with at UAB, I made every attempt to set aside my assumptions, feelings and preconceptions by "bracketing" my experiences throughout the research process. The intent of bracketing is to minimize researcher bias in data collection, analysis, and interpretation (Hatch, 2002). It is my purpose to contribute to the knowledge base with respect to mentoring in the field of cooperative education.

Mixed Methods Research

With the recent emergence of mixed methods research as a separate tradition of inquiry, it is important to identify key characteristics that distinguish it from purely quantitative or qualitative research. A consensus definition provided by Teddlie and Tashakkori (2003) describes mixed methods research as a process that "involves the collection of both quantitative and qualitative data in a single study, in which the data are collected concurrently or sequentially and involves the integration of the data at one or more stages in the process of research" (p. 34).

The mixed methods approach for this study was used to provide a substantive understanding of students' perceptions of mentoring in the cooperative education setting. The complexity of the research problem merited both a broad understanding of students' experiences captured through survey data as well as a closer examination of individual accounts through in-depth interviews. By calling on the strengths of both the quantitative and qualitative traditions of inquiry, the researcher intended to provide a high level of inference quality from the findings (Teddlie & Tashakkori, 2003).

Philosophical Assumptions

Before an investigation can begin to address a research question or phenomenon, the researcher must first identify his/her belief system to provide a framework for the study (Creswell, 2003; Hatch, 2002). There are six philosophical assumptions that provided a framework for this study: *ontology* (the nature of reality), *epistemology* (the relationship of the knower and the known), *axiology* (the role of values in the inquiry), *generalizations* (the role of time and context to make generalizations), *causal linkages* (the understanding of cause and effect as separate or intertwined), and

inductive/deductive logic (the directionality of reasoning from general to specific or vice versa) as defined by Tashakkori & Teddlie (1998).

The pragmatism paradigm guided this research in order to allow the researcher to use "what works" to enhance the readers' understanding of a complex system while enabling the researcher to call upon his belief system to examine participants' responses in greater detail (Tashakkori & Teddlie, 1998). The value of pragmatism and the foundation for the study was that the research problem took precedence over methodology. Because of this, pragmatism allowed the researcher to use both quantitative and qualitative data to better understand the research problem (Coll & Chapman, 2000; Creswell, 2003; Patton, 1990).

If viewed on a continuum, the researcher's worldview was reflective of the pragmatism paradigm in that his beliefs fell along the midline between positivism and constructivism. Based on the six philosophical assumptions, the researcher believed that there are multiple constructed realities (ontology) and that the knower and the known are inseparable (epistemology). The researcher acknowledged that values played a prominent role in the investigation and may have influenced the study on multiple levels (axiology). Consistent with the pragmatism paradigm, personal values guided the researcher to a topic of interest. The topic, in turn, directed the researcher to appropriate methodological tools to best answer the research question. From the researcher's perspective, the findings of this investigation helped him gain a deeper understanding of the topic in order to bring about positive change in accordance with his own value system (Tashakkori & Teddlie, 1998).

It is expected that the first quantitative phase of research could be replicated in other studies; however, limitations would exist regarding the generalizability of findings beyond a specific time or context based on the qualitative phase of inquiry. The findings may provide inferences that are transferable in some degree to other settings, populations, and times (Tashakkori & Teddlie, 1998). It was the researcher's belief that the potential benefits of the mixed methods design outweighed any potential limitations of the separate quantitative and qualitative phases of investigation.

Given the context of a value-bound system, as well as the researcher's belief in an external reality, the researcher looked for possible explanations to the research problem that resonated with his belief system rather than a "better" explanation of findings to address the issue of causal linkages (Tashakkori & Teddlie, 1998). Additionally, the study tapped into both the confirmatory (deductive) and exploratory (inductive) nature of research by using the quantitative phase of research to address the research problem and the qualitative phase to illuminate the results from the first phase of research. From this perspective, the findings answered two critical questions of inquiry: 1) What happened? and 2) Why did it happen? (Creswell, Goodchild, & Turner, 1996).

Mixed Methods Research Design

The mixed methods design for this study was *sequential explanatory* which is characterized by two distinct phases of data collection and analysis. For this investigation, the collection and analysis of the numeric data was completed in the quantitative phase of research. This was followed by the collection and analysis of interviews in the qualitative phase of research. The two phases were connected in an intermediate stage and the findings from the two distinct phases were described

separately and brought together in the interpretation stage of research (Ivankova, Creswell, & Stick, 2006). The sequential explanatory design has the advantages of being straightforward in nature and easy to implement because the steps fall into clear separate phases. (Creswell, Plano Clark, Gutmann, & Hanson, 2003).

Since the purpose of the study was to examine students' perceptions of mentoring in cooperative education in higher education, a sequential explanatory design was used. This design allowed the researcher to gain perspective from different types of data and seek clarification and elaboration from different methods (Creswell et al., 2003; Greene, Caracelli, & Graham, 1989; Morgan, 1998). The rationale for using mixed methods to study this research problem was to "attack the research problem with an arsenal of methods that have nonoverlapping weaknesses in addition to their complementary strengths" (Brewer & Hunter, 1989, p. 17). Van Gyn and colleagues (1997) suggested that the true value of the co-op experience cannot be measured solely by quantitative techniques.

The three elements of implementation, priority, and integration served to guide the overall design of this study. According to Creswell and colleagues (2003), "Implementation refers to the sequence the researcher uses to collect both quantitative and qualitative data" (p. 25). In this study, the implementation of phases was first, quantitative, and second, qualitative. In the quantitative phase, a non-probability sample of cooperative education students completed a web-based version of Noe's (1988) *Mentoring Functions Scales*. In the qualitative phase, interviews were conducted with a purposeful sample comprised of nine students who were selected from the sample used in the quantitative phase. The priority or emphasis of the study was the collection and

analysis of data from the web-based survey in order to develop a broader understanding of students' perceptions of mentoring in cooperative education. For this study, the integration of data occurred after both the quantitative and qualitative data had been collected and independently analyzed. In addition to the integration of findings, Ivankova and colleagues (2004) identified "connecting points" between the quantitative and qualitative phases of research. The data for this research was connected in an intermediate stage where the results from the data analysis of the quantitative data were used for two purposes: 1) to inform the selection of participants in the qualitative phase, and 2) to develop an interview protocol for the qualitative phase.

Visual Diagram

To illustrate the sequential explanatory mixed methods design, a visual diagram was developed (Appendix C). In the diagram, the quantitative phase is identified as the priority phase through the use of capitalized letters (QUAN); the qualitative phase is denoted in lowercase letters (qual). The collection and analysis of quantitative and qualitative data are shown as separate and sequential phases of research through a series of arrows. The "connecting points" are displayed through ovals in the diagram (Ivankova, Creswell, & Stick, 2006; Morse, 1991). The goal of the visual model was to enhance the readability of the study and to delineate the "complex and interrelated data collection and analysis procedures" (Creswell et al, 2003, p. 210).

Population and Study Sample

Rationale for Site Selection

The site for this study was the cooperative education program at a four-year public institution in the southeast. As the largest co-op program in the state, the site was selected based on its outstanding reputation, long-standing history, structure, and diverse student population.

Brief History of Co-op Program

While it was not exactly clear how long the Cooperative Education Program had been in place at this institution, internal records indicated that a small co-op program in Engineering existed prior to World War II. In a letter dated January 26, 1953, from the Chancellor to the Dean of Engineering, it was recommended that the Cooperative Education Program in Engineering be reopened. Since then, the Cooperative Education Program has increased in both size and scope. It has expanded from the School of Engineering to include programs and students in almost all of the schools. In 1984 the program was assigned to the Provost's Office, and it currently resides in the Division of Undergraduate Academic Programs under the auspices of the Provost (S. Matney, personal communication, May 17, 2006).

The Cooperative Education Program serves approximately 500 undergraduate students a year and is administered by four full-time professional staff members, two full-time administrative staff members, and two graduate assistants. Program administrators are actively involved in professional development through their memberships in the American Society for Engineering Education (ASEE) and Cooperative Education and Internship Association (CEIA).

Quantitative Phase I

Sample for Study

The quantitative phase was based on a targeted population of approximately 323 students (n = 323) participating in the cooperative education program at a four-year public institution in the southeast. The targeted population represented all students who participated in co-op in either summer or fall semesters 2005. Participating students were enrolled in the following academic disciplines: Agriculture and Life Sciences, Computer Science, Design, Education, Humanities and Social Sciences, Management, Natural Resources, Physical and Mathematical Sciences, and Textiles. Majors included the following Engineering disciplines: Aerospace, Civil, Chemical, Construction Engineering and Management, Electrical and Computer, Environmental, Industrial, Materials, Mechanical, and Nuclear. The overwhelming majority of students participating in co-op at this institution (93%) represented one of the engineering disciplines.

The gender composition for the total undergraduate co-op population (n = 498) was as follows: 418 males (84%) and 80 females (16%). The ethnic composition for the undergraduate co-op population was as follows: 18 African Americans (4%), 49 Asian Americans (10%), 413 Caucasians (83%), 14 Hispanic (3%), and 4 Other (<1%).

The gender composition for the targeted population (n = 323) was as follows: 284 males (87.93%) and 39 females (12.07%). The ethnic composition for the targeted population was as follows: 8 African Americans (2.48 %), 20 Asian Americans (6.19%), 282 Caucasians (87.31%), 10 Hispanic (3.10 %), and 3 Other (.93%).

The gender composition for the non-probability sample (n = 91) was as follows: 74 males (81%) and 17 females (19%). The ethnic composition for the non-probability

sample was as follows: 1 African American (1.1%), 3 Asian American (3.3%), 81 Caucasian (89%), 5 Hispanic (5.5%), and 1 Other (1.1%). There were no students in the study who self-identified as Pacific Islander.

Figure 1. Gender comparisons for total, targeted, and sample populations.

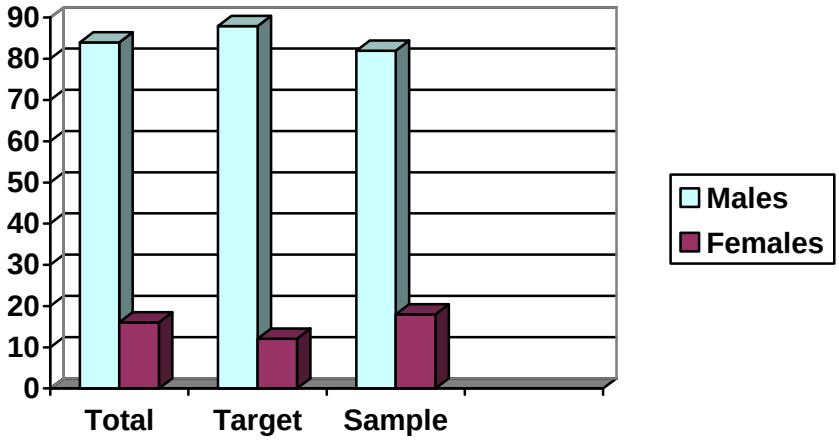
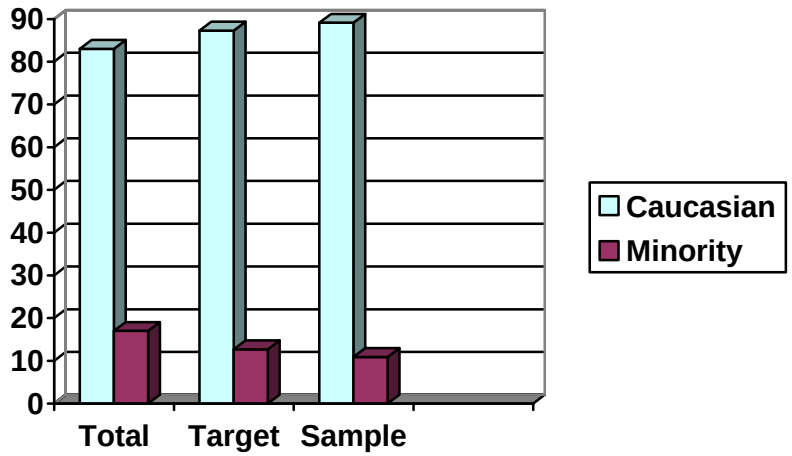


Figure 2. Ethnicity comparisons for total, targeted, and sample populations.



Participation in the web-based survey by female students in the sample (19%) was higher than the targeted population (12.07%) and slightly higher than the undergraduate co-op population for the institution (16%). Participation in the web-based survey for ethnic minority students (11%) was consistent with the targeted population (12.7%) but slightly lower than the undergraduate co-op population for the institution (17%).

Instrument

The study used a web-based version of Noe's (1988) *Mentoring Functions Scales*. Participants were asked to respond to a 21-item attitude scale based on their experiences with cooperative education. Students' perceptions of the extent of psychosocial and career-related mentoring were assessed based on the independent variables of gender, ethnicity, and length of time in the co-op program. The *Mentoring Functions Scale* was originally designed to measure mentoring support provided to educators based on the two

primary functions of mentoring, psychosocial and career-related support (Kram, 1983, Zey 1984). Questions on the original 21-items instrument were divided between these two functions (14 items for the psychosocial function and seven items for the career-related function).

Validity and Reliability

According to Tashakkori and Teddlie (1998), "internal validity has been conceptualized as the degree to which we can trust the conclusions/inferences of the researcher regarding the 'causal' relationship between variables/events" (p. 67). To address issues of internal validity and reliability, Cronbach's alpha was used to measure internal consistency among the questions on the instrument. The original instrument recorded alpha coefficients for the psychosocial functions scale as .92 and .89 for the career-related function. As might be expected, there was some intercorrelation between the two subscales (r = .49); however, this intercorrelation only accounted for 25% of the variance.

External validity refers to the generalizability of the findings. As reported by Rosnow and Rosenthal (1996), external validity can be defined as "the approximate validity by which we can infer that the. . . relationship can be generalized across alternate types of persons, settings, times, and measures" (pp. 158-159). The researcher intended to minimize threats to external validity by making participation in the web-based survey as convenient as possible for all individuals in the defined population and providing specific descriptive information regarding the setting, context, and requirements for participating in the research (Creswell, 2002).

Data Collection

Prior to participating in the study, potential participants received an electronic recruitment letter (Appendix D) that explained the purpose and details of the study. The recruitment letter provided instructions for completing the study, logon information, and a password to access the web-based survey (Appendix E). The UAB Career Services website was used to host the web-based survey instrument for the project. Measures to protect confidentiality as well as additional information regarding voluntary participation were provided for participants. Individuals were notified that their responses would be coded by an ID so that no names or other self-identifying characteristics would be used in the study. By accessing and completing the web-based survey, students granted explicit and informed consent for the study. Since entries were anonymous, all potential participants (respondents and non-respondents) received two follow-up electronic reminder letters. Data collection for the quantitative phase occurred in spring 2006 and lasted approximately four weeks.

Data Analysis

Responses to the survey instrument were downloaded into an Excel file, coded numerically and analyzed using SPSS 11.5 (Green & Salkind, 2003). Descriptive analysis of the data was conducted including frequencies, percentages, means, and ranges for each item on both scales. Responses were checked for entry error and demographic information was totaled. A factorial analysis of variance (ANOVA) procedure was used to examine the differences in the dependent variable scores for psychosocial and career-related functions as related to the independent variables of gender, ethnicity, and length of time in the co-op program. The factorial ANOVA design allowed the researcher to test

for any interaction effects between levels of independent variables. Additionally, factorial ANOVA enabled the researcher to test the significance of group differences based on levels of the independent variables (Mertler & Vanetta, 2005). Since no significant interaction was found in Null Hypothesis 1 and 2, a one-way ANOVA technique was used to test for main effects between the dependent and independent variables.

Qualitative Phase II

Sample for Study

In the qualitative phase, nine participants were selected to adequately represent the distribution of scores. Purposeful sampling was used to ensure that a cross section of the independent variables, gender, ethnicity, and length of time in the co-op program, was represented by the scores. Purposeful sampling was used to sample individuals that differed on specific characteristics (Creswell, 2002). The sample was selected based on the dependent variable scores for the psychosocial and career-related functions. Participants were identified from extreme ends of the distribution of scores for both the psychosocial and career-related functions. Descriptive statistics in the demographic characteristics of gender, ethnicity, and length of time in the co-op program were reviewed in order to identify a representative sample.

Instrument

Based on the responses from the quantitative phase, an interview protocol (Appendix F) was developed and individuals were selected for the qualitative phase. The two dimensions of mentoring measured by Noe's (1988) *Mentoring Functions Scales,* as well as the review of the literature, was used as a framework for developing the protocol.

The interview protocol was reviewed by a panel of experts to assure content validity and suggestions made by members of the panel were used to improve the quality of data to be collected using the interview protocol. A pilot test of the interview protocol was conducted prior to the actual data collection process for the study. Results from the pilot were reviewed to determine the quality of the data collected from participants using the protocol. A discussion of methods used to insure reliability as well as other verification techniques is outlined under the heading of legitimation procedures. The purpose of the interview protocol was to examine the central phenomenon of students' perceptions of mentoring in cooperative education. Students were asked to describe the frequency and quality of their interactions with their supervisors as well as the extent to which gender, ethnicity, and length of time in the co-op program had been factors in influencing these interactions.

Data Collection

Data were collected by the researcher during the spring semester 2006. The qualitative data consisted of individual interviews that were audio-recorded and transcribed verbatim. Individual interviews were scheduled within a four week time frame following the completion of the quantitative phase of research. Nine individuals were identified for the qualitative phase of research. Informed consent was secured through a series of statements that were read by the researcher prior to the phone interview and agreed to by the participants. As part of this consent, participants were once again assured of confidentiality within the research and informed of the nature of the qualitative phase of research, the foreseeable time commitment, and the potential benefits of participation (Appendix G). Participants were assigned pseudonyms to protect

their privacy and informed of their right to withdraw from the study at any time. Throughout the research process, participants were allowed to ask questions about the research and clarify their role within the project. By using member checking as a verification procedure, participants had full access and input to the processes of data collection and interpretation.

Data Analysis

According to Hatch (2002), "Data analysis is a systematic search for meaning. It is a way to process qualitative data so that what has been learned can be communicated to others" (p. 148). Responses from the qualitative phase of research were transcribed from audio recordings of each interview. The researcher followed an iterative process in which transcriptions were read several times to get a sense of the material. The goal throughout this process was to identify emerging patterns and themes in the data. Emergent codes and themes were managed using a Microsoft Word application called text-to-table.

Legitimation Procedures

In order for the qualitative research to be "useful, meaningful, and credible" (Creswell & Miller, 1995, p. 13), there were a number of techniques used to ensure the validity of the qualitative findings. Specifically, three distinct verification procedures were used: member checking; peer review/debriefing; and thick, rich description. Additionally, Patton (1980) indicated that "the trustworthiness of the data is tied directly to the trustworthiness of the evaluator who collects and analyzes the data" (p. 338). Therefore, a concerted effort was made by the researcher to ensure the credibility of the data throughout the processes of data collection and analysis.

Member Checking.

Member checking was used as a way to solicit feedback from the interviewees and to determine the accuracy of the report. According to Lincoln and Guba (1985), member checking should be considered "the most critical technique for establishing credibility" (p. 314). Once the themes had been developed, they were sent to participants for review. Participants were asked to respond to the relevance of the themes based on their perceptions of overall mentoring in the context of cooperative education. Participant feedback was incorporated into the final research product. As noted by Creswell and Miller (2000), "participants add credibility to the qualitative study by having a chance to react to both the data and the final narrative" (p. 4).

Peer Review and Debriefing.

Peer review/debriefing was used to provide an external check on the research process. The peer reviewer was selected by the researcher based on the peer reviewer's knowledge of the text-to-table protocol as well as his ability to provide an independent and unbiased assessment of the data. The peer reviewer was not associated with the cooperative education program under investigation. As suggested by Lincoln and Guba (1985), the role of the peer reviewer will be that of "devil's advocate." In addition to keeping a separate written account of peer debriefing sessions, this individual was encouraged to ask questions about methodology and interpretation in order for the researcher to actively reflect on the overall processes of data collection, analysis, and interpretation (Creswell & Miller, 1995).

Thick, Rich Description.

Detailed and specific accounts of individuals' experiences with mentoring in cooperative education were captured in the qualitative phase of research. By providing as much detail as possible, the qualitative data should make the experience come alive for the readers and provide possible explanations of the results from the first quantitative phase of research. The goal of rich description is create verisimilitude or a sense that the reader has experienced or could experience the events as described in the report (Creswell & Miller, 2000). As it relates to a verification procedure, rich, thick description was used to help the readers generalize or transfer the interpretation to other contexts.

Legitimation for Mixed Methods

In addition to verification strategies used to address issues of validity in the quantitative phase and trustworthiness in the qualitative phase of research, Onwuebuzie and Johnson (2004) suggested that strategies for *legitimation* be identified to ensure inference quality in the mixed methods design. For this study, peer debriefing and member checking were used to reconcile the emic and etic viewpoints (insider and outsider perspectives, respectively). As described by Onwuebuzie and Johnson (2004), quantitative research often seeks the objective outsider's view while qualitative research often seeks the insider's view. Mixed methods research "seeks to balance fully these two viewpoints" (p. 18). Within this specific mixed methods design, the insider-outsider legitimation process was especially critical at the connecting points in the intermediate and interpretation stages of research.

Additionally, Onwuebuzie and Johnson (2004) identified *weakness-minimization legitimation* as a fundamental principle of mixed methods research. Weakness-minimization legitimation refers to the ability of one research method to compensate for the weakness of another research methods. The authors suggested that the extent to which the methods complement one without overlapping weaknesses may lead to high quality inferences.

Ethical Considerations

Prior to conducting any research, the study was submitted to the Institutional Review Board (IRB) of the University of Alabama at Birmingham (UAB) for review (Appendix H). Once the proposal had been approved, a formal letter of intent was sent to the Director of the Cooperative Education Program at the selected southeastern university as a follow-up to previous conversations regarding the investigation. This letter was accompanied by a copy of the IRB approval as submitted by the researcher. Confidentiality was assured and the storage of data was secured in a locked metal cabinet in the researcher's office. All data was destroyed within one year of the conclusion of the study. Separate IRB applications were made for the pilot study at UAB and the actual study at the selected southeastern university. Research followed the three guiding principles of the IRB, "respect for persons (their consent, their right to privacy, and their anonymity), beneficence (weighing the benefits of research versus the risks to individuals), and justice (equity for participation in a study)" (Creswell, 2002).

Pilot Study

Rationale

Both the quantitative and qualitative instruments were piloted in early spring 2006. The purpose of the pilot was to test the processes for the web-based survey and interview protocol. Specific areas of interest included accessibility to the web-based survey, validity of the test questions, response rate for individuals electing to participate in follow-up interviews, and practice with the interview protocol. For each instrument piloted, the sample, data collection procedures, and revisions are reported in this section. Additionally, revisions to the web-based process at the institution in which the study was conducted are reported in this section.

Pilot of Web-Based Survey

The pilot of the web-based survey was conducted with a non-probability sample of students in cooperative education at the University of Alabama at Birmingham (UAB). Individual e-mails were sent to 56 students who were “actively involved” with the co-op program at UAB. Students were determined to be “actively involved” based on their completion of at least one academic semester in a co-op placement. These students had not yet graduated prior to receiving the survey. Students were not required to be working in their placement at the time they received the survey, but they had to be enrolled at the institution.

Of the 56 original e-mails, 46 were successful with 10 returned as undeliverable. Twenty-two students responded to the survey for a response rate of 48% based on successful e-mails. Regarding the demographic characteristics of the 22 students in the pilot study, 19 were male (86%) and 3 were female (14%). The ethnic breakdown of the

student was 3 African Americans (13.6%), 16 Caucasian (72.7%), 1 Hispanic (4.5%), 1 Pacific Islander (4.5%), and 1 Other (4.5%). The median age for participants was 23. Fifteen of the 22 students (68%) volunteered to provide additional contact information to be considered for the interview component of the investigation. When asked to describe the number of supervisors that students had worked with in their co-op experiences, the mode was between two and three supervisors and the average number of semesters that students had worked with their current, direct supervisor was 2.5 semesters.

The process of piloting the web-based survey resulted in three changes that corrected for coding errors in the results. In the first section, students were asked to respond to 21 questions by selecting from Likert-scale options (5 to a very large extent – 1 to a very slight extent). In addition to these responses, students could select “DK” to indicate that they “Don’t Know” or there was not enough information to adequately answer the question. In tallying responses for the pilot instrument, answers of “DK” were assigned a non-numerical value so that they would not influence the total averages of scores. Averages for questions 1 – 21 were only based on responses with a numerical value.

In one question, there were response options with overlapping ranges. Students were asked to estimate the number of hours they typically spent interacting with their co-op supervisor. The first two responses (0-1 hours, 1-2 hours) could not be coded as separate options. These ranges were separated (0-1 hours, 2-3 hours) before the full study was conducted. Finally, participants were asked to identify the number of times they interacted with their co-op supervisor over a two-month period. The first four response options presented ranges (0 – 6 times) over a two month period, while the last two

response options presented number of times per week. To rectify this situation, the final survey asked students to base their responses on interactions with their supervisors in a typical week and response options ranged from 0 – 9 or more.

Pilot of Interview Protocol

At the conclusion of the pilot for the web-based survey, averages were calculated for questions based on the psychosocial and career-related functions of mentoring. A purposeful sample of participants for the interview component of the pilot study was based on distributions of high and low scores, gender and ethnic composition of participants, and length of time in the co-op program. Four individuals were selected to participate in follow-up phone interviews for the pilot. The sample included one African American female, one African American male, and two Caucasian males. The demographic characteristics and scores for the four students can be seen in Table 3.

Table 3
Descriptive Statistics for Pilot Sample

	Gender	Ethnicity	Age	Psychosocial Score	Career-Related Score	Terms in Co-op
Participant 1	F	African American	21	1.14	1.13	3
Participant 2	M	African American	33	4.29	4.18	1
Participant 3	M	Caucasian	23	4.71	4.00	6
Participant 4	M	Caucasian	19	4.43	4.55	2

Students were contacted via e-mail to schedule individual telephone interviews. Interviews were recorded and transcribed verbatim. Based on the first interview, the following three questions were added to the interview protocol to be used in the full study:

1. The primary concept of this study is to look at supervisors who provide a mentoring role – both career support and friendship and encouragement. To what extent would you say your supervisor fulfills these mentoring roles?
2. Based on your experiences, what might account for the scores (high and low) on the web-based survey?
3. Are there other supporting individuals, other than your supervisor, who you would say have provided a mentoring role?

Revisions to the Web-Based Process

In order to be in compliance with the IRB regulations of the institution in which the full study was conducted, changes were made to the web-based survey in the areas of consent, confidentiality, and potential risks to participants. The first change consisted of configuring the web-based survey so that informed consent would be mandatory. This was done by removing the "optional" button for information regarding voluntary participation from the original front page of the pilot survey. By clicking on "proceed," students were sent directly to the informed consent page for the full study. The purpose statement on the front page of the survey was updated to restate the purpose as conveyed to participants in the recruitment letter and subsequent reminder e-mails correspondence.

Reviewer comments from the institution's IRB office prompted the addition of an expanded "Risks" section in the informed consent portion of the web-based survey. Despite precautions to protect the confidentiality of the responses, the IRB reviewer indicated that responses could pose a potential risk since co-op experiences could be described in both positive and negative terms. Since survey and interview data were

linked for comparison purposes, this potential risk to confidentiality was also identified for students.

Summary

In this study, a mixed methods research design was used to capitalize on the strengths of both quantitative and qualitative data in order to answer the research questions. The study was guided by the pragmatism paradigm based on the researcher's worldview regarding ontology, epistemology, axiology, generalizations, causal linkages, and inductive/deductive logic. The sequential explanatory design for the study was evident by two distinct phases of data collection and analysis. The quantitative phase was the priority for the study followed by the qualitative phase. The data was brought together in an intermediate stage and integrated once both sets of data had been collected and independently analyzed.

The sample for the quantitative phase was drawn from a targeted population of approximately 320 students participating in a cooperative education program at a four-year public institution in the southeast. A web-based version of Noe's (1988) *Mentoring Functions Scales* was used for the quantitative phase or research. Measures were taken to ensure the validity and reliability of the instrument. A factorial ANOVA was used to test for interaction effects between levels of the independent variables gender, ethnicity, and length of time in program. In interpreting the survey data, the interaction of levels of independent variables and dependent variables as well as differences between the independent variables were examined first using factorial ANOVA. Main effects of the independent variables were tested using one-way ANOVA.

For the qualitative phase, a purposeful sample of nine participants was drawn from extreme ends of the distribution of scores for the dependent variables. The range and frequencies of the independent variables were considered to provide a representative voice within the sample. Data collection for the qualitative phase of research was comprised of individual telephone interviews. Interviews were audio-recorded and transcribed verbatim. Data was coded by the researcher and aggregated into larger themes. The legitimation procedures of member checking, peer review/debriefing, and thick, rich description were used to ensure the rigor of the qualitative research. Additional verification techniques were used to strengthen the inference quality of the mixed methods design. The research was conducted under the guidance and approval of the Institutional Review Board (IRB) of the University of Alabama at Birmingham and the host institution for the study.

CHAPTER 4

ANALYSIS OF THE DATA

Introduction

The purpose of this study was to examine the perceived extent of psychosocial and career-related functions of mentoring and to determine if there were significant differences in the data when examined by gender, ethnicity, and length of time in the cooperative education program. The goal of this chapter is to present the findings from the quantitative and qualitative phases of research. Information has been provided regarding the demographic characteristics of the sample and the return rate for the web-based survey. The results from the quantitative analysis have been examined based on the two null hypotheses for the study. Follow-up interviews provide narrative descriptions to help illuminate the findings from the web-based survey. The six themes that were explored in the qualitative interviews included the following: psychosocial support, career-related support, time as a factor, differing experiences by gender and ethnicity, explanation of scores, and others as mentors.

Population and Sample

The study was conducted with a targeted population of students in cooperative education at a four-year, public institution of higher education in the southeast. Individual e-mails were sent to 323 students who were “actively involved” with the co-op program. Students were determined to be “actively involved” based on their completion of at least one academic semester in a co-op placement.

The criterion for inclusion in the non-probability sample was students who had not yet graduated prior to receiving the survey. Students were not required to be working in their co-op placement at the time they received the survey, but they had to be enrolled at the institution. All of the 323 original e-mails appeared to be delivered successfully to their intended recipients. While the majority of users, 300 (93%), used school-based accounts the remaining students, 23 (7%), received e-mail through commercial providers. School and commercial providers were differentiated by address domains ("edu" vs. "com" or "net" respectively). One of the students set his/her spam-blocking mechanism on a commercial provider so low that additional information was required from the sender in order for the recipient to accept the message. Since the spam-blocker did not re-appear in subsequent reminders, it was assumed that the messages were successfully received by the intended recipient.

Ninety-two students responded to the survey, and 91 of the surveys contained complete information required for data analysis yielding a response rate of 28%. Given the high rate of research requests from college students and corresponding low rate of return, a response rate of 28% is above the minimum sample size for selected small populations at the 95% level of confidence (Rea & Parker, 1992).

Sample Demographic Data

The gender composition for the non-probability sample (n = 91) was as follows: 74 males (81%) and 17 females (19%). The ethnic composition for the non-probability sample was as follows: 1 African American (1.1%), 3 Asian American (3.3%), 81 Caucasian (89%), 5 Hispanic (5.5%), and 1 Other (1.1%). There were no students in the study who self-identified as Pacific Islander.

The average age for participants in the study was 22, and the average number of terms that students worked in co-op was 2.45 semesters. When asked to describe the number of supervisors that students had worked with in their co-op experiences, the most frequent responses were one (47%) and two to three (43%). The majority of students indicated that they had worked with their current, direct supervisor either one semester (40%) or between two and three semesters (51%). Thirty-nine of the 91 students (43%) volunteered to provide additional contact information so that they could be considered for participation in the qualitative phase of research. Nine students were purposefully selected from this pool of 39 students for follow-up interviews.

Due to the low frequencies of students who identified themselves as African American, Asian American, Hispanic, Pacific Islander and Other, a decision was made to collapse the category of ethnicity to membership in a Minority or Caucasian subset. In addition, low frequencies were also observed on the far ends of the distribution for the numbers of semesters that students were enrolled in a co-op program. Participants were grouped into binary categories for the variable of length of time in the co-op program due to the 33% of students who endorsed these two categories.

Quantitative Analysis

Reliability Coefficients

Reliability analyses were performed on each of the subscales in the study using Chronbach's alpha. Alpha coefficient ranges in value from zero to one and is used to ensure that the two halves of the test measure the content in a reliable and consistent way. The higher the score is the more reliable the scale. Nunnally (1978) has indicated 0.7 to be an acceptable reliability coefficient. The Chronbach alpha was .91 for the psychosocial

mentoring function and .90 for the career-related mentoring function. Clearly, these subscales had a very high level of internal consistency, as indicated in Table 4.

TABLE 4
Reliability Coefficients

Subcales	Cases (n)	Items	Alpha
Psychosocial Mentoring	91	14	.91
Career-Related Mentoring	91	7	.90

Research Questions

In this study, two research questions were developed to direct the investigation. The research questions were based on students' perceptions of mentoring in co-op. Statistical analyses were used to examine the extent of psychosocial and career-related mentoring perceived by co-op students. A Likert scale was used to determine the extent of mentoring (5 = To a very large extent, 4 = To a large extent, 3 = To some extent, 2 = To a small extent, 1 = To a very slight extent, DK = Don't know). The scale mean score for both mentoring functions were examined in response to the research questions.

Findings from Research Question One.

The first research question measured the extent of psychosocial mentoring in cooperative education. Survey respondents were asked to complete the first 14 questions on the *Mentoring Functions Scale*, which examined psychosocial mentoring. Descriptive statistics were computed to reflect participants' perceptions on this scale when the scores possible ranged from 14 to 70. The mean score for psychosocial mentoring functions was 43.42 (SD = 13.58) indicating that students perceived psychosocial mentoring to *some extent*, as seen in Table 5.

TABLE 5
Descriptive Statistics for Psychosocial Variable

Gender	Semesters in Co-op	Ethnicity	n	M	SD
Female	1 - 2	Minority	1	43.00	
		Caucasian	6	46.50	10.25
		Total	7	46.00	9.45
	3 - 4	Minority	2	48.50	7.78
		Caucasian	8	52.88	12.10
		Total	10	52.00	11.10
	Total	Minority	3	46.67	6.35
		Caucasian	14	50.14	11.37
		Total	17	49.53	10.58
Male	1 – 2	Minority	4	42.80	12.12
		Caucasian	36	44.44	13.06
		Total	40	44.28	12.83
	3 – 4	Minority	3	32.33	14.22
		Total	34	39.35	14.73
	Total	Minority	7	38.29	13.11
		Caucasian	67	42.40	13.98
		Total	74	42.01	13.86
Total	1 – 2	Minority	5	42.80	10.50
		Caucasian	42	44.73	12.61
		Total	47	44.53	12.32
	3 – 4	Minority	5	38.80	13.95
		Caucasian	39	42.67	15.10
		Total	44	42.23	14.87
	Total	Minority	10	40.80	11.83
		Caucasian	81	43.74	13.81
		Total	91	43.42	13.58

Findings from Research Question Two.

The second research question measured the extent of career-related mentoring in cooperative education. Survey respondents were asked to complete seven questions on the *Mentoring Functions Scale*, which examined career-related mentoring. Descriptive statistics were computed to reflect participants' perceptions on this scale when the scores possible ranged from 7 to 49. The mean score for career-related mentoring functions was

20.36 (SD = 8.39) indicating that students perceived career-related mentoring to a *lesser extent*, as seen in Table 6.

TABLE 6
Descriptive Statistics for Career-Related Variable

Gender	Semesters in Co-op	Ethnicity	n	M	SD
Female	1 - 2	Minority	1	17.00	
		Caucasian	6	25.00	7.10
		Total	7	23.86	7.15
	3 - 4	Minority	2	21.00	7.10
		Caucasian	8	23.80	7.29
		Total	10	23.20	6.94
	Total	Minority	3	19.67	5.51
		Caucasian	14	24.29	7.00
		Total	17	23.47	6.81
Male	1 – 2	Minority	4	23.75	3.77
		Caucasian	36	20.28	8.29
		Total	40	20.63	8.00
	3 – 4	Minority	3	11.67	4.04
		Caucasian	31	19.16	9.35
		Total	34	18.50	9.23
	Total	Minority	7	18.57	7.37
		Caucasian	67	19.76	8.75
		Total	74	19.65	8.59
Total	1 – 2	Minority	5	22.40	4.45
		Caucasian	42	20.95	8.23
		Total	47	21.11	7.89
	3 – 4	Minority	5	15.40	6.84
		Caucasian	39	20.10	9.07
		Total	44	19.57	8.91
	Total	Minority	10	18.90	6.57
		Caucasian	81	20.54	8.60
		Total	91	20.36	8.39

Findings from Null Hypotheses

Two null hypotheses were used to examine the interaction and main effects of the independent variables of gender, ethnicity, and length of time in the co-op program as related to the dependent variables of psychosocial and career-related functions of mentoring. Factorial ANOVA and one-way ANOVA techniques were used to test each of the null hypotheses and to determine significant differences and relationships. The information in this section outlines the statistical procedures applied and the results obtained.

Rationale and Description of Factorial ANOVA

A factorial ANOVA design was chosen for this study in order to test the significance of group differences based on the levels of the three independent variables and to test for any interaction effects between the levels of the independent variables (Mertler & Vannatta, 2005). The design allowed the researcher to first test for the significance of any interaction effects and then to proceed to an evaluation of the main effects for the independent variables. The validity of results of a factorial ANOVA is dependent upon the following three assumptions:

1. The observations within each sample must be randomly sampled and must be independent from one another.
2. The distributions of scores on the dependent variable must be normal in the populations from which the data were sampled.
3. The distributions of scores on the dependent variable must have equal variances.

According to Mertler and Vannatta, “the violation of the assumption of homogeneity of variance is more crucial than a violation of the other assumptions” (p. 75). For this study, Levene’s test was used to sample variances to determine if there was any difference among population variances. The scores reported for the psychosocial and career-related functions were .366 and .079, respectively. Since these scores were not significant at the .05 level, there was no violation of the assumption of homogeneity. For this factorial ANOVA, all three assumptions were met for the null hypotheses described below.

Null Hypothesis One

Null Hypothesis One stated the following: There is no significant interaction between the variables of gender, ethnicity, and length of time in the cooperative education program with regard to the perceived psychosocial function as reported by cooperative education students using the *Mentoring Functions Scales.*

To test Null Hypothesis One, a factorial analysis of variance (ANOVA) technique was applied to compare the means of psychosocial mentoring functions by gender, ethnicity, and length of time in the co-op program. There was insufficient evidence based on the interaction of the variables to reject Null Hypothesis One, ($F(1, 83)=.060$, $p=.808$, ES=.001), as reported in Table 7. Since there was no significant interaction between the variables of gender, ethnicity, and length of time in the co-op program, the main effect of each variable was examined separately.

Table 7
Factorial ANOVA for Psychosocial Variable

Source	SS	df	MS	F	p	ES
Between Treatments	1587.98	7	226.86	1.254	.283	.096
Gender	402.72	1	402.72	2.226	.139	.026
Semesters	3.58	1	3.58	.020	.888	.000
Ethnicity	122.46	1	122.46	.677	.413	.008
Gender x Semesters	292.85	1	292.85	1.619	.207	.019
Gender x Ethnicity	.947	1	.947	.005	.943	.000
Semesters x Ethnicity	19.44	1	19.44	.107	.744	.001
Gender x Semesters x Ethnicity	10.81	1	10.81	.060	.808	.001
Within Treatments	15016.15	83	180.92			
Total	188147.00	91				

Psychosocial Function and Gender

A one-way analysis of variance (ANOVA) technique was employed to compare mean score differences between the independent variables of gender, ethnicity, and length of time in the co-op program and the dependent variable of psychosocial mentoring functions. The psychosocial function was reported on a scale in which higher mean scores represented a greater association to the independent variable of gender. For females, the mean score for the psychosocial function was 49.53 (SD = 10.58). For males, the mean score was 42.01 (SD = 13.86). ANOVA results, presented in Table 8, indicated that the mean score differences were statistically significant at the .05 level (F (1, 89) = 4.392) for the variables of gender and psychosocial function.

Table 8
Findings from One-Way ANOVA for Gender and Psychosocial Score

	df	SS	MS	F	p
Between Groups	1	780.91	780.91	4.392	.039
Within Groups	89	15823.22	177.79		
Total	90	16604.13			

Psychosocial Function and Ethnicity

The psychosocial function was reported on a scale in which higher mean scores represented a greater association to the independent variable of ethnicity. For minority students, the mean score for the psychosocial function was 40.80 (SD = 11.83). For Caucasian students, the mean score was 43.74 (SD = 13.81), indicating a slightly higher average. ANOVA results, presented in Table 9, indicated that mean score differences were not statistically significant at the .05 level (F (1, 89) = .415) for the variables of ethnicity and psychosocial function.

Table 9
Findings from One-Way ANOVA for Ethnicity and Psychosocial Score

	df	SS	MS	F	p
Between Groups	1	77.98	76.98	.415	.521
Within Groups	89	16527.16	185.70		
Total	90	16604.13			

Psychosocial Function and Semesters in Co-op

The psychosocial function was reported on a scale in which higher mean scores represented a greater association to the independent variable of length of time. For students who had participated for one to two semesters, the mean score for the psychosocial function was 44.53 (SD = 12.32). For students who had participated for

three to four semesters, the mean score was 42.23 (SD = 14.87), noting a slightly decreased level of importance of the factor. ANOVA results, presented in Table 10, indicated that the mean score differences were not statistically significant at the .05 level (F (1, 89) = .652) for the variables of length of time in co-op and psychosocial function.

Table 10
Findings from One-Way ANOVA for Semesters in Co-op and Psychosocial Score

	df	SS	MS	F	p
Between Groups	1	120.70	120.70	.652	.422
Within Groups	89	16483.43	185.21		
Total	90	16604.13			

Null Hypothesis Two

Null Hypothesis Two stated the following: There is no significant interaction between the variables of gender, ethnicity, and length of time in the cooperative education program with regard to the perceived career-related function as reported by cooperative education students using the *Mentoring Functions Scales.*

To test Null Hypothesis Two, a factorial analysis of variance (ANOVA) technique was applied to compare the means of career-related mentoring functions by gender, ethnicity, and length of time in the co-op program. There was insufficient evidence based on the interaction of the variables to reject Null Hypothesis Two, (F(1, 83)=1.551, p=.216, ES=.018), as reported in Table 11. Since there was no significant interaction between the variables of gender, ethnicity, and length of time in the co-op program, the main effect of each variable was examined separately.

Table 11
Factorial ANOVA for Career Variable

Source	SS	df	MS	F	p	ES
Between Treatments	550.70	7	78.67	1.130	.352	.087
Gender	58.10	1	58.10	.835	.364	.010
Semesters	44.85	1	44.85	.644	.425	.008
Ethnicity	89.62	1	89.62	1.287	.260	.015
Gender x Semesters	104.47	1	104.47	1.501	.224	.018
Gender x Ethnicity	18.59	1	18.59	.267	.607	.003
Semesters x Ethnicity	13.42	1	13.42	.193	.662	.002
Gender x Semesters x Ethnicity	108.00	1	108.00	1.551	.216	.018
Within Treatments	5778.33	83	69.62			
Total	44061.00	91				

Career-Related Function and Gender

A one-way analysis of variance (ANOVA) technique was employed to compare mean score differences between the independent variables of gender, ethnicity, and length of time in the co-op program and the dependent variable of career-related mentoring functions. The career-related function was reported on a scale in which higher mean scores represented a greater association to the independent variable of gender. For females, the mean score for the career-related function was 23.47 (SD = 6.81). For males, the mean score was 19.65 (SD = 8.59). Although females obtained slightly higher scores, ANOVA results, presented in Table 12, indicated that the mean score differences were not statistically significant at the .05 level (F (1, 89) = 2.933), for the variables of gender and the career-related function of mentoring.

Table 12
Findings from One-Way ANOVA for Gender and Career-Related Score

	df	SS	MS	F	p
Between Groups	1	201.93	201.93	2.933	.090
Within Groups	89	6127.10	68.84		
Total	90	6329.03			

Career-Related Function and Ethnicity

The career-related function was reported on a scale in which higher mean scores represented a greater association to the independent variable of ethnicity. For minority students, the mean score for the career-related function was 18.90 (SD = 6.57). For Caucasian students, the mean score was 20.54 (SD = 8.60) indicating a slightly higher average. ANOVA results, presented in Table 13, indicated that the mean score differences were not statistically significant at the .05 level (F (1, 89) = .339) for the variables of ethnicity and career-related function.

Table 13
Findings from One-Way ANOVA for Ethnicity and Career-Related Score

	df	SS	MS	F	p
Between Groups	1	24.03	24.03	.339	.562
Within Groups	89	6305.00	70.84		
Total	90	6329.03			

Career-Related Function and Semesters in Co-op

The career-related function was reported on a scale in which higher mean scores represented a greater association to the independent variable of length of time. For students who had participated for one to two semesters, the mean score for the career-

related function was 21.11 (SD = 7.89). For students who had participated for three to four semesters, the mean score was 19.57 (SD = 8.91), noting a slightly decreased level of importance of the factor. ANOVA results, presented in Table 14, indicated that the mean score differences were not statistically significant at the .05 level [*F* (1, 89) = .763] the variables of length of time in co-op and career-related function.

Table 14
Findings from One-Way ANOVA for Semesters in Co-op and Career-Related Score

	df	SS	MS	F	p
Between Groups	1	53.77	53.77	.763	.385
Within Groups	89	6275.26	70.51		
Total	90	6329.03			

Qualitative Analysis

A purposeful sample of participants for the interview component of the study was based on distributions of high and low scores on the variables of psychosocial and career-related functions of mentoring, gender and ethnic composition of participants, and length of time in the co-op program. Nine individuals were selected to participate in follow-up phone interviews for the study. Pseudonyms and case numbers were assigned to each participant. Descriptive statistics can be seen in Table 15. Students were contacted via e-mail to schedule individual telephone interviews. Interviews were recorded and transcribed verbatim. After the interviews were transcribed, the researcher checked for accuracy by listening to the audio recordings and comparing them with the written text. Participants were compensated with a $10.00 gift card for movie rentals at the completion of the interview.

Table 15
Descriptive Statistics for Interview Sample

	Gender	Ethnicity	Age	Psychosocial Score	Career-Related Score	Terms in Co-op
Participant 5	F	Caucasian	22	4.28	3.58	4
Participant 6	M	Caucasian	23	1.71	1.50	3
Participant 7	F	Caucasian	20	2.42	3.33	2
Participant 8	F	Caucasian	21	3.42	2.92	3
Participant 9	M	Caucasian	23	2.00	1.53	5
Participant 10	M	Caucasian	21	4.28	4.28	4
Participant 11	F	Hispanic	22	4.14	3.64	4
Participant 12	M	Caucasian	20	4.71	5.00	2
Participant 13	F	Caucasian	22	4.57	4.14	3

Transcripts were reviewed on a line-by-line basis and an open coding system was used to hand record key ideas and concepts. In reviewing the transcripts, the researcher attempted to code the data using the participants' own words, a technique referred to as "in vivo coding" (Creswell, 2002). Emergent codes and themes were managed using a Microsoft Word application, text-to-table. The sample included four Caucasian males, four Caucasian females, and one Hispanic female. Narrative descriptions below provide additional information about each of the interviewees.

Description of Purposeful Sample

Abbie (5) was a 22-year-old student majoring in Industrial Engineering. She worked in the logistics department of a major distribution company and her primary responsibilities included installing and teaching new software for mail and package tracking. Abbie had participated in cooperative education for four rotations and indicated that she had worked with two to three supervisors on different projects. Her primary supervisor, however, remained the same throughout her co-op experience. From her web-

based survey, Abbie noted that she typically interacted with her supervisor five to six times per week and that the total number of hours they spent per week was approximately four to five hours. Abbie was a Caucasian female.

Brian (6) was a 23-year-old student majoring in Industrial Engineering. He worked in a large corporation which was responsible for document reproduction. Brian described his co-op placement as a supporting role in which he assisted his supervisor in operating five copy centers and managing a fleet of copiers. His responsibilities involved a high level of administrative tasks including cost analysis for new equipment and budgeting. Brian had participated in cooperative education for three rotations and indicated that he had only worked with one supervisor throughout his tenure with the company. From his web-based survey, Brian noted that he typically interacted with his supervisor nine or more times per week and that the total number of hours they spent per week was approximately two to three hours. Brian was a Caucasian male.

Anna (7) was a 20-year-old student majoring in Chemical Engineering. She worked in a process engineering department and described her responsibilities as fixing problems, gathering data, and doing historical research on similar problems from the past to improve processes in the future. Anna had participated in cooperative education for two rotations and indicated that she had only worked with one supervisor in her co-op placement. From her web-based survey, Anna noted that she typically interacted with her supervisor three to four times per week and that the total number of hours they spent per week interacting was approximately two to three hours. Anna was a Caucasian female.

Judy (8) was a 21-year-old student majoring in Mechanical Engineering. She worked in a manufacturing facility and her primary responsibilities included ensuring

compliance with the environmental health and safety regulations at the facility. She spent most of her time doing procedural reviews and safety improvement projects. Judy had participated in cooperative education for three rotations and had worked with two or three supervisors on different projects. Her primary supervisor, however, stayed the same throughout her co-op experience. From her web-based survey, Judy noted that she typically interacted with her supervisor seven to eight times per week and that the total number of hours they spent per week interacting was eight or more hours. Judy was a Caucasian female.

Jason (9) was a 23-year-old student with a double major in Electrical and Computer Engineering. Jason completed two co-op placements for a total of five rotations. His primary responsibility for the second of his two placements was to work with the IT security group for a government agency. He moved from IT security to programming and systems operations to support the existing infrastructure of the organization. Jason indicated that he had worked with two or three different supervisors through his co-op experiences. From his web-based survey, he noted that he did not meet with his supervisor on a weekly basis and that when they did meet it was for less than an hour. Jason was a Caucasian male.

Tim (10) was a 21-year-old student majoring in Mechanical Engineering. He worked in a test analysis group for his company, and his primary responsibilities included software analysis and lab testing. Tim had participated in cooperative education for four rotations and had worked with four supervisors in the course of his co-op placement. He had been with his current supervisor for one rotation. From his web-based survey, Tim noted that he typically interacted with his supervisor three to four times per week and that

the total number of hours they spent per week interacting was eight hours or more. Tim was a Caucasian male.

Aisha (11) was a 22-year old student majoring in Mechanical Engineering. Her primary responsibility involved converting control drawings from the engineers to graphics for the customers. Additionally, she described work in which she created front-end manuals to capture product information. Aisha had participated in cooperative education for four rotations and had worked with two to three different supervisors on different projects. Her primary supervisor, however, remained the same throughout her co-op experience. From her web-based survey, Aisha noted that she typically interacted with her supervisor three to four times per week and that the total number of hours they spent per week interacting was four to five hours. Aisha was a Hispanic female.

Chris (12) was a 20-year-old student majoring in Construction Engineering and Management. He identified his co-op position as a Quality Assurance Representative and described his role as a project manager between the government and construction contractors. The majority of his work involved pay estimates and contract specifications. Chris had participated in cooperative education for two rotations and had worked for two supervisors in his current placement. He had been with his current supervisor for the second of the two rotations. From his web-based survey, Chris noted that he typically interacted with his supervisor three to four times a week and that the total number of hours they spent interacting was four to five hours. Chris was a Caucasian male.

Courtney (13) was a 22-year-old student majoring in Civil Engineering. She worked for a utility distribution company primarily in the steam and hot water systems. Courtney identified her primary responsibilities as meeting with contractors, hiring

surveyors, and completing all computer-aided design (CAD) work for the department. Courtney had participated in cooperative education for three rotations and had worked with two supervisors in her co-op placement. From her web-based survey, Courtney noted that she typically interacted with her supervisor seven or eight times per week and that the total number of hours they spent interacting was four to five hours. Courtney was a Caucasian female.

Since the original intent of the qualitative interviews was to illuminate the findings of the web-based survey, the interview protocol was tightly structured and therefore the corresponding themes were reflective of the questions in the interviews. Responses centered around the two dependent variables of psychosocial and career-related mentoring as well as the three independent variables of gender, ethnicity, and length of time in the co-op program. Additionally, students provided alternative explanations for their posted scores on the web-based survey and described workplace environments that were replete with individuals who were willing to share valuable insights and information with them. Based on an analysis of the qualitative interviews, the researcher identified six primary themes based on students' experiences in co-op: psychosocial support, career-related support, time as a factor, differing experiences by gender and ethnicity, explanation of scores, and others as mentors.

Psychosocial Support

The majority of co-op students indicated that their supervisors were "encouraging and supportive" of them throughout their co-op experiences. Students described open door policies that allowed them to ask questions of their supervisors and to engage in

conversations that were both work-related and broader in scope. As an example of this informal policy, Judy said, “I can walk into his office whenever I need to and ask him questions.”

Jason described the psychosocial function of mentoring as a type of “positive reinforcement” and said that his supervisor did a “fairly good job of completing the ‘warm feeling’ for the company.” Over the course of her co-op experience, Abbie and her supervisor discovered that they were both originally from the same city and supported the same sporting teams from their hometown. Abbie felt like this area of mutual interest helped her connect with her supervisor and establish a rapport that promoted a positive work experience for both of them.

Tim said that as he got further into his work semester the communication between him and his supervisor became “less formal, more personal, and more friendly.” Tim described his work environment as congenial and said that he and his supervisor as well as his co-workers would occasionally go “uptown together on Fridays.” Since these interactions were outside of work, Tim found these conversations to be more personal than business-related. On average, however, Tim concluded that “probably about 90% of our conversations are work-related.”

Courtney reported that she and her supervisor talked about his family “all the time.” During one of Courtney’s work semesters, her supervisor’s wife had a baby. Courtney said that it was helpful for her to watch him balance the commitments of both work and family and “to see how having a family affects the job.” Courtney described the support she received from her supervisor as less like a conversation and more like a feeling, “we just kind of grew with it…if that makes any sense.”

Chris characterized his work environment as an extended part of his family and said that he considered his supervisor to be “another mom.” When asked for additional information, he said that “she looks out for me and tries to do what’s in my best interest.” Chris felt strongly about the sense of protection and advocacy provided by his supervisor and said that she stressed the importance of talking to her if there was ever a problem. Chris said that his supervisor was “always there and open” and he appreciated the opportunity to talk with her without the fear of negative consequences.

Brian’s experiences with his supervisor were unlike those expressed by any of the other co-op students who were interviewed, especially in the area of psychosocial support. When asked about his supervisor, Brian expressed regret that he and his supervisor did not get to know each other on a more personal level. He assessed the situation as follows:

> She didn’t really find out much about my life at all. She would oftentimes tell me about her family and how it was going and I’d kind of listen to her talk about that but she didn’t really get to know me very well to encourage me in my life or find out how she could help me. I mean, sometimes her kids were in plays and I’d go see them but there was never any reciprocation of that like her coming to watch me get inducted into an honor society.

In counterpoint to Brian’s experiences, Abbie highlighted an opportunity that she felt was both unique and different from the experiences of her peers in the co-op program. She said that she and one other co-op student were invited to go on a business trip with her supervisor to view and evaluate the operations of another facility. The goal of the trip was to bring back information that would help them improve their own

processes. According to Abbie, her supervisor invited the co-op students because he valued their opinions and recognized that they brought a different perspective to the situation. Abbie viewed this invitation as a sign of trust, technical competence, and mutual respect between her supervisor and the co-op students.

Career-Related Support

In addition to emotional support and encouragement, the co-op students cited numerous examples of career-related support that they received from their supervisors. Examples focused on both the instructional role that their supervisors played throughout the process of becoming proficient in their co-op positions as well as the "role modeling" aspect of this mentoring function.

For Jason, learning the technical aspect of the job was important because his ultimate goal was to work in a comparable position to his supervisor upon graduation. According to Jason, "The entire organization worked very well to bring me in and they helped to push me in the direction that I wanted to be pushed. They didn't force me into doing something that I wasn't interested in doing." Jason found his supervisor's approach, as well as the ethos of the organization, to be beneficial in the pursuit of his professional career goals.

Courtney said that her supervisor opened her eyes to the industry she was working in by teaching her about the professional and business aspects of her job. Similarly, Chris said that his supervisor had been very encouraging of him in terms of career support and development. According to Chris, his supervisor had worked in both the private and

public sectors and was able to share with him multiple perspectives regarding his career choices based on her extensive experience in the field.

Abbie, Tim, and Judy indicated that they had all spoken with their supervisors about the career paths their supervisors had taken. These conversations included questions about how their supervisors had gotten started in the industry as well as how they had gradually moved up into their current supervisory roles. In addition to discussing his own career path, Tim said that his supervisor had shared with him information about other people in the industry. According to Tim, a typical interaction would be as follows:

> I'll ask him from time to time, what is so-and-so's position or what does this person do and he'll give me an overview about what that job is and what all that entails so that I get a perspective of different levels, different grades. It just gives me a better idea of what people do and how you get to that point.

In addition to general career advice, several of the co-op students indicated that their supervisors had advised them on curriculum choices in school as well as their future plans for graduate school. Anna was the most vocal about this kind of support and said that her supervisor had encouraged her to take courses that would support her overall educational goals. Based on her co-op work experience, Anna had identified classes that would help her perform her job better even though these classes were not required for her major. Speaking on behalf of her supervisor, Anna said, "He's encouraged me to take those classes and is allowing me to take some of those classes while 'co-oping' so that I can get that experience." According to Anna, she and her supervisor had also discussed graduate school options that would support her in her pursuit of a manager position.

The curriculum and career advice that Aisha received from her supervisor took on the form of discussing career options outside of her major. Aisha said, “I’m not sure I want to continue in engineering – Mechanical Engineering – she showed me some other options of things I could do with the degree.” Aisha said that she and her supervisor had discussed the possibility of Aisha applying to a professional program upon graduation like law school or medical school. Aisha said that her supervisor had validated the value of her degree and confirmed that even with a degree in Mechanical Engineering she did not have to go into a traditional engineering profession.

Time as a Factor

While the quantitative analysis of the web-based survey did not show a statistical significance between the length of time in the co-op program and students’ perceptions of mentoring, the co-op students who were interviewed for the qualitative phase of research consistently identified time as a factor in both the quality of their experiences as well as the level of interactions they had with their supervisors throughout their co-op experience.

Many of the students described their first rotation in co-op as a starting point in which they were responsible for learning the systems and processes of the organization before they could move on to larger projects. For Judy, this meant spending the first rotation “learning the ropes.” By her third rotation, Judy was moved into a project management role in which she had significantly more responsibility. Over time, Judy’s role had changed and she felt like she was treated more like an “employee instead of just an intern.” Similarly, Jason described his first rotation in entry level terms:

> I was assigned to do a lot of menial tasks but a lot those tasks were just preparing me to be a better engineer…how to look up research information, how to find out about the technology, that kind of stuff, which in the long run helped out.

In his first rotation, Jason said that he was moved from one assignment to another to become more familiar with the overall operation. By the second rotation, he was given small tasks to complete with limited supervision and by his final rotation, Jason was put in charge of several projects and "treated like a full-time employee."

Chris described his first rotation as "getting my feet wet." Instead of a set job, Chris was responsible for going to different job sites with his managers. In his second rotation, Chris was assigned to work on his own projects as well assisting others with their work. For Chris, the most notable change in his interactions with his supervisor was reflected by an increase in the level of his responsibility and expectations for his work. Since this was the end of his second co-op rotation, Chris described this change as "appropriate." Tim also said that his supervisor's expectations of him had changed over time since he had gained more experience with the company through his co-op rotations. Based on his level of experience, Tim felt like he was "more in tune with decisions" and certainly capable of taking on larger tasks within the organization.

At the beginning of Abbie's first co-op rotation, she had not had many of her major courses. She said that her supervisor was "very understanding of that fact and worked pretty close with us to make sure that we understood everything that was going on." Over time, Abbie said that she and the other co-op students were given more responsibility once they understood "how the business was run and what kinds of things the department was responsible for." Abbie indicated that once she had developed a good

understanding of the organization, her supervisor would let her complete assigned tasks without micromanaging her work. When she had questions about an assignment, Abbie said that she would check back with him, but for the most part he let her work independently. She said that her supervisor trusted her to get the work done.

Aisha indicated that her supervisor was pregnant during Aisha's first rotation in co-op and was not in the office on a regular basis. When she was in the office, Aisha noted that her supervisor tried to spend time with her to make sure she understood the responsibilities of the job. Towards the end of her co-op experience, however, Aisha said that her supervisor "would just e-mail me things and she wouldn't really tell me what to do, I'd just do it."

Differing Experiences by Gender and Ethnicity

In the quantitative phase of research, the variable of gender was reported to be statistically significant in relation to the psychosocial function of mentoring. Gender was not a significant factor related to the career-related function of mentoring, and ethnicity was not reported to be statistically significant for either the psychosocial or career-related functions of mentoring. With the exception of this association between gender and perceptions of psychosocial support, co-op students who participated in follow-up interviews indicated that gender and ethnicity had little to no influence on their interactions with their supervisors. When asked to discuss the extent to which these factors might play a role in mentoring, several students responded with simple answers like "not at all" or "none."

Brian, who was least satisfied by the level of mentoring he received in his co-op placement, did not see a relationship between gender and mentoring since he had worked for other female supervisors with much greater success. Brian acknowledged that while he could have worked well with a person of another race, the same ethnicity provided some common ground between him and his supervisor and this made the relationship more "comfortable" for him.

Tim identified his supervisor and himself as white males. He did not see how gender or ethnicity might influence his day-to-day interactions with other people but he also recognized that his field of Mechanical Engineering, like most engineering environments, is dominated by white males. Because of this, his experiences were somewhat limited within his professional work environment. While Jason's primary supervisor was also a white male, he said that he did not see his supervisor playing favorites with co-op students or other subordinates. Additionally, in his rotations with co-op, Jason had had opportunities to work under female engineers on various assignments. When placed in this situation, Jason said, "I treated her as the lead engineer. I didn't see the gender."

Both Courtney and Aisha described co-op situations in which their workplaces were dominated by men. In Courtney's case, she was the only female in the plant. When asked about this, Courtney said:

> I think a lot of the guys didn't think that I would necessarily be willing to do a lot of the work things but over time they realized that that wasn't true. So, I'm just like anyone else now. They've gotten over that. I'll climb in a manhole just like anyone else.

Courtney described an adjustment period for her co-workers as well as her supervisor because she was the first female in their department, but indicated that the gender difference had not posed a problem since she had proven to her co-workers that she could do the work.

Aisha identified herself and her primary supervisor as both female, and she further described herself as Hispanic. She said that she and her supervisor, for the most part, had gotten along pretty well. There was a situation that Aisha described in which her supervisor had asked her to do some translation for her; work that that Aisha described as "not really job-related." Other than her direct supervisor, Aisha indicated that most of her co-workers were white males. She said that these co-workers did not like giving her work to do, that "they didn't seem to trust me with their projects." Aisha was not able to pinpoint the origin of this mistrust, whether it was related to her being female, Hispanic, or some other factor, but she said that she did not feel as if she had been treated the same as other co-workers.

Chris' primary supervisor in his co-op assignment was a female and he said that she treated everyone consistently and with fairness. He also indicated that his co-op employer set high expectations for the workplace environment by requiring participation in online seminars which included the topics of sexual harassment and discrimination. Chris felt like there was respect between himself and his supervisor as well as his fellow co-workers and that this mutual admiration transcended the lines of gender and ethnicity.

Explanation of Scores

Based on the findings of the web-based survey, gender, ethnicity, and length of time in the co-op program did not appear to significantly influence students' perceptions of mentoring in cooperative education. In follow-up interviews, students were asked if there were other mitigating factors that may have influenced the way they answered the survey. While responses to this question were equivocal, students suggested that their answers to the web-based survey were more a reflection of the relationships they had developed with their supervisors than a response to demographic characteristics or time spent in co-op.

The two lowest sets of scores for psychosocial and career-related support were reported by Brian (1.71, 1.50) and Jason (2.0, 1.53), respectively. Brian offered the most straightforward critique of his supervisor, "I would say she pretty much did not fulfill a mentoring-type role at all." In addition to his perceived lack of psychosocial support, Brian said that she was generally unsupportive of his career endeavors, "she never provided any career direction or advice on how to succeed." This mismatch seemed evident when Brian talked about his experiences at work:

> A lot of times I just felt like I was doing more of her work than I should have. Like simple stuff that she really should have taken care of she'd oftentimes ask me to take care of like talking to higher level employees within the company which I thought would have been better if they had spoken with her about whatever the situation was rather than having a co-op speak to them.

While Brian's low scores reflected a lack of involvement by his supervisor which may have resulted in unmet needs, Jason's low scores seemed to reflect a lack of

involvement by his supervisor that did not affect his overall performance. On the contrary, Jason's experiences highlighted an environment in which individuals strived for self-reliance and greater autonomy. Jason described his supervisor as someone who did not micromanage his projects and said, "I didn't see him sometimes for weeks on end."

Anna said that her average scores on the web-based survey were primarily based on a lack of organization by her supervisor. There were occasions where she did not have work to do and she described unclear expectations for many of the assignments that she was currently working on.

Despite Courtney's fairly high scores, she highlighted time-management as a concern as well as the high level of responsibility that she was given as two primary concerns with her co-op experience. Courtney described a placement in which her supervisor "puts a lot more work on me than probably should be placed (on a co-op student)" based on the circumstances of the organization. After her first rotation, Courtney's original supervisor was fired from his position and her current supervisor was moved from the Mechanical Department into the Civil Department. Courtney said that when he was not her supervisor, he was "very good at teaching but now that he's been placed in this position he's very stressed out." In response to learning his new supervisory position as well as managing the workload, Courtney said that he tends to give her more work to do because she is "faster and more efficient" than her co-op counterparts. In spite of these circumstances, Courtney still described her supervisor as "a very good mentor."

Although their web-based survey ranged from mid-to-high scores, Abbie, Tim, Judy, and Chris indicated that their scores were a reflection of positive working

relationships with their supervisors and co-workers. Abbie said that she and her supervisor had a “very open relationship.” Tim described a work environment that was characterized by a sense of mutual respect:

> I think the combination of my respect for them and what they do and their respect for me in terms of how I conduct myself and how I get things done…I think that ends up helping out in terms of the “personal thing”

Judy said that her co-workers had always “gone the extra mile whenever I needed it,” and Chris reiterated that his supervisor was always there for him when he needed her assistance.

Others as Mentors

The most consistent theme that surfaced throughout the qualitative interviews was the prevalence of mentoring activities that co-op students experienced outside of their regular student/supervisor interactions. All of the students identified at least one or more individuals, other than their direct supervisors, who had served as a mentor to them over the course of their co-op experience.

Two of the students, Tim and Jason, mentioned that they were assigned a mentor in addition to their supervisor by their employer. When asked about the differences, they both agreed that the mentor was an individual who assisted the co-op student with the day-to-day operations while the supervisor had more authority to delegate projects and evaluate performance. Tim differentiated the two by describing his mentor as the one who managed his daily activities while his supervisor managed the administrative tasks like performance evaluations and paperwork. In addition to his assigned mentor, Tim also

identified colleagues of his mentor who he had talked with on occasion to discuss industry-related questions and questions about career development.

Jason said that his mentor was “someone who helped me out and made sure I was doing alright.” Jason viewed his mentor “more as a colleague and a co-worker” as compared with his supervisor who Jason saw as having more accountability to the organization. In addition to his mentor and supervisor, Jason mentioned the “new hires” as the ones who were the biggest influence in helping him learn more about the expectations of the organization. When faced with questions about processes and procedures, Jason would often bypass his supervisor and mentor and ask individuals who had just started to work for the company full-time because they “had recently gone through the same situation and knew what I was going through because they had gone through it themselves.”

Abbie identified one of the contractors she had worked with through co-op as someone she saw as a mentor for her. As another female engineer in her field, Abbie connected with this contractor and said, “She really supported me and we talked a lot about being a female in the industry and what you had to do to get ahead and the obstacles we face.” In addition to the positive experiences she had with her direct supervisor, Abbie suggested that there was value in asking for and receiving feedback from a person other than her direct supervisor.

Judy recognized the importance of networking and mentoring so much that at the beginning of her co-op experience she sought assistance from an organization outside of her employer. According to Judy:

> I contacted the local professional association and asked them to put me in touch with a female engineer for a mentor. So they gave me a couple of people's names and I went to lunch with one of the girls and talked with her about her career and toured her company and she gave me some more contacts.

Judy said that she had also talked with the other engineers at her facility throughout the course of her co-op experience to learn more about their jobs in order to make an informed decision about her specific career path.

Anna, Courtney, and Chris had also gotten both career advice and support and encouragement from their co-workers. For Anna, her co-workers had been supportive of her goals to pursue graduate school. They expressed regret that they had not continued with their education and discussed the long-term benefits of an advanced degree from their perspectives. Courtney expressed her sense of gratitude for the individuals on the plant floor who were willing to share with her what they knew about the industry.

Chris described his workplace as a "good blending of personalities" and said that the "older guys" had helped him learn more about the industry while he and some of the "younger guys" were eager to share their knowledge of the new technology. More specifically, Chris recalled how much he had learned about construction from the project engineer on his first rotation. He concluded, "I gather something from all my co-workers and I think that's what makes this job really a good experience for a co-op in my field…because you learn so much about how business is done."

Even Brian, the student who reported the least positive experience with mentoring in co-op, was able to identify a mentor other than his supervisor within his co-op placement. He said that she was a manager for the contracted labor, and he had worked

with her fairly frequently. Brian described her as “really easy to get along with and very helpful with anything I ever needed and she helped me figure out how to interact with people better.” Brian said that he learned the most by watching her work with other people and indicated that she had taken the time to get to know him as both a person as well as a co-op student.

Summary

The purpose of this study was to examine students’ perceptions of mentoring in cooperative education. In spring 2006, an electronic recruitment letter was sent to a targeted population of 323 students who were participating in a co-op program at a four-year public institution in the southeast. Ninety-one students completed the web-based survey in full for a return rate of 28%. Students were asked to respond to the 21-question survey based on their perceptions of the psychosocial and career-related functions of mentoring in the co-op program. Based on the results of a factorial ANOVA design, there was no significant interaction between the independent variables of gender, ethnicity, and length of time in the co-op program and the two dependent variables of psychosocial and career-related mentoring functions. Additional one-way ANOVA techniques were utilized to test for main effects for the three independent variables. The only statistical significance that was found was between the variables of gender and the psychosocial function of mentoring in which females scored significantly higher than males on this factor.

At the conclusion of the web-based survey, nine co-op students were purposefully selected from the sample to participate in follow-up interviews. The goal of the

interviews was to illuminate the findings from the quantitative phase of research. Due to the tightly structured design of the interview protocol, interview questions provided the basis for the following emergent themes: psychosocial support, career-related support, time as a factor, differing experiences by gender and ethnicity, explanation of scores, and others as mentors. Co-op students discussed the quality and extent of their interactions with their supervisors in the co-op setting and provided examples of both psychosocial and career-related support. In describing their responses to the web-based survey, co-op students generally reflected on the quality of their relationships with their supervisor and co-workers; this response was also reflected in the theme of time as a factor. Students typically did not see a relationship between gender and ethnicity and their interactions with their supervisors although there were several examples by female co-op students in which they discussed the challenges of working in male-dominated work environments. All of the co-op students identified at least one individual, other than their supervisor, who had served as mentors for them throughout their co-op placement.

CHAPTER 5

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

Students' perceptions of mentoring in a university cooperative education program were described in this study. Both quantitative and qualitative methods were used in this descriptive design. Ninety-one students participated in the quantitative component by completing the web-based survey. Data from the web-based survey were used to assess students' perceptions of the psychosocial and career-related mentoring functions by their supervisors in co-op. Results from the web-based survey were also used to inform the qualitative component by shaping the interview protocol and by identifying a purposeful sample of interview participants. Nine students contributed to the qualitative component of the study by sharing their perceptions and experiences of mentoring in co-op.

As a bridge between school and work, co-op provides students with opportunities to apply their in-class learning to real world applications through practical work experience. Within the co-op setting, students report to a supervisor who is their primary contact within the organization. While students may work with others in the organization, the supervisor has direct responsibility for the welfare of the student and may influence the quality of the co-op experience by providing a mentoring role. A need existed to examine the interactions between students and supervisors in co-op during this transitional phase between school and work.

For this study, mentoring was divided into two primary domains; the psychosocial and career-related functions of mentoring. Students' perceptions of the extent of each domain were assessed based on the independent variables of gender, ethnicity, and length of time in the co-op program.

In Chapter 4, data from the web-based survey and data from the follow-up interviews were analyzed by describing students' perceptions of the psychosocial and career-related functions of mentoring. Findings, conclusions, and recommendations are presented in this chapter.

Review of Findings

Web-Based Survey

Based on the results of a factorial ANOVA design, there was no significant interaction between the independent variables of gender, ethnicity, and length of time in the co-op program and the two dependent variables of psychosocial and career-related mentoring functions. Additional one-way ANOVA techniques were utilized to test for main effects for the three independent variables. The only statistical significance that was found was between the variables of gender and the psychosocial function of mentoring, indicating that females scored significantly higher than males on this variable.

Follow-up Interviews

In the follow-up interviews, co-op students discussed the quality and extent of their interactions with their supervisors in the co-op setting and provided examples of both psychosocial and career-related support. In describing their responses to the web-based survey, students spent more time reflecting on the quality of their relationships

with their supervisors and co-workers than the variables of gender and ethnicity. This finding is consistent with previous research by Ricks and Van Gyn (1997) that emphasized the importance of relationships over roles in the co-op setting. This focus on relationships was also reflected in the theme of time as a factor. Students typically did not see a relationship between gender and ethnicity and their interactions with their supervisors although there were several examples by female students in which they discussed the challenges of working in male-dominated work environments. All of the co-op students identified at least one individual, other than their supervisor, who had served as a mentor for them throughout their co-op placement.

Differing Experiences by Gender and Ethnicity.

In the quantitative phase of research, the variable of gender was reported to be statistically significant in relation to the psychosocial function of mentoring. Students' perceptions of psychosocial mentoring in co-op were statistically higher for females than males on this scale. Research literature has reported the need for mentoring among young women in middle school, high school, and college as strongly related to self-efficacy in predominantly male-oriented courses and experiences (Burger et al., in press; Borg, Budil, Ducloy, & McKenna, 2005; Margolis & Fisher, 2002). In this study, the psychosocial scores for females may have been significantly higher than those for males based on the value that each of these two groups placed on this specific variable.

The majority of students who participated in the follow-up interviews, both males and females, expressed an appreciation for the psychosocial and career-related mentoring they received from their supervisors and co-workers. Students reported that the co-op experience afforded them the opportunity to gain new skills, develop rapport with their

co-workers, and acculturate to the work environment. The most appreciable difference between the experiences of men and women was the challenges that women faced by working in male-dominated work environments.

For students like Tim, gender and ethnicity were not relevant issues because he fit the profile of a typical co-op student, white and male. Courtney, on the other hand, was the only female working in her co-op placement. She said that there was a period of adjustment for her co-workers when she first started her co-op position because her co-workers had never worked with a female before. For Courtney, the expectations for her abilities and for the quality of her work seemed different than they might have been for a male co-op student simply because she was female. Courtney indicated that she felt the need to "prove" herself to her co-workers in order to be treated as "an equal".

Courtney's experiences in co-op exemplify many of the workplace challenges that women face in the fields of Science, Technology, Engineering, and Mathematics (STEM), including (a) a lack of female role models (National Center for Educational Statistics [NCES], 2000; National Institute for Science Education [NISE], 1998; Seymour, 1995); (b) an unconscious bias towards male employees (Hadelsman et al., 2005); and (c) a persistent argument regarding biological differences between men and women and their ability to succeed in science (Benbow & Stanley, 1980; Sonnert, 1995; Webb, 2006). For Aisha, these challenges in the workplace may have been even more acute since she had identified herself as both female and Hispanic.

While it would be disingenuous to characterize Aisha's experiences as representative of the experiences of other ethnic minorities in co-op, her responses to the questions in the follow-up interview described a different set of work challenges than

those of other females in this study. Because of her fluency in Spanish, there were occasions in which Aisha's supervisor had asked her to do some translation work for her that Aisha characterized as "not really job-related." Additionally, Aisha indicated that her co-workers, who were all white males, did not seem to trust her with their work. By the end of her co-op experience, Aisha described a situation in which she was completely disengaged from her supervisor and fellow co-workers. In her words, "they gave me work, I did it, and then I returned it to them – that was about it."

One of the few positive things that Aisha had to say about her co-op experience was that her supervisor had helped her brainstorm ways that she could apply her Mechanical Engineering degree to professional pursuits outside of the field of engineering. The sense of social isolation, as described by Aisha, and her subsequent departure from the field of engineering is well documented in the literature regarding women in the sciences. Researchers have reported unfriendly and uninviting work environments for women (Creamer & Laughlin, 2005; Creamer, Meszaros, & Burger, 2004) and indicated that women who leave engineering attribute their departure to alternative choices rather than poor academic performance (NSF, 1998; Seymour & Hewitt, 1997).

While it was difficult to ascertain if Aisha's change of heart was due to her interactions with her co-op supervisor and co-workers or for some other reason, it was certainly a decision worth highlighting in this study. It should be further noted that Aisha was the only ethnic minority who volunteered to provide additional contact information so that she could be considered for participation in the qualitative phase of research. Her

specific experiences, however, were reflective of the larger body of research regarding women's careers in science and engineering.

Length of Time in a Co-op Program.

The web-based survey did not reveal statistically significant differences in perceptions of mentoring based on the length of time students had participated in the co-op program, however, students discussed major differences in the quality of their interactions with their supervisors in the follow-up interviews. When asked about mentoring by their supervisors, co-op students most frequently cited examples from their first rotation when they were "learning the ropes" and their last rotation when they were preparing to graduate and enter the workforce as a new professional. The "mentoring" that students described during their first rotation, while important, seemed more consistent with on-the-job training than the "mentoring" they described toward the end of their experience. At this later stage, students moved beyond questions of technical expertise to more sophisticated concerns about maintaining balance in their professional and personal lives and seeking individuals with whom they could identify with and model their professional behavior. This is consistent with the role modeling aspect of mentoring as described in the literature (Jacobi, 1991; Ledford, Peel, Good, Greene, & O'Connor, 2006; Murphy & Ensher, 2006). Recommendations for managing these different levels of "mentoring" experiences are presented under the conclusions heading of this chapter.

Unanticipated Outcomes

Influence of Technology

The technical nature of co-op and the use of technology in the day-to-day operations of the co-op employer resulted in two unanticipated findings regarding the influence of technology and its relationship to the concept of mentoring in co-op. The first finding could be described as a practical issue within the study as it related to the specific use of language in the web-based survey. The second finding was more philosophical in nature and highlighted the concept of technology as a factor that might influence future mentoring experiences by contrasting years of experience with technical expertise as the foundation for the mentoring relationship.

In the web-based survey, students were asked students to report the number of times they met with their direct supervisors on a weekly basis. Due to the ubiquitous nature of electronic communication (e-mail), it may have been more relevant to ask how frequently students communicated with their direct supervisors. From the follow-up interviews, Jason indicated that there were times in which he did not see his supervisor "for weeks on end." Since Jason was a double major in Electrical Engineering and Computer Science and worked in an IT industry, this statement may have been misleading. Even though Jason had not "seen" his supervisor for an extended period of time, it cannot be assumed that Jason did not "communicate" with his direct supervisor more frequently through electronic communication.

In Chris' follow-up interview, he described a mentoring exchange in which the "older guys" helped him learn about the industry while he and some of the "younger guys" were eager to share their knowledge of the new trends in technology with their co-

workers. While this exchange seemed reciprocal in nature, it raised an interesting question regarding the relevance of chronological age and years of experience using high level technology. More specifically, will future co-op students seek out mentors who have experience in the field or mentors who have access to and knowledge of technological resources?

Conclusions

In addition to capturing students' perceptions of mentoring in co-op based on the independent variables of gender, ethnicity, and length of time in the co-op program, the integration of data from both the quantitative and qualitative phases of research suggests broader implications for the field of cooperative education with regards to the mentoring concept. Students' interactions with their direct supervisors and others in co-op may provide key insights and ideas regarding the structure of mentoring relationships, application of theory in practice, training for mentors and students, and mentoring options available in the co-op setting.

Structure

The design of this study was similar to the one proposed by LaBonty and Stull (1993) in which the supervisor provided both supervisory and mentoring roles for students. The study, however, deviated from past research by exploring the informal nature of these interactions. Previous mentoring models advocated for formal structures of mentoring in which students were assigned to mentors, provided training, and monitored and evaluated throughout the mentoring process. This formal structure of mentoring was also reflected

in the Weyerhauser IT Internship Program (Gibson & Angel, 1993) in which students were assigned to two separate individuals, one as the supervisor and one as the mentor.

There was evidence in this study that informal interactions with supervisors, co-workers, and other professionals in the field provided valuable information for students in environments that were less rigid and more voluntary in nature. Participants indicated that some of the most valuable information they received was obtained from informal mentoring that occurred naturally as compared to the more formal interactions that conformed to organizational structures and expectations.

This finding is consistent with previous research by Van Gyn and Ricks (1997) in which they described a greater degree of interpersonal commitment on the part of mentoring participants when the relationship was “mutually voluntary as opposed to one that is formal and imposed” (p. 81). Additional studies found that informal mentoring produced a larger and more significant effect on career outcomes than formal mentoring (Underhill, 2006), and formal mentoring programs cannot effectively emulate the serendipity and rapport associated with informal mentoring processes for participants (Cox, 2005).

The findings from this study suggest that informal networks within a structured environment might be a more suitable starting point for the mentoring process to begin. By informing potential mentors of the roles they can assume in the co-op experience for students, potential mentors and students can initiate a process that is specific and unique to the individual needs of the students.

Theory and Practice

One tool that may assist supervisors and/or mentors in realizing the mentoring potential for interactions with their students is through the practical application of a theory-based model of mentoring. By overlaying the conceptual framework of mentorships as described by Ricks and Van Gyn (1997) and the Situational Leadership model by Hersey, Blanchard, and Johnson (2004), it is possible to see how an emphasis on relationship versus an emphasis on task might vary depending on the situation and the co-op student's level of readiness at any given time. For example, students described their first rotation as "learning the ropes" or what Schein (1993) called the "rules of the game" (p. 372). At this point in the co-op experience, there was more of an emphasis on task; the relationship was comprised of one-way communication in which a supervisor "tells" (S1) the student what to do. Ricks and Van Gyn described this relationship level as "transmission." It stands to reason that as the co-op student gains more experience, knowledge, and confidence in his/her abilities, the student and supervisor or mentor would begin to renegotiate their interactions. The next level of relationships, "transaction" was characterized by two-way communication which corresponded well with the "selling" aspect of the Situational Leadership model (S2). By the third level of relationships, "transformation" the student and supervisor or mentor would work together toward a shared goal "participating" (S3) until eventually the student had enough skills and confidence to operate independently from his/her supervisor. This was described as "delegating" (S4) within the Situational Leadership model.

In this study, students described situations in which there were imbalances on both sides of the task/relationship scale. An emphasis on task could be seen with

Courtney as she described the level of responsibility her supervisor had given to her and her supervisor's over-reliance on her skills, "He probably puts a lot more work on me than should be placed…I realize how much stress he's under so I just try to help him more than try to get information from him." As stated before, Brian described a situation with his supervisor where there seemed to be no emphasis on relationship, "She (his supervisor) didn't really find out much about my life at all." Co-op students in this study expressed an interest in both the technical and interpersonal aspects of their co-op experiences. Clearly, students' needs were different at the end of the experience than they were at the beginning. Recognition of this balance between "relationship" and "task" as well as an appreciation for the co-op student's level of readiness for new situations may help supervisors and mentors reframe experiences with their co-op students in order to provide an appropriate level of psychosocial and career-related mentoring within the co-op placement.

Training

For this study, the concept of mentoring was examined based on the informal interactions that occurred between co-op students and their supervisors. In the structure of the co-op program under review, there was no expectation that specific, formal mentoring would occur and neither students nor supervisors were provided training or instruction in how to conduct a mentoring relationship beyond the ascribed supervisory role. The study was simply designed to see if students' perceptions of mentoring were different based on the independent variables of gender, ethnicity, and length of time in the co-op program.

Despite the equivocal data in the research literature regarding the merits of informal versus formal structures of mentoring relationships, this literature suggests that some level of training and preparation for the mentoring relationship would benefit both mentors and mentees regardless of the structure of this relationship. In her practical guide for effective mentoring, Zachary (2000) identified mentoring as a process that requires both preparation and dedication. Competencies for effective mentoring included (a) self-reflection, (b) personal disclosure, (c) reflective communication, (d) cross-cultural understanding, and (e) a development of mentoring skills. In this text, a checklist for potential mentors was provided to assess their level of readiness for taking on this additional role. The following critical mentoring skills were identified: (a) goal setting, (b) managing conflict, (c) facilitating learning, and (d) problem solving to help mentors more effectively assist their mentees throughout the learning process. Interestingly, Zachary suggested that it was not unusual for an individual to be trained and knowledgeable of a specific skill and still be uncomfortable using the skill. In this sense, mentor preparation was about increasing the individual's level of readiness to assume the responsibilities as a mentor.

Similarly, students who were interviewed for this study seemed interested in participating more fully in a mentoring relationship, but they lacked the knowledge and skills of how to make the most of their interactions with their supervisors and other potential mentors in their co-op placement. Consistent with adult learning theory, Hal Portner (2002) suggested that one of the most important things a student can do is to assume responsibility for his/her learning outside of the classroom. Portner identified five principles for mentoring success including: (a) initiating conversations with prospective

mentors, (b) establishing ground rules and expectations for the mentoring experience, (c) developing goals for learning, (d) asking for and receiving feedback, and (e) reflecting on the process. Specific techniques for students to actively participate in the mentoring process included reflective writing, researching trends and realities of the field, and identifying professional networking opportunities with the mentor. Covey (1989) noted that individuals may also find it beneficial to develop a personal mission statement with the assistance of a mentor. This mission statement would provide a framework for the student and supervisor to discuss the student's professional goals, values, and activities that support the student's growth and development as an emerging professional in the field. The mentoring literature is replete with practical suggestions for conducting effective mentoring relationships. It is suggested that this information could be introduced to students and potential mentors by the co-op employer, co-op program, or through a combination of both organizations.

Mentoring Options

One of the assumptions for this study was that students who were paired with their supervisors at the beginning of the co-op placement would remain with the same person throughout the student's tenure with the company. In reality, students were moved around frequently to gain experience and exposure to the many areas within the organization. Slightly less than half (43%) of the students in this study indicated that they had worked for two to three supervisors throughout their co-op experience, and all of the students in the follow-up interviews reported that they had received mentoring from at least one person other than their direct supervisor in the co-op placement. While the potential exists for direct supervisors to provide psychosocial and career-related

mentoring to their co-op students, these findings suggested that it may be shortsighted to limit mentoring activities to only student-supervisor interactions.

By recognizing the transitory nature of supervision in co-op, as reported in this study, it may be better for an organization to identify individuals who would be willing to serve as informal mentors for co-op students. Potential mentors could come from a pool of employees who would be willing to remain with the student throughout his/her time with the organization regardless of the student's direct supervisor. The primary benefit of this arrangement would be to establish stability for the co-op students within their co-op placements. Informal mentors could help with students' transitions to the organization and provide consistent guidance in practices and policies of the organization from the onset of the experience.

In the follow-up interviews, both Tim and Jason indicated that they had been assigned mentors who were in addition to their direct supervisors in their co-op placements. In reflecting on their experiences, the students identified their mentors as individuals who could help them better understand the culture of their organizations as compared with their supervisors who were responsible for the evaluation and compensation of their work performance. They expressed value in having another set of eyes to review their work and saw their mentors more as colleagues than authorities. Consistent with the findings from the Weyerhaeuser Information Technology (IT) Intern Program (1993), both Tim and Jason recognized the benefit of having a contact within the organization, an individual who was not directly responsible for their performance evaluations, to help them learn to do their jobs more effectively.

Implications for Professional Practice

As alternatives to the student-supervisor-mentor model, co-op employers might consider providing co-op students with "group mentoring" by connecting a senior-level person within the organization to a group of co-op students to provide support and encouragement as well as career advice and professional development. Co-op administrators and/or employers may also find it beneficial to develop a "peer network" of support in which new co-op students would be paired up with "seasoned" co-op students to learn from their experiences. By expanding the concept of mentoring beyond solely student-supervisor interactions, it may be possible for co-op students to access a network of individuals to meet their mentoring needs.

Given the current literature on mentoring, it is not unusual for an individual to seek mentoring from multiple individuals both inside and outside of an organization. Stanley and Clinton (1992) described a "constellation model" of mentoring relationships that included both vertical relationships (mentors) and horizontal relationships (peers and co-workers). Similar images from the research literature depicted mentoring as: (a) networks (deJanasz & Sullivan, 2004; Fritzberg & Alemayehu, 2004; Walker & Taub, 2001); (b) webs (Quinlan, 1999); (c) superhubs (Reeves, 2006); and (d) mosaics (Ayers & Griffin, 2005; Mullen, 2005). Co-op students who are encouraged to pursue this type of mentoring arrangement may find it possible to tap into a deeper pool of resources available through multiple mentoring relationships in the co-op setting.

Enrollment Trends and Participation in Co-op by Women and Ethnic Minorities

The concept of cooperative education originated at the University of Cincinnati as a way for engineering students to gain practical work experience while in school, and the prevailing academic major for co-op participants continues to be engineering. For this study, 93% of the total co-op population at the host institution represented engineering disciplines. While there are no consistent data regarding participation by minority and female students in co-op, a review of degrees awarded in the field of engineering showed that there were 73,706 Bachelor of Science degrees in Engineering awarded in 2004-2005. Of these degrees, 19.5% were awarded to women and 14.1% to ethnic minorities (American Society for Engineering Education, 2005). With these figures in mind, it is reasonable to assume that participation in a co-op program is reflective of graduation rates by women and ethnic minorities.

Despite its 100 year history in higher education, co-op programs continue to be overwhelmingly dominated by white males. The pervasiveness of this dominant, white male culture in co-op should be considered as a potential detriment towards the recruitment of women and ethnic minorities to co-op programs. The lack of diverse role models/mentors may have a “chilling effect” on the number of female and ethnic minority candidates interested in co-op and, in turn, lead to a diminished applicant pool upon graduation. The circular nature of this problem becomes evident as organizations realize that they have a fewer number of female and ethnic minority employees from which to promote internally who could become role models/mentors for a new generation of potential co-op students.

Within the shifting demographic of college-bound students, the most far-reaching effect for co-op programs and employers may be the ways in which they recruit for and promote co-op experiences among female and ethnic minority students. Of particular note is the rate in which female students are outpacing male students in overall enrollment at the postsecondary level. According to the National Center for Educational Statistics (2005), the undergraduate population of women increased from 42 percent to 56 percent between 1970 and 2001. Projections indicate that women's undergraduate enrollment will increase to 8.9 million or 57 percent of the undergraduate population by 2013 (Peter & Horn, 2005).

Despite growth in the biological sciences and chemistry, participation by female students in physics, engineering, and computer science has lagged behind or declined in popularity over the past 10 years (NSF, 2004). Based on the research literature, two of the primary deterrents for women considering the STEM fields included negative stereotypes of the professions (Johnson, Johnson, & Stanne, 1985; Klawe & Leveson, 2001; Steele & Aronson, 1995), and the lack of perceived utility in improving the quality of other people's lives. Researchers found that the "usefulness" factor accounted for why women tended to choose the social sciences over the natural sciences, except for medicine (Margolis & Fisher, 2002; Margolis, Fisher, & Miller, 1999).

Suggestions for overcoming the challenges faced by these populations may include highlighting positive experiences of women and ethnic minorities in the STEM fields and exposing students to the STEM fields through hands-on experiences. Research has shown that both of these activities have potential to affect long-term commitment to the sciences and help current students to envision similar careers for themselves

(Handelsman, et al., 2005). In order to overcome the negative stereotypes associated with the STEM fields, and to sustain their programs at the collegiate level, co-op programs and employers may be compelled to recruit students as early as middle school and high school. Research has suggested that the STEM fields need to be portrayed as not just acceptable but normative for women and ethnic minorities in order for real change to occur (Burger et al., in press; Frehill, Ketcham, & Jeser-Cannavale, 2004). Co-op programs may also consider developing marketing strategies that address the specific needs of women and ethnic minorities in the STEM fields as compared with the "one-size-fits-all" approach to recruitment.

Future Research

The following recommendations are provided as a basis for further study:

1. Since diversity within a single co-op program may be difficult to find, future researchers are encouraged to explore the research questions from this study among multiple co-op programs or to target specific populations of diversity through professional organizations like SWE (Society for Women Engineers, www.swe.org); AWIS (Association for Women in Science, www.awis.org); and NSBE (National Society for Black Engineers, www.nsbe.org). It is suggested that a larger pool of female and/or ethnic minority students would contribute to a greater understanding of mentoring in co-op by traditionally underrepresented populations.

2. Future studies should survey the entire population of co-op students within a specific co-op program. This may be accomplished by contacting all of the students who had participated in any of the three semesters of the academic year.
3. This research represented a “snapshot” of students’ perceptions of mentoring in co-op. The only criterion for inclusion was that the students had completed at least one work semester in co-op and had not graduated from the institution at the time of the survey. A longitudinal study of co-op students should be conducted to assess their perceptions of mentoring at various points through their co-op experience.
4. Future research on mentoring in co-op may investigate the use of electronic technology in describing students’ “interactions” with their supervisors. Specifically, additional research may be conducted in the area of electronic mentoring or “e-mentoring.” Researchers are encouraged to explore questions related to the application of technology through professional organizations like IEEE (Institute of Electrical and Electronics Engineering, www.ieee.org) and AITP (Association of Information Technology Professionals, www.aitp.org).
5. Future researchers may want to use the Situational Leadership Model as the primary lens with which to view the concept of mentoring in co-op. The interrelated concepts of relationship, task, and readiness seemed particularly relevant to students’ actual experiences in co-op and may provide substantive information to help interpret interactions between students and supervisors.
6. Future studies might examine the concept of mentoring in co-op from a cross-gender perspective to see how perceptions may differ across gender schemas

related to supervision (Valian, 1999). While most of the mentoring interactions described in this study were with male supervisors, both male and female students described situations in which they reported to female supervisors. Under female leadership, students more frequently used the word “family” to describe their co-op work environment. Chris went so far as to describe his supervisor as someone who was “like another mom.” These examples of cross-gender mentoring may provide additional information regarding relationship versus task orientations.

7. In addition to the independent variables of gender, ethnicity, and length of time in the cooperative education program, future researchers are encouraged to explore the variables of personality and leadership style (Bernier, Larose, & Soucy, 2005; Daresh & Playko, 1992; Reed, 1992) as they relate to participants’ ability to establish a sense of relational mutuality (Beyene, Anglin, Sanchez, & Ballou, 2002) within a mentoring relationship. Previous literature on mentoring has suggested that interactions and perceptions of mentoring may be influenced by these additional considerations.

Summary

The concept of mentoring is as relevant today as it was in ancient Greek mythology as individuals continue to seek out role models and guides in their professional pursuits. The potential for mentoring in co-op is evident as students and employers attempt to bridge the transitional phase between school and work. Current research provides a theoretical framework that supports mentoring relationships between

students and supervisors, and the key to transforming these professional interactions may lie somewhere in the balance between relationship, task, and student readiness.

The purpose of this study was to assess students' perceptions of mentoring in a university cooperative education program. The findings of this study revealed that there was no significant interaction between the independent variables of gender, ethnicity, and length of time in the co-op program. In a test for main effects, however, the variable of gender was reported to be statistically significant in relation to the psychosocial function of mentoring, which is not surprising given the literature reviewed regarding challenges for women in the STEM fields. While most students in the study indicated a moderate level of psychosocial and career-related mentoring from their co-op supervisor, the qualitative component of this study suggested that mentoring experiences may be appreciably different for female students and ethnic minorities in co-op.

It is evident from the findings of this study that further research should be conducted with a larger, more diverse pool of students in co-op. Consideration should be given to electronic interfaces that may differentiate between face-to-face interactions and electronic communications between students and supervisors, and the question of mentoring in the twenty-first century deserves further exploration. Finally, the transitory nature of co-op requires a re-conceptualization of mentoring beyond solely student-supervisor interactions to a network of potential mentors.

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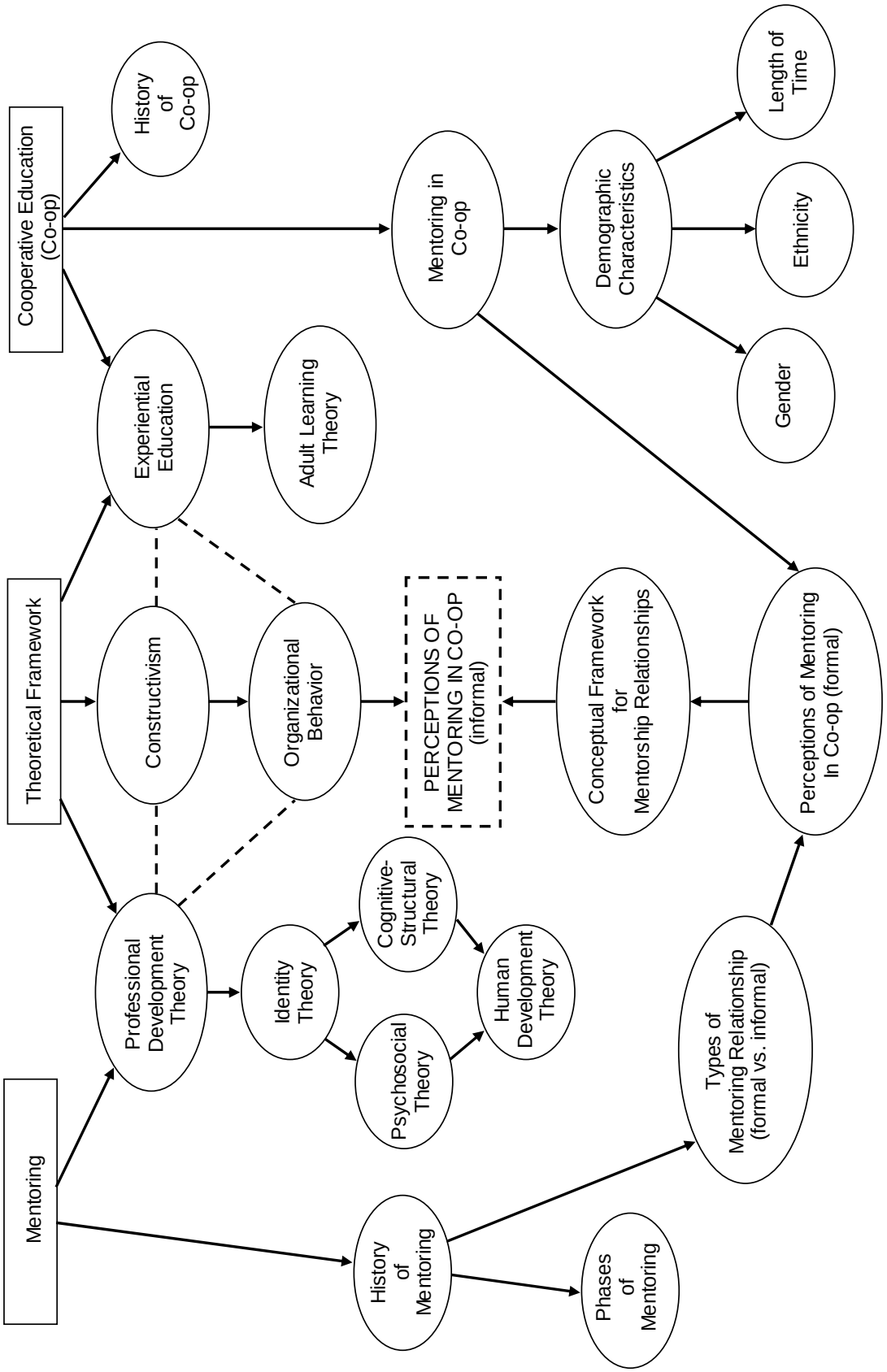
APPENDIX A

CONCEPTUAL FRAMEWORK FOR STUDY


Mentoring
Theoretical Framework
Professional Development Theory
Identity Theory
Cognitive-Structural Theory
Psychosocial Theory
Human Development Theory
Constructivism
Organizational Behavior
Experiential Education
Adult Learning Theory
Cooperative Education (Co-op)
History of Co-op
PERCEPTIONS OF MENTORING IN CO-OP (informal)
Conceptual Framework for Mentorship Relationships
Perceptions of Mentoring In Co-op (formal)
Mentoring in Co-op
Demographic Characteristics
Length of Time
Ethnicity
Gender
History of Mentoring
Phases of Mentoring
Types of Mentoring Relationship (formal vs. informal)

APPENDIX B

SITUATIONAL LEADERSHIP MODEL

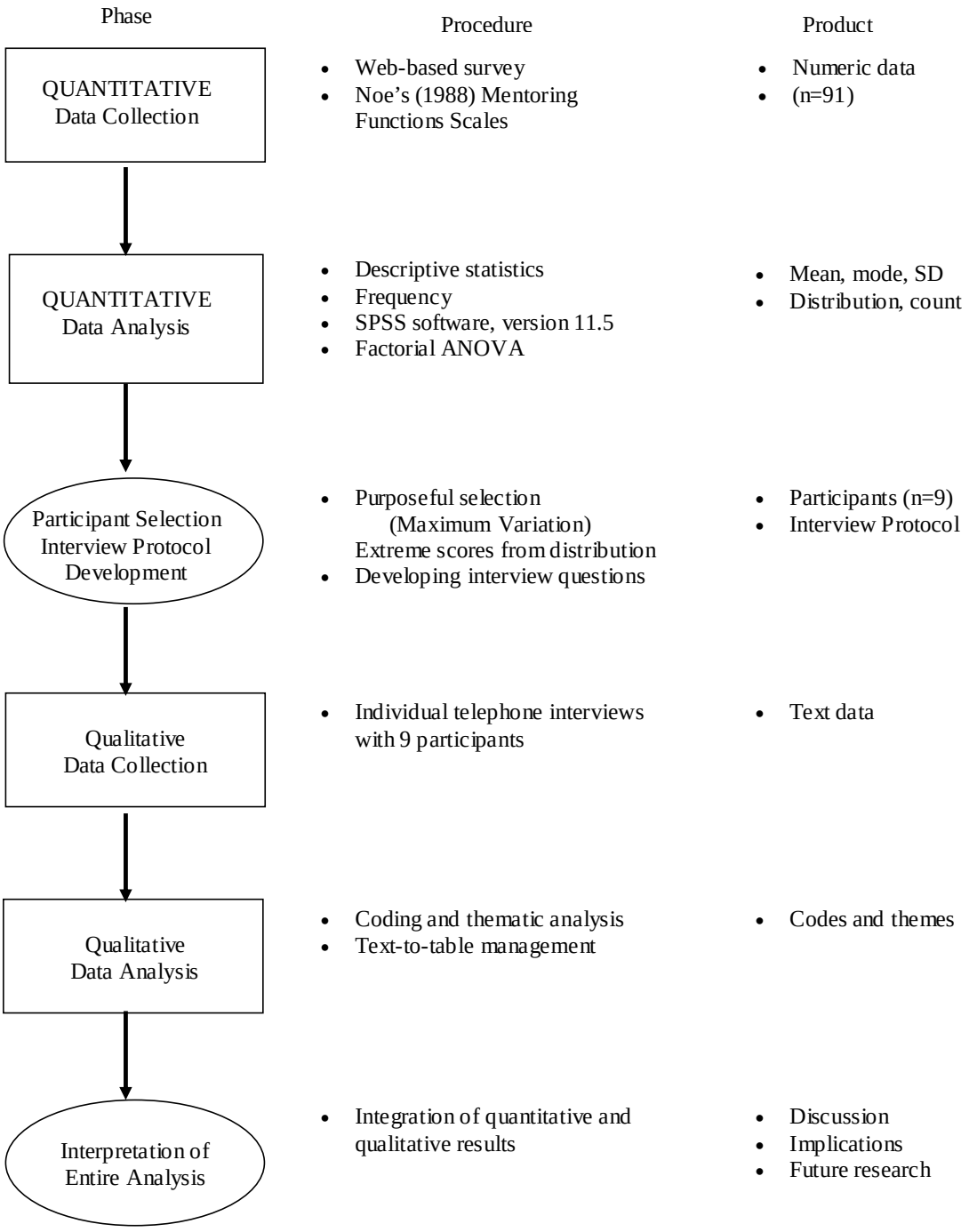
Situational Leadership Model

To view the Situational Leadership Model©, please refer to Figure 8.7 (p. 182) in the original publication:

Hersey, P., Blanchard, K., & Johnson, D. (2001). *Management of organizational behavior: Leading human resources* (8th ed.). Upper Saddle River, NJ: Prentice-Hall.

APPENDIX C

VISUAL DIAGRAM



Note: "Using mixed methods sequential explanatory design: From theory to practice" by N.V. Ivankova, J.W. Creswell, and S. Stick, 2006, *Field Methods, 18*(1), 3-20. Adapted with permission.

APPENDIX D

RECRUITMENT LETTER

Recruitment Letter

Dear Co-op Student:

My name is Matt Fifolt and I am a doctoral student at the University of Alabama at Birmingham (UAB). My dissertation topic focuses on students' interactions with their supervisors in cooperative education and I have been given permission by XXXX to work with you to further investigate this topic. I am excited to conduct this research at XXXX because of the program's outstanding reputation, long-standing history, structure, and diversity. In order for it to be successful I need your help.

I invite you to participate in a brief, yet informative web-based survey. The survey should only take between 5 – 10 minutes to complete and can be accessed through the URL listed below. Your participation is, of course, voluntary but could provide important data to improve the field of Cooperative Education. Student feedback helps all co-op programs grow and improve. Your participation in this research is critical to the success of this study.

http://careercenter.uab.edu/XXXXX

A password is being used to ensure that no one outside the sample has access to the survey. Your responses are completely confidential and cannot be tied to your password. The survey will be available until 5:00 pm (EST) on Friday, April 7, 2006.

Your password is: XXXXX (all caps)

If you have any questions about this letter, the survey, and/or the study details feel free to contact me or one of the individuals listed below.

Thank you for your interest and participation in this study. Your contribution is important to this investigation.

Sincerely,

Matthew Fifolt
Assistant Director of Experiential Education
University of Alabama at Birmingham

Matt Fifolt Associate Director of Co-op Institutional Review Board
UAB Career Services
Mfifolt@uab.edu
205) 934-4302

APPENDIX E

WEB-BASED SURVEY AND INFORMED CONSENT

Survey of Cooperative Education Experiences

Password:

Submit

The University of Alabama at Birmingham

UAB Career Services

Charting Your Course

Survey of Cooperative Education Experiences

Principal Investigator: Matthew M. Fifolt,
University of Alabama at Birmingham
School of Education

Purpose
The purpose of this study is to examine students' interactions with their supervisors in cooperative education (co-op). The results are intended to provide important data to improve the field of Cooperative Education.

Proceed

The University of Alabama at Birmingham

UAB Career Services

Charting Your Course

Information for the Participant

Time
The web-based survey should take approximately 5 – 10 minutes. Elective follow up interviews may take 10 - 15 minutes.

Costs and Benefits
There will be no costs associated with participating in this study other than time. You may not personally benefit from your participation in this research; however, your participation may provide valuable information as it relates to a greater understanding of student-supervisor interactions in cooperative education.

Confidentiality
The information gathered during this study will be kept confidential. Your response will be combined with all the others and only group responses will be reported. All data will be stored in a locked metal file cabinet in the researcher's office and will be destroyed within one year of the conclusion of the study. The information being collected is strictly for research purposes only. Participants who indicate their willingness to participate in follow up interviews will be assigned pseudonyms to protect their privacy and informed of their right to withdraw from the pilot study at any time.

Risks
Questions in the web-based survey and optional follow up interviews will ask you to honestly discuss your experiences in cooperative education. Since experiences may be both positive and negative, your participation may be seen as a risk. Additionally, survey data and interview data will be linked for comparison purposes which may also constitute a risk for you as a participant.

Withdrawal without Prejudice
Your participation in this research is voluntary. At any point, either prior to or even during the process, it will be permissible for you to withdraw without adversely affecting your relationship with the investigator or the staff. Your decision will not result in any loss of benefits to which you are otherwise entitled, and your responses will not affect your standing in the program.

Contacts
You may ask questions about this study and have those questions answered before agreeing to participate or any time during the study by contacting:

Matt Fifolt, Principal Investigator
University of Alabama at Birmingham
phone: 205-934-4302 email: mfifolt@uab.edu

or

Associate Director of Cooperative Education

If you have any questions about your rights as a research participant, you may contact:

Regulating Compliance Officer
Institutional Review Board for Human Use

Proceed to survey

The University of Alabama at Birmingham

UAB Career Services

Charting Your Course

Survey of Cooperative Education Experiences

The following questions will ask you about your interactions with your Cooperative Education Supervisor (co-op supervisor). Your responses will not be used for any personnel action nor will they be made available to your co-op supervisor or members of the university administrative team. The original survey was developed by Noe (1988).

Please respond to questions about your interactions with your ***current, direct supervisor***. This survey does not focus on relationships or support you may receive from peers or others within the organization.

Each question is specifically designed to reflect your individual perceptions of the following types of activities in cooperative education:

- Counseling
- Role modeling
- Friendship
- Career advice
- Coaching
- Professional Development
- Support and encouragement
- Types of assignments

PART 1 (of 4): ACTIVITIES

In answering this set of questions about your interactions with your Cooperative Education Supervisor, please use the following scale:

5 = To a very large extent
4 = To a large extent
3 = To some extent
2 = To a small extent
1 = To a very slight extent
DK = Don't know

Questions	5	4	3	2	1	DK
1. My co-op supervisor has shared history of his/her career with me.	○	○	○	○	○	○
2. My co-op supervisor has encouraged me to prepare for advancement.	○	○	○	○	○	○
3. My co-op supervisor has encouraged me to try new ways of behaving in my job.	○	○	○	○	○	○
4. I try to imitate the work behavior of my co-op supervisor.	○	○	○	○	○	○
5. I agree with my co-op supervisor's attitude and values regarding education.	○	○	○	○	○	○
6. I respect and admire my co-op supervisor.	○	○	○	○	○	○

7. I will try to be like my co-op supervisor when I reach a similar position.
8. My co-op supervisor has demonstrated good listening skills in our conversations.
9. My co-op supervisor has discussed my questions or concerns regarding feelings of competence, commitment to advancement, relationships with peers and colleagues, and work/family conflicts.
10. My co-op supervisor has shared personal experiences as an alternative perspective to my problems.
11. My co-op supervisor has encouraged me to talk openly about anxiety and fears that distract me from my work.
12. My co-op supervisor has conveyed empathy for the concerns and feelings I have discussed with him/her.
13. My co-op supervisor has kept feelings and doubts I shared with him/her in strict confidence.
14. My co-op supervisor has conveyed feelings of respect for me as an individual.
15. My co-op supervisor has reduced unnecessary risk that could threaten the possibility of being hired full-time upon graduation.
16. My co-op supervisor helped me finish assignments/tasks or meet deadlines that otherwise would have been difficult to complete.
17. My co-op supervisor helped me meet new colleagues.
18. My co-op supervisor gave me assignments that increased written and personal contact with hiring managers.
19. My co-op supervisor assigned responsibilities to me that have increased my contact with people in my field who may judge my potential for future advancement.
20. My co-op supervisor gave me assignments or tasks in my work that prepare me for a full-time position in my field.
21. My co-op supervisor gave me assignments that present opportunities to learn new skills.

Next

The University of Alabama at Birmingham

UAB Career Services

Charting Your Course

Survey of Cooperative Education Experiences

PART 2 (of 4): TIME SPENT WITH CO-OP SUPERVISOR

1. Estimate the number of hours you spend interacting (i.e., conferencing, discussing directions or activities, receiving guidance, assistance) with your co-op supervisor in a typical week.
   - ○ 0 – 1 hours
   - ○ 2 – 3 hours
   - ○ 4 – 5 hours
   - ○ 6 – 7 hours
   - ○ 8 or more hours

2. How often do you interact with your co-op supervisor in a typical week (receiving coaching, guidance, information, support, assignments, communicating)?
   - ○ 0
   - ○ 1 – 2
   - ○ 3 – 4
   - ○ 5 – 6
   - ○ 7 – 8
   - ○ 9 or more

3. How many supervisors have you had in cooperative education?
   - ○ 0 – 1
   - ○ 2 – 3
   - ○ 4 – 5
   - ○ 6 – 7
   - ○ 8 or more

4. How many terms have you worked with your current, direct supervisor?
   - ○ 0 – 1
   - ○ 2 – 3
   - ○ 4 – 5
   - ○ 6 – 7
   - ○ 8 or more

Next

The University of Alabama at Birmingham

UAB Career Services

Charting Your Course

Survey of Cooperative Education Experiences

PART 3 (of 4): DEMOGRAPHIC CHARACTERISTICS

1. What is your GENDER
   - ○ Male
   - ○ Female

2. What is your ETHNICITY
   - ○ African American
   - ○ Asian American
   - ○ Caucasian
   - ○ Hispanic
   - ○ Pacific Islander
   - ○ Other - Please Specify:

3. What is your AGE

4. How many semesters have your participated in Cooperative Education (work terms)?
   - ○ 1 semester
   - ○ 2 semesters
   - ○ 3 semesters
   - ○ 4 semesters
   - ○ 5 semesters
   - ○ 6 semesters
   - ○ 7 or more

Next

The University of Alabama at Birmingham

UAB Career Services

Charting Your Course

Survey of Cooperative Education Experiences

PART 4 (of 4): Contact Information

If you are interested and willing to share information about your experiences in cooperative education, please provide your contact information below. Matt Fifolt, the Principal Investigator, will be conducting brief (10 - 15 minute) follow-up telephone interviews with a selected number of students and would appreciate your additional participation. (As a reminder, all information will remain confidential.)

*****Individuals selected for follow-up interviews will receive a movie rental gift card.*****

1. Name:

2. Telephone Number (primary):

3. Telephone Number (secondary):

4. E-mail address:

Next

Survey of Cooperative Education Experiences

THANK YOU

Thank you for your participation in this study.

Results of the findings will be available at the conclusion of the study.

Exit

APPENDIX F

INTERVIEW PROTOCOL

Students' Perceptions of Mentoring in a University Cooperative Education Program

Interview #:
Pseudonym:
Date:
Time:
Length of Interview:

- In your co-op placement, describe...
  - Type of work/responsibilities
  - Interactions with other co-workers
  - Interactions with supervisor
  - Has your relationship with your supervisor changed over time?
  - Have your expectations of your supervisor changed over time?

1. How would you describe the frequency and quality of your interactions with your supervisor?
   - How often do you meet?
   - What do you typically discuss?
   - Is your supervisor the same sex/opposite sex from you?
   - Is your supervisor the same race/different race from you?
   - To what extent has the role of gender and ethnicity been a factor in the frequency and quality of your interactions with your supervisor?

2. The primary concept of this study is to look at supervisors who provide a mentoring role – both career support and friendship and encouragement. To what extent would you say that your supervisor fulfills these mentoring roles?

3. What might account for the scores (high and low) on the web-based survey?

4. Are there other supporting individuals, other than your supervisor, that you would say have provided a mentoring role?

- Are there specific positive or negative experiences that you have had with your co-op supervisor that would like to share?

Address information to send Movie Rental Card

APPENDIX G

INSTRUCTIONS FOR TELEPHONE INTERVIEW AND INFORMED CONSENT

Instructions for telephone interview (informed consent)

Notify participant that he/she will be put on speaker phone.

Inform participant that this conversation is a follow up to the web-based survey and that the conversation will be audio-recorded and transcribed verbatim.

Proceed with the following statements:

“I want to remind you of your rights as a participant that were outlined in the web-based survey and review with you some additional information about your participation in this follow up phone interview.”

“After I have read these statements, you may ask for additional information, decline to participate, or agree to continue as a participant in this phase of the research.”

- The follow up interview should take approximately 10-15 minutes
- There will be no cost associated with participating and you will receive a $10 gift card at the successful conclusion of the phone interview.
- All data gathered will be stored in a locked metal file cabinet.
- Your information will be kept confidential and will be destroyed within one (1) year of the conclusion of the study.
- Your survey data and interview data will be linked for comparison purposes and you will be asked to honestly discuss your experiences in cooperative education. Since experiences may be both positive and negative, a breach of confidentiality is possible. If this occurs, you may be identified as having negatively evaluated your program.
- You will be assigned an interview number and pseudonym to minimize the possibility of this breach of confidentiality and any other identifying characteristics will be removed.
- You should feel free to discuss your experiences without identifying the name of your co-op employer or the name of your supervisor.
- Your participation in this research is voluntary and you may withdraw at any point without adversely affecting your relationship with the investigator. Your decision will not result in any loss of benefits to which you are otherwise entitled, and your responses will not affect your standing in the program.
- There may be additional follow up correspondence to verify themes in the data.

If you would like additional information regarding your rights as a research participant, you may contact the following individuals:

Associate Director of Cooperative Education

Regulating Compliance Officer for IRB

Matt Fifolt, Principal Investigator
(205) 934-4302

Do you understand these statements?
Do you accept these conditions of participation?

Shall we continue?

APPENDIX H

INSTITUTIONAL REVIEW BOARD APPROVAL FORM

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

Institutional Review Board for Human Use

Form 4: IRB Approval Form
Identification and Certification of Research
Projects Involving Human Subjects

UAB's Institutional Review Boards for Human Use (IRBs) have an approved Federalwide Assurance with the Office for Human Research Protections (OHRP). The UAB IRBs are also in compliance with 21 CFR Parts 50 and 56 and ICH GCP Guidelines. The Assurance became effective on November 24, 2003 and the approval period is for three years. The Assurance number is FWA00005960.

Principal Investigator:	FIFOLT, MATTHEW M
Co-Investigator(s):	
Protocol Number:	**X051123009**
Protocol Title:	*Students' Perceptions of Mentoring in a University Cooperative Education Program - Pilot Study*

The IRB reviewed and approved the above named project on 12-20-05. The review was conducted in accordance with UAB's Assurance of Compliance approved by the Department of Health and Human Services. This Project will be subject to Annual continuing review as provided in that Assurance.

This project received EXPEDITED review.

IRB Approval Date: 12-20-05

Date IRB Approval Issued: 12-20-05

Marilyn Doss

Marilyn Doss, M.A.
Vice Chair of the Institutional Review
Board for Human Use (IRB)

Investigators please note:

The IRB approved consent form used in the study must contain the IRB approval date and expiration date.

IRB approval is given for one year unless otherwise noted. For projects subject to annual review research activities may not continue past the one year anniversary of the IRB approval date.

Any modifications in the study methodology, protocol and/or consent form must be submitted for review and approval to the IRB prior to implementation.

Adverse Events and/or unanticipated risks to subjects or others at UAB or other participating institutions must be reported promptly to the IRB.

470 Administration Building
701 20th Street South
205.934.3789
Fax 205.934.1301
irb@uab.edu

The University of
Alabama at Birmingham
Mailing Address:
AB 470
1530 3RD AVE S
BIRMINGHAM AL 35294-0104

APPENDIX I

SAMPLE INTERVIEW

Students' Perceptions of Mentoring in a University Cooperative Education Program

Interview #:	13
Pseudonym:	"Courtney"
Date:	5/1/06
Time:	6:00 pm CST
Length of Interview:	13:30

[Informed consent reviewed]

M: Do you understand these statements?

C: Yes.

M: Do you wish to continue?

C: Yes.

M: In your co-op placement, would you please describe the type of work that you do and your responsibilities?

C: I've been doing utility distribution systems…mostly in steam and hot water systems. As of right now, I have full responsibility. I complete all of the civil department's work as of right now. I have done all the CAD work. I meet with contractors, I do construction admin. – which consists of going and checking on the contractor and I also hire the surveyors for the different jobs. We work with different universities to do their steam systems.

M: What is your major?

C: Civil Engineering.

M: Can you tell me about your interactions with other co-workers?

C: I work with the civil group and the mechanical structure group and my boss and I work hand in hand with everything. We do all the work together and the design work together. The mechanical group…we just make sure the information goes together.

M: In addition to your supervisor, do you have a good amount of interaction with others on a daily basis?

C: Yes. I'm actually the contact person for the electrical group and the other mechanical group upstairs. They tend to come to me when they have a civil problem within their designs.

M: Is the environment more professional, more collegial – can you describe the environment a little bit?

C: It's mostly professional – I mean everyone gets along really well. A lot of the people are pretty good friends outside of work. I'm strictly professional though with everyone there.

M: Can you tell me about your interactions with your supervisor?

C: Well, we just talk every day and make sure that we get all the projects done. We go out to job sites and look at any work we need and go to meetings. We have a pretty good relationship…he's just learning the more manager aspects of his job because he was just placed in this position. So, we're kind of working through that but (garbled) it's pretty good. He puts a lot more work on me than probably should be placed…

M: Just because he's new?

C: He was originally in the mechanical department but worked somewhat in the civil

aspects and then my original boss was fired and he was put in his position. So he's learning both civil and manager aspects of his job.

M: How long did you work for the previous boss?

C: One rotation.

M: And you've been with this other person one rotation?

C: Two rotations. I'm finishing up in a week actually.

M: Has your relationship with your supervisor changed over time?

C: Well, when he wasn't my boss, he was very good at teaching but now that he's been placed in this position he's very stressed out and so I think that might affect his teaching a little bit but he's still a very good boss. He's just…there's two of us in the civil department besides him and he just has a hard time separating the work between the two of us. He just tends to give it to me because I'm faster and more efficient. So, it's just a little bit more stress.

M: Have your expectations of your supervisor changed over time?

C: It's probably gone down a little bit just because I realize how much stress he's under and so I just kind of try to help him more than try to get information out of him I guess.

M: How often do you meet? Everyday?

C: Yeah, his office and my cube are right next to each other so we're in constant contact.

M: What do you typically discuss?

C: Just design issues. If there's a problem out in the field we'll talk about that. We'll just talk about how the design's going and how far I've taken it and if it's meeting the deadline and whatnot.

M: You said that your supervisor is a male?

C: Yes.

M: Is your supervisor the same race/different race from you?

C: Same (Caucasian).

M: To what extent has the role of gender and ethnicity been a factor in the frequency and quality of your interactions with your supervisor?

C: Well, at first he was…I think a lot of the guys didn't think that I would necessarily be willing to do a lot of the work things but over time they realized that that wasn't true. So, I'm just like anyone else now. They've gotten over that. I'll climb in a manhole just like anyone else.

M: And that's with everyone, not just your supervisor?

C: Yeah, it's pretty much with everyone. It's very weird for them to have a girl probably because I'm the first one in our department at least. It's taken a little bit of adjustment but it's really good. They're good with me.

M: At this point is it not as big of an adjustment for them?

C: Yeah, they're completely used to it now. In the beginning they were like, OK t here's a girl but they got used to that.

M: The primary concept of this study is to look at supervisors who provide a mentoring role – both career support and friendship and encouragement. To what extent would you say that your supervisor fulfills these mentoring roles?

C: He's been a very good mentor. I enjoyed having him, he's taught me a lot both about the professional and about just business in general. He's a very good mentor.

M: Is there one area that he's stronger at than another – between career support and guidance?

C: He's probably taught me the most about just engineering in general and just the field. And basically just how stuff goes throughout the career it's just opened my eyes to everything that goes on.

M: From an engineering perspective?

C: Yeah.

M: Have you had conversations in the past just about things outside of work like balancing different commitments or talk about struggles or obstacles he's faced or his career path?

C: Not directly. I mean – we talk about his family all the time. He just had a new baby so I've kind of watched him with that and see how having a family affects the job.

M: And that's a conversation he's had with you but with everyone as well?

C: Yeah, I mean it's not really a conversation like sitting down and talking about it…I don't know we just kind of grew with it…if that makes sense.

M: Are there other supporting individuals, other than your supervisor, that you would say have provided a mentoring role?

C: Probably anyone in…there's two different floor shops, so anyone downstairs has been very good at teaching me everything they could. There's also been a few

individuals upstairs that are in the project management positions that have found a way to help me and teach me.

M: Are there female supervisors that have provided a role model in such a way?

C: There's no female supervisors at my company.

M: Have you identified other female engineers in terms of professional development outside of your work?

C: I haven't really been around that many other than with school. There's no other female engineers with my company and other than that I haven't really been around that many very much.

M: Do you think that's important?

C: I think it could be important…I could probably learn a lot from their side of things but since I'm not around it I don't know how different it is right now.

M: Do you think mentoring is important when you go through an experience like cooperative education?

C: Yes, definitely. Probably the basis of my whole experience.

M: Are there specific positive or negative experiences that you have had with your co-op supervisor that would like to share?

C: Not really, I mean the only problem we've had is time management and having a little bit more responsible than a co-op probably should have but it's also made me learn a lot more than what I could have learned somewhere else.

END OF INTERVIEW

APPENDIX J

SAMPLE INTERVIEW ANALYSIS

Students' Perceptions of Mentoring in a University Cooperative Education Program

A=Psychosocial support
B=Career-related support
C=Time as a factor
D=Influence of gender/ethnicity
E=Explanation of scores
F=Others as mentors

1. Can you tell me about your interactions with your supervisor?

A	B	C	D	E	F	Comments
x	x					5: I don't know how much a difference it would make, but he (supervisor) did take us on a business trip which I thought was kind of a big deal because I hadn't heard many of my co-op friends say that they had gone along with the supervisor on a trip. But the major project we were working on required that we go out of town and look at the other site's operations and evaluate them so that we could bring back that knowledge and see how we could change our processes. **I thought that was a pretty big step that they would say "OK co-ops you can come with me because I value your input and I want to know what you see as opposed to the way that I see the process."**
x		x				5: I hadn't had many of my major courses yet and so **my supervisor was very understanding of that fact and worked pretty close with us to make sure that we understood everything that was going on.** Once we got a hang of things and understood how the business was run and what kinds of things the department was responsible for he gave us more and more responsibility and he's kind of let me go on my own and do my work and rarely check up because I was pretty good about checking in with him if I had any questions**.** So basically he would assign me a project and I would check back with him**. It was a very open relationship where if I had any questions I felt free to walk in his office and say "Hey, I don't understand this," and he'd gladly explain anything.** It was a very good experience.
x						8: I can walk into his office whenever I need to and ask him

			questions.
x			9: He ensured that if I had any questions that he could at least direct me to the answers. **He helped me a lot technically because I wanted to do similar things to what he did** – he answered a lot of questions that I had. From a business standpoint, he would give me direction about where to go to ask for answers about HR-type questions.
x			9: My experience with the company I worked for was excellent. **They were very open to moving me around** and the organization seemed to work very well together. The entire organization worked very well to bring me in and they helped to push me in the direction that I wanted to be pushed. They didn't force me into doing something that I wasn't interested in doing.
	x	x	9: **I was treated pretty much as a full-time employee.** The first time around they treated me with the same amount of respect but the task they gave me was more – they were trying to get me involved with a lot of different people. I wasn't tasked to do one specific project but I was tasked to work with a lot of different employees. They would have me working a couple of weeks here, a couple of weeks there. And the tasks they gave me pretty much – like the data mining, finding information, shadowing different engineers that kind of stuff. **The second time around I was given my own tasks to complete. They were kind of small tasks but I was given my own reign to go off and do it myself and I learned how to interact with different employees.** My direct manager said, "Just go off and figure out how to do this," so I'd go off and learn how to – find out what employees to talk to about the project. Then by the last semester, I was actually treated like a full-time employee fully.
	x		9: **I was assigned to do a lot of menial tasks but a lot of those tasks were just preparing me to be a better engineer.** How to look up research information, how to find out about the technology, that kind of stuff which in the long run helped out.
	x		11: I guess it was pretty good. At the beginning, in my first rotation, she was pregnant so she was doing work and she wasn't in the office. She was probably in the office once a week. And after that, she was probably in the office 3-4 times a week. I didn't really do work with her but she'd do the control drawings and hand them off to me. We didn't really work together, though.
		x	6: Well, I think that the overall experience was a positive one because my supervisor was so hands-off and aloof I guess. Just because it allowed me to be more individualized and kind of find my own way in the process and it gave me a lot of responsibility like when she'd come to me and ask me to do things and not provide a whole lot of follow up like I could just

	go with it and learn a lot on my own and rather than having someone micromanage me.
x	13: Well, we just talk every day and make sure that we get all the projects done. We go out to job sites and look at any work we need and go to meetings. We have a pretty good relationship…he's just learning the more manager aspects of his job because he was just placed in this position. So, we're kind of working through that but it's pretty good. **He puts a lot more work on me than probably should be placed**… He was originally in the mechanical department but worked somewhat in the civil aspects and then my original boss was fired and he was put in his position. So he's learning both civil and manager aspects of his job.
x	6: Most of my correspondence with my supervisor happened via e-mail. **Most of the time I would get an e-mail explaining something that needed to be done without a whole lot of direction.** She'd ask me to start working on it and then with questions I'd always go to her but a lot of times she was just hard to get up with her. **Her door would be closed and she'd be on the phone and I just felt like I was waiting outside her door to talk with her.** So mostly e-mail was the best way to get any information.
x	7: **I basically interact with him when something needs to get done that he's given me**. Sometimes I get projects from other co-workers. Usually it's doing some data analysis with him or helping him with an experiment. 12: Everyday I'm going to my project engineer and asking him about certain things and making sure I'm doing something right or I'm contacting someone else and making sure this is the step I need to take. 11: My manager and my supervisor and a few people that I worked directly under…I think it was generally a good relationship. They gave me work, I did it, and then I returned it to them – that was about it. 12: In my opinion – everybody that's ahead of me is my supervisor – that's my honest opinion. I do have a resident engineer and an area engineer I guess they'd be considered my true supervisors but my project engineer and some of the older guys I consider them my supervisors.

2. Has your relationship with your supervisor changed over time?

A	B	C	D	E	F	Comments
x		x				6: Yeah it did…as I was found to be a pretty responsible employee, my supervisor would come to me with more pressing

			issues that needed to be done and she knew that I could get them done so she was asking me to do that **so I felt that she trusted me more and more**. **And then we got to know each other a little bit better so when we talked we talked about things like her family and stuff so she'd tell me about things like that sometimes.**
x	x		9: Well, I definitely became more familiar with him and I think that he had more trust in my ability as an engineer over time. The relationship did not change but we had non-business related…we would go out for lunch maybe once a semester and that was usually…kind of still a formal setting because it was like the last day that I was at work they would all take me out and my manager would come along but I felt very comfortable to go to him for any questions that I had because towards the end I knew that I wouldn't have a mentor after the last term I was working there so I knew I had to have a really good relationship with my manager. **I did spend a lot of time in his office asking a lot of questions to my manager but the relationship was more of getting to know each other over time.**
x	x		10: **I would say as you get further and further into the semester the communication becomes less formal, more personal and more friendly**.
	x		8: He gives me a lot more responsibility and increases the amount of work.
	x		8: My third rotation, I started to do a lot of project management stuff and **my supervisors gave me a lot more responsibilities than I've had in the past.** My role at the plant changed more for my third rotation to a real employee instead of just an intern. **The first rotation, I spent the whole rotation basically learning the ropes and then by the last rotation I had a lot more responsibility.**
	x		11: Yeah. At the beginning, I guess she would try to spend more time with me – trying to make sure I understood everything about it but at the end she would just e-mail me things and she wouldn't really tell me what to do, I'd just do it.
		x	13: Well, when he wasn't my boss, he was very good at teaching but now that he's been placed in this position he's very stressed out and so I think that might affect his teaching a little bit but he's still a very good boss. There are two of us in the civil department besides him and he just has a hard time separating the work between the two of us. He just tends to give it to me because I'm faster and more efficient. So, it's just a little bit more stress. 5: I wouldn't say so – it was pretty much the same. 7: No.

12: No. It's pretty much been the same. I know what she expects of me and I go to her for questions and I report to her certain things and that's basically how it's been since I got here.

3. Have your expectations of your supervisor changed over time?

A	B	C	D	E	F	Comments
		x				5: Yes, **he gave me more reign of projects I was working on.** Like he would say, I want you to do this and I pretty much took it from there. **As far as responsibility, he gave me more, entrusted me to get my work done.**
		x				10: I would say yes. **I feel like now that I have more experience with the company that I feel I'm more in tune with decisions and my knowledge of what's going on is a lot higher.** And I expected to get more out of it because not only the knowledge I've gained through school but through work I feel that I'm more capable of taking on larger tasks.
		x				12: No. She's lived up to what I'd expect for a supervisor to be and she's been good. I guess she expects more of me - which is appropriate – this is my second rotation. I would say that would be my number one difference. In my first rotation it was more of getting my feet wet. I didn't have a set job to handle I went to different job sites with different people and now I have my own projects as well as helping out with other people. So I guess that would be the major difference in our relationship. **She expects more of me and the responsibility is greater that she expects me to have.**
						6: Not really. I think I got a pretty good understanding of how she works from the first week that I was there and not a whole lot changed over time. I never really expected anything different from her as time progressed.
						7: No.
						9: Actually, I would have to say probably not. I expected from him since the beginning to dictate the types of products I would work on and it stayed pretty constant throughout the time that I worked there. In the division meetings, he would be the one handing out jobs to all of the other employees in my division and he handed out most of my tasks. As I acquired projects, he was the one to hand them out and then my mentor was the one to help me with those projects
						11: Not really. I don't think so.
						13: It's probably gone down a little bit just because I realize how much stress he's under and so I just kind of try to help him more than try to get information out of him I guess.

4. What do you typically discuss?

A	B	C	D	E	F	Comments
x						5: **Actually, it's funny. We found out that we're both originally from the same city and so we used to talk about some of the sports teams from back in Xxxxxx**.
x						9: It was usually me asking him questions. The questions I would usually have was in case my mentor wasn't there and I'd ask him the type of questions I'd ask my mentor like how would I go about getting to the next step in my project and that type of stuff. It was very informal. **He didn't criticize a lot of the things I did because he knew that it was a learning process.** The really formal stuff that he had to call me in for was regarding HR matters stating there was a problem with paperwork, we need you to do this, we need you to do that. He was more of just a supervisor, he didn't micromanage at all to the extent of my engineering ability.
x						10: I mean, **we talk personally sometimes about common interests. And myself and him and a couple of other guys normally go uptown together on Fridays and so we do have personal conversations as well**.
				x		6: Pretty much just the progress of whatever I was working on. How it was going, who I had talked to most recently. She always asked if I needed help but mostly she wouldn't offer to help a lot she'd just kind of direct me on who to talk to. **A lot of times I just felt like I was doing more of her work than I should have. Like simple stuff that she really should have taken care of she'd oftentimes ask me to take care of like talking to higher level employees within the company which I thought would have been better if they had spoken with her about whatever the situation was rather than having a co-op speak to them.**
				x		11: **We didn't really discuss anything.** She'd just give me my work. Every once in while she'd ask me to translate something for her personally not really job-related.
						5: Projects I was working on. If I had questions about things that were going on. And sometimes he would call me in and clarify some things or ask me to make some phone calls or just check in to see how things were going and to see if there was anything

						else that could be done.
						7: Send him data…let him know what I think about the data and let him look through the data a let me know his opinion about the data as well.
						8: Whatever project I'm working on.
						10: The status of things that I'm working on and a lot of the projects that I'm doing are actually assigned to him but he's passed them off to me as basically one of his employees. When we do data acquisition or working on any sort of analysis projects at times we work side-by-side and other times it's just me doing the work and then when I'm finished I present it to him.
						13: Just design issues. If there's a problem out in the field we'll talk about that. We'll just talk about how the design's going and how far I've taken it and if it's meeting the deadline and whatnot.

5. To what extent has the role of gender and ethnicity been a factor in the frequency and quality of your interactions with your supervisor?

A	B	C	D	E	F	Comments
			x			5: No, not at all.
			x			6: **I don't really see a direct correlation between the fact that she was a female and I was a male and how we interacted. I mean, I've had other female supervisors before and it wasn't the same so it wasn't just the fact that she was female and I was male made it different.**
			x			6: **I guess I just felt that it was easier to work with someone that was of my same ethnicity just because I was more comfortable with that person but I don't really think it affected how we worked together** because I don't think she worked together with me very well at all. So I could have worked as well or better with a person of another race.
			x			7: I don't think it has at all.
			x			8: None.
			x			9: Well, I would say that it didn't play a difference at all. The type of group that I worked with had been working together for a very long time and there were probably at most about five females in the group ranging from entry level engineer to lead engineer so that means that **I worked under a couple of women engineers in some groups and I didn't perceive any issues with other people with her and I had no issues. I treated her as the lead engineer. I didn't see the gender.**
			x			10: I wouldn't say that it creates any difference in terms of who I deal with or how those conversations go. **Most of the people**

						that I work with are male because it is predominately an engineering environment and it seems that many – at least Mechanical Engineers – tend to be male. That's just kind of how the environment is.
					x	11: Not with her…**but I think with everyone else in the office it did. I'm Hispanic and most of the people working there were white male and they didn't seem to like giving a female work to do. They didn't seem to want to trust me with their projects.**
					x	12: I'd say none. I mean everyone around here - we know what we're expected to do. Every now and then we'll have classes that we need to take online. I know last year we had to take a sexual harassment class and we've had to take a discrimination class. Around here it's really kept up to not cross any lines and everyone expects everything so…**She doesn't treat me any differently than anybody else. She treats everyone fairly and the same.**
					x	13: Well, at first he was…**I think a lot of the guys didn't think that I would necessarily be willing to do a lot of the work things but over time they realized that that wasn't true. So, I'm just like anyone else now. They've gotten over that. I'll climb in a manhole just like anyone else.**
					x	13: It's very weird for them to have a girl probably because I'm the first one in our department at least. It's taken a little bit of adjustment but it's really good. They're good with me. They're completely used to it now. **In the beginning they were like, OK there's a girl but they got used to that.**

6. The primary concept of this study is to look at supervisors who provide a mentoring role – both career support and friendship and encouragement. To what extent would you say that your supervisor fulfills these mentoring roles?

A	B	C	D	E	F	Comments
x	x					5: I would say, pretty good as far as career. **We did talk a lot about his co-op experience and how he got started in the industry and how he gradually moved up** and he offered advice about classes and stuff while I'm still in school. As far as friendship – it was a very business-like and professional relationship but **he was encouraging of my work**.
x	x					6: **I would say she pretty much did not fulfill a mentoring-type role at all** like the most ever was she offered to look at my resume later to let me know how I could rewrite it to make it better but she never followed through with that like even when I left. And other than that, she never really provided any career-direction or advice on how to succeed really. **And as far as the**

		friendship-type encouraging role she didn't really find out much about my life at all. She would oftentimes tell me about her family and how it was going and stuff and I'd kind of listen to her talk about that but she didn't really get to know me very well to encourage me in my life or find out how she could help me. I mean sometimes her kids were in plays and I'd go see them but there was never any reciprocation of that like her coming to watch me get inducted into an honor society or anything.
x	x	10: **In terms of career development, we've talked a number of times about not only how my mentor has gotten to where he is but other people that we deal with**…I'll ask from time to time, what is so-and-so's position or what does this person do and he'll give me kind of an overview about what that job title is and what all that entails so that I get a perspective of different levels, different grades. It just gives me a better idea on what people do and how you get to that point. **And in terms of personal interaction, I'd say that we're definitely friendly to one another and we definitely do talk about things outside of work** but I would say probably 90% of our conversations are work-related.
x	x	12: **In career support and development – I think she's done great. She's opened my eyes**. She did private work and now she works for the government so she's seen it both and she's filled me in on things about my career and whatnot so I'd say in that regard she's been good. And the other items (friendship, support, encouragement), she's been good. I don't go to her house and hang out so to say but when I come to work, it's part of my family**. I consider her another mom. I mean, she looks out for me and tries to do what's in my best interest and I greatly appreciate that.**
x		9: **I would say that he did a fairly good job of completing the "warm feeling" for the company**. He did a very good job of answering all of the questions that I had. **He was very good at positive reinforcement.** I mean, I didn't really make any mistakes engineering-wise but he was very good about – if something like an accident happened he didn't get upset or anything like that he just – he was OK with it I guess. He was very positive to that end. We didn't go out and have lunch every week and I didn't see him sometimes for weeks on end but…
x		10: I know some of my friends who have worked in the past have not had as favorable of experiences…they may not be "tasked" as highly or **they may not be given the support and encouragement that I have been given.**
x		13: **We talk about his family all the time.** He just had a new baby so I've kind of watched him with that and see how having

			a family affects the job. It's not really a conversation like sitting down and talking about it…I don't know we just kind of grew with it…if that makes sense.
x		x	10: I've talked with him a little about that (career path) and other people that have been with the company 10 or so years just to kind of get a feel on how you progress in your career and the inner-workings of the company just to see how things work.
x			7: He's helped with discussing classes to take. Some classes that are not required for my major I've determined I needed to take based on my work here. So, he's encouraged me to take those classes and is allowing me to take some of those classes while co-oping so that I can get that experience. **He's also discussed going into grad school and things like that because it would probably help me get into a manager position which is kind of where I want to go.**
x			7: He's encouraged me with all of my schooling but as far as friendship…I mean he responds in a friendly manner but I wouldn't say more of a friendship sort of thing.
x			8: He's done a really good job of it. I've talked with him a lot. I'm graduating this semester. **I do talk with him a lot about my future career choices and his career path and all that kind of stuff.**
x			11: I think that she gave me a lot of advice like dealing with people out on the field. And she gave me advice about school too… I'm not sure I want to continue in engineering – Mechanical Engineering – **she showed me some other options of things I could do with the degree**. I'm really close to finishing my degree so it would kind of be pointless to switch to another major right now so she said that with a Mechanical Engineering degree I could go into law school or even med school, other options. Even with a Mechanical Engineering degree I don't have to go into engineering.
x			13: He's been a very good mentor. I enjoyed having him, **he's taught me a lot both about the professional and about just business in general.** He's probably taught me the most about just engineering in general and just the field. And basically just how stuff goes throughout the career it's just opened my eyes to everything that goes on.
	x		7: I think for my first rotation it (orientation to workplace/mentoring) was more important than it is now. In my first rotation I was kind of trying to figure out what was going on but now I'd kind of rather be given something and asked to do it rather than having to be "dragged along" the whole time.
			12: I think it's good that you have all your co-workers but **having that one person to go to and I guess really respond to and their goal is to help you out – that's a great thing to**

have. It just makes the experience so much better and I think you take more from it because of that.
13: It's probably the basis of my whole experience (mentoring).

7. What might account for the scores (high and low) on the web-based survey?

A	B	C	D	E	F	Comments
x				x		12: **I guess for me, always being there for help– that's what I consider being a highpoint.** I can go to her and not have to worry about am I going to get this back. Or she's not going to see me because she's always there and open and she makes that a point, come talk to her if we're having trouble. That's why I did the high scores.
				x		5: **I think it was because it was just a very open relationship**, his door was always open if I had any questions. I never felt intimidated. I did work with another guy but I never felt that being a female – that he favored the male co-op over me, the female co-op. I mean, he treated us the same and that helped me trust him and be able to do my work better.
				x		7: **Organization**. Having work for me to do. Sometimes I really don't have anything to do. And also organization as far as being more clear about what to do.
				x		8: **Just the informal relationships that I have had with all of my co-workers. They've all been very helpful and they've gone the extra mile whenever I needed it.**
				x		10: I think in general, at least this current co-op rotation I'm going through, I get along with everybody that I work with. Everybody I think feels that I'm performing well – I'm meeting my duties and when I've faced with challenging things I think I handle them pretty well. I think the combination of my respect for them and what they do and their respect for me in terms of how I conduct myself and how I get things done…I think that ends up helping out in terms of the personal thing. **They respect me on a professional level as well as a personal level.**
				x		11: Well, **I generally liked working there** and my co-op rotation ended but I'm still working there part-time right now. I mean, generally I like it because – I've got a laptop – they gave me a laptop - so I don't have to be in the office to work. I can do it from school of from home and I personally like that.
				x		13: **The only problem we've had is time management and having a little bit more responsiblility than a co-op probably should** have but it's also made me learn a lot more than what I could have learned somewhere else.

8. Are there other supporting individuals, other than your supervisor, that you would say have provided a mentoring role?

A	B	C	D	E	F	Comments
	x				x	11: I also worked out on one of the job sites and there I had a different supervisor I guess. I liked him a lot. He offered me advice on what to do when I graduate and things like that.
					x	5: Yes. She was – I guess she was a contractor in one of the other departments and I had been assigned to help her with a major project and **being another female engineer she really supported me and we talked a lot about being a female in the industry and what you had to do to get ahead and the obstacles we face.**
					x	6: Yeah, actually that manager for the contracted labor – I worked with her pretty frequently and **she was much more like a mentor-type person like she was really easy to get along with and very helpful with anything I ever needed and she helped me figure out how to interact with people better.** I mean, she didn't really give me advice or anything but more of watching her she provided me with a mentor role. **And I guess as far as encouragement too, she did get to know me and who I was**.
					x	7: I've had a lot of interactions with co-workers specifically with encouraging me to go to grad school or get some grad-level program in because they've said they all regretted not going and encouraging me to at least look into it. And also encouraging me to take as many classes as I can that would probably help me in the long run even though it may not be required for me. **Also, with giving me work to do or having me help them with something they are willing to explain exactly what is going on and exactly what's happened in the past.**
					x	8: Some of the other engineers, **pretty much all of the engineers at the plant at some point since I've been there – I've gone in and talked to them about their jobs and what they like about it and get that information to help me make decisions about what I want to do.**
					x	8: I'm involved with Xxxxxx - and when I started thinking about a career in HVAC over manufacturing which is what my co-op is in, **I contacted the local professional association and asked them to put me in touch with a female engineer for a mentor. So they gave me a couple of people's names and I**

went out to lunch with one of the girls and talked with her about her career and toured her company and she gave me some more contacts.

- x 9: **Throughout the entire process I had a mentor. Just someone who helped me out and made sure I was doing alright** but for the last term I didn't have a mentor and I was treated like a full-time employee.
- x 9: Well, I think the relationship I had with my mentor was – **I viewed him more as a colleague and a co-worker. I didn't feel like he was evaluating me in a big sense and so my business mannerisms relaxed just a little bit.** I felt just a little bit more comfortable to trust –personal things. I mean I wouldn't go really in depth but with my boss, there was that feeling of evaluation that always came with that.
- x 9: **The other people who I think gave me the biggest help were the new hires…people who had just stared working**. What they provided for me was…, they had a lot of the answers that I had about working there and about getting things done because most of the people that work there – the average age is 40-45 and so there is a gap of about 10 years of people so I got a lot of the questions I wanted answered that I knew my mentor and my boss may or may not understand I got those resolved with the people who were recently hired because they obviously had recently gone through the same situation and they knew what I was going through because they had gone through it themselves.
- x 10: My manager is the manager for everyone in the entire group. And so he does my performance evaluations, all the paperwork, and all that kind of stuff where **my mentor…he's just the person I report to everyday and give updates to. He's a lot more in tune with what I do on a day-to-day basis** where my manager is in charge of all the administrative things.
- x 10: I have a manager who does my performance evaluations and then I have sort of a mentor that I do most of my work for and I deal with him on a daily basis.
- x 10: **I would say that there are a couple of colleagues of my mentor that I have talked to from time to time about work and about career development and also personally, they've been very favorable and are willing to answer any questions I have about that sort of thing.**
- x 12: We have the older guys who've been here a long time and we have a couple of younger guys – myself and a couple of other young men. We help them out with certain things – with the new technology and they help us out with the way things are run around here. It's a good "blending" of personalities as well.
- x 12: Definitely. My first rotation, my project engineer,

construction and just his knowledge – **he passed on so much to me as well as all my other co-workers. I've taken something from everyone**. **My current project engineer, he's taught be a lot about the business-side of stuff.** What goes on and what to do and the middles (specific term) and the paperwork. And that's helped me out a lot too. **I gather something from all my co-workers and I think that's what makes this job really a good experience for a co-op in my field. Because you learn so much about how business is done.**

x 13: Probably anyone in…there's two different floor shops, so **anyone downstairs has been very good at teaching me everything they could.** There have also been a few individuals upstairs that are in the project management positions that have found a way to help me and teach me.