Faculty technology mentoring: how graduate student mentors benefit from technology mentoring relationship

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Faculty technology mentoring: How graduate student mentors benefit from technology mentoring relationship

by

Sonmez Pamuk

A dissertation submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education (Curriculum and Instructional Technology)

Program of Study Committee:
Ann Thompson, Major Professor
    Donna Merkley
    Denise Schmidt
    Mack Shelley
    Peter Boysen

Iowa State University

Ames, Iowa

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DEDICATION

To my wife Hatice, my children, Oguzhan, Ruya, and Furkan, and to my mother and father, Hatice and Maksut, for their love, inspiration, generous support, and patience.
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ABSTRACT

Literature on the concept of mentoring in general and technology mentoring specifically indicated that studies have investigated mentoring relationships in different settings and reported benefits for the less experienced mentoring partner. However, existing literature was limited in providing insights about mentoring from the more experienced partner’s point of view. But, to establish sustainable and beneficial mentoring relationships, studies suggested that understanding mentor’s reactions to the experience is necessary.

For that reason, the main purpose of this study was to examine a faculty technology mentoring program at a Midwestern university from the perspective of graduate students’ who served as mentors. Based on the social learning theory framework, data were analyzed within the grounded theory research methodology.

Findings revealed that the mentoring experience was also beneficial to mentors in several ways (technical, pedagogical, academic, and professional). According to results, mentors’ benefits were not limited to the observable or to the ones that were more practical in a short time, such as learning new technical skills; instead, benefits extended to the unobservable and occurred over a longer time period (i.e., professional benefits).

In addition to identifying benefits to mentors, several other aspects of mentoring relationships were also investigated: understanding mentors’ thoughts about characteristics of successful technology mentoring; issues in mentoring relationships; and whether or not mentors’ lived mentoring experiences indicated successful mentoring relationships within the their definition of an ideal mentoring relationship.
CHAPTER 1
INTRODUCTION

“There is no doubt that we live in an information age and that technology is the symbol of progress. Each day brings new products, new applications, new hardware and software, and new opportunities to connect with information resources and people. There is an inevitability about the growth of information technology. We expect new developments, new products, and new experiences…” (Ely, 1995).

The use of information technologies, especially computer-based technologies, has become one of the indispensable parts of our lives in this century and has dramatically affected us in many ways (Baldwin, 1998; Ely, 1995). Because of the promising potential of information technologies in general and computers specifically, the number of computer-based units in workplace, home, and school has increased rapidly in the last two decades (Anderson & Ronnkvist, 1999; DeBell & Chapman, 2003; Stevens & Lonberger, 1998). The results of a number of early studies revealed that using such technologies in daily life has produced crucial changes in the worlds of business, entertainment, and communication (OTA, 1995).

We have been in the process of changing our behaviors and attitudes with respect to traditional activities such as shopping, entertainment, and communication due to the presence of technology. As many of us have experienced, today advancements in networking and internet technology has made it possible, for example, to shop at home without the hassle of going to shopping malls; developments in chip technology have made it easier to carry a laptop, use a DVD player to watch a movie at the airport while waiting for an airplane, or use
a telephone while away from the office. Compared to available technology of twenty or thirty years ago, modern technology has dramatically increased flexibility in work, communication, and business, and technology is expected to continue to profoundly affect our lives so long as new developments continue to emerge.

Very large financial investments have been made to support use of information technologies in U.S. schools, and the rate of computer and internet use by Americans in the age range between 5 and 17 years has increased rapidly. However, critics sometimes opine that this technology has not made the same remarkable positive changes in the U.S. educational system, schools, teaching, and learning as it has in other areas (DeBell & Chapman, 2003; Healy 1998; Mean & Olson, 1994; Pearlman, 1989; Schrum, 2005; Spotts, 1999; Stoll, 1999). Although the literature cites several reasons for this deficiency, the most important reason that has emerged is that teachers who have access to technology in their schools and classrooms often lack the ability to meaningfully use and integrate those technologies into their classrooms (Franklin, Turner, Kariuki, & Duran, 2001; Gonzoles & Thompson, 1998; Russell, Bebell, O’Dwyer, & O’Connor, 2003; Spotts, 1999). Investigations regarding this issue in different environments have pointed out that the effectiveness of technology in school settings depends on how successfully teachers integrate it with their educational goals and curricula (Means & Olson, 1994; OTA, 1995; Stewart, 1999).

In the process of such technology integration, teachers’ knowledge of hardware and software technologies is a key component for success, but the results of early implementation has shown that the question of how teachers (educators) use these technologies meaningfully still remains the most important issue to address (Cuban, 1998; Glenn, 2002).
A Department of Education survey of public school teachers around the nation regarding teachers’ use of technology has identified that teacher education programs have a large influence on teachers’ feelings of being well or very well-prepared to use technology for instructional purposes (U.S. Department of Education, 2000). According to the report, half of the participating public school teachers feel at least well prepared because of their teacher education/graduate college programs, and they were, therefore, much more capable of integrating technology. More important, in the DOE study eighty-four percent of teachers who had three or fewer years teaching experience reported that college/graduate work prepared them to use computers and the internet in their classroom and had a generally positive influence on their technology confidence level (p. 78).

Therefore, the importance of teacher education programs on the issue of educational technology integration has received increasing attention by teacher educators. Several studies have concluded that focusing on preservice teacher education programs is the “more logical way” to begin or “the most important step” to be taken in addressing the question of how teachers can use technology more effectively for instruction (OTA, 1995; Steven & Lonberger, 1998; Thompson, Schmidt, & Davis, 2003; Wetzel & Williams, 2004).
The Need for Technology Mentoring in Teacher Education Programs

In recognition of the importance of the relationship between effective use of technology by teachers in K-12 environments and the role of teacher education programs, several studies (Glenn, 2002; Oke, 1992; Thompson, Hansen, & Reinhart, 1996) encouraged teacher education programs around the nation to take on a leadership role and have teacher educators model methodology with which to integrate technology meaningfully into teaching of prospective teachers. To meet the challenge, institutions across the nation initiated and carried out variety of approaches (adding technology courses to pre-service teacher education programs, technology workshops, etc.) in their preservice teacher education programs so that prospective teachers would be exposed to effective use of technology by teacher educators before they go into service in schools (Gillingham & Topper, 1999; Hargrave & Hsu, 2000; Wetzel, 1993).

Efforts to model effective use of technology by faculty members in teacher education programs, however, raise two major concerns: (1) whether or not faculty members are currently well enough prepared to use appropriate types of technologies, and (2) what kind of professional development opportunities institutions should provide to those who lack technical skills and support. Consequently, although a variety of methods have been employed in different institutions to help faculty members, a one-on-one mentoring approach has gained the most credit for its effectiveness in addressing faculty members’ individual technology needs (Beisser, Kurth, & Reinhart, 1997; Chuang, Thompson, & Schmidt, 2003; MacArthur, Pilato, Kercher, Peterson, Malouf, & Jamison, 1996; Stewart, 1999). For instance, the study carried out by Strudler and Wetzel (1999) reported that faculty from several teacher education programs have indicated that the one-on-one approach is an
effective practice in providing support for learning the use of technology in teaching and learning.

Because of its effectiveness in addressing individual needs of faculty members (Franklin, Turner, Kariuki, & Duran, 2001), several institutions have adopted a one-on-one technology mentoring approach as a professional development model to help their teacher educators (Chuang, Thompson, & Schmidt, 2003). The Iowa State University College of Human Sciences (formerly known as the College of Education), is one of the institutions that has been using such a one-on-one technology mentoring model for the past 16 years to address the individual technology needs of faculty members.

Need for the Study

Existing mentoring literature informs us that there are several teacher education programs that have adopted and used mentoring models successfully in meeting their faculty members’ individual needs. In those cases, faculty members have become more proficient and confident in using available technologies in teaching, research, and other professional activities. Effective use of information technologies by teacher educators could eventually provide an answer for the question of how faculty members who lack technical support can model effective technology use to preservice teachers (Wetzel & Williams, 2004).

Studies investigating the growing use of technology mentoring approaches as a professional development model have drawn several conclusions about how mentoring may be effective in helping faculty members, the main characteristics of successful mentoring relationships, pros and cons of the different technology mentoring structure, and so on.
Although these studies have no doubt made great contributions to the mentoring knowledge base, close examination reveals that most of these studies focus mainly on the participating faculty members’ mentee experiences and investigate the relationship from that viewpoint. Relatively few studies include the thoughts of other participants or mentors. To facilitate understanding of the details of technology mentoring relationships within the specific ISU College of Human Sciences framework, we believed that investigating technology mentoring from participating graduate student mentors’ viewpoints was a considerable need. Deeper understanding of participant mentors’ experiences would very likely reveal some important details about previously invisible components of the current mentoring structure and help us think about how to make the relationship more sustainable, efficient, and beneficial to both sides, mentor and mentee.

Therefore, this study was aimed at investigating this missing part of the current literature on technology mentoring through deep analysis of mentors’ experiences based on the following research questions.
Research Questions

The purpose of this study was two-fold: (1) investigate graduate students’ experiences with one-on-one faculty technology mentoring in a College of Human Sciences at a large Midwestern research-based university and (2) describe important dynamics of a successful mentoring relationship based on the perspectives of mentors. Thus, the following guiding questions were created:

1. What do mentors report as benefits of participating in the technology-mentoring program?
2. What kinds of factors influence mentors’ perception of benefit?
3. What are the characteristics of a successful technology-mentoring program?
4. Do the mentoring experiences of the mentors reflect their views of a successful mentoring program?
5. What are the strengths and weaknesses of the faculty technology-mentoring program from mentors’ perspectives?
6. Do former mentors use their mentoring experiences in their professional life?
CHAPTER 2
LITERATURE REVIEW

As discussed in the Chapter One of this study, the mentoring model has been suggested as one effective solution to address the need for professional development in educational settings. Therefore, this chapter is intended to provide more insights about the concept of mentoring and its implementation at a Midwestern university. To do so, details on mentoring including mentoring as a professional development model, use of mentoring in education, evaluation of mentoring relationships, and explanation of the concept of benefit within the social learning theory framework are provided in this chapter.

Our literature review, first of all, begins with broader look over the mentoring as a professional development model, provides its historical development over the years, definition, and discusses the meaning of concepts (mentor, mentee, protégé) used in the mentoring related publications. Different structures of mentoring used in education field and structure of faculty technology mentoring are provided. To investigate the mentor benefits within the social learning theory, as the main objective of the study, the essentials of the theory is described and the structure of the faculty mentoring is examined based on the social learning theory principles.

The Need for a Professional Development Model

Individuals’ knowledge and experience in almost all occupations is no doubt very important for their careers as well as for organizational success (Gibb, 1999; Willbur, 1987). Poor professional judgments because of lack of knowledge and experience in some
occupations could result in unrecoverable failures such as a patient dying, buildings falling down, or people giving up their own educational pursuits (Hargreaves & Fullan, 2000).

As many of us have experienced in our lives, new entrants in most occupations would most likely lack knowledge, experience, competence, or confidence to perform some of the tasks assigned to them, at least for a while. For example, in this sense new doctors in hospitals would most likely be unable to perform some of the medical procedures on patients without guidance from one or more experienced colleagues until they feel confidence in their knowledge and experience. Otherwise, as noted, disaster is most likely or even inevitable. Similar to the medical field, patterns commonly emerge in which new organization members in business, education, and many other fields seek guidance from more experienced colleagues to develop competence in their profession and an understanding of the organization’s culture (David, 2000; Donaldson, Ensher, & Grant-Vallone, 2000; Hargreaves & Fullan, 2000; Johnson, 1980). To avoid failures and to help new members in any organization accomplish both organizational and individual goals, a well developed professional development model for members of an organization is a fundamental and non-optional component (Cook, 1982).

Among several approaches (workshops, training sessions, etc.) for improving employees individual competencies in professional life, the mentoring approach in particular has been identified as a most powerful and effective method to address the changing needs of both individuals and organizations (David, 2000; Lawrie, 1987).
Mentoring: As a Professional Development Model

The concept of mentoring is not new (Jacobi, 1991; Willbur, 1987). The literature on mentoring informs us that its origins actually date back to Greek mythology, as described in the story of Mentor in Homer’s *Odyssey* (Johnson & Ridley, 2004; Klasen & Clutterbuck, 2002). When Odysseus, the king of Ithaca in ancient Greece, went off to fight in the Trojan War, legend has it that he left behind his trusted friend, Mentor, to look after his son Telemachus and his house. As history is recorded, Telemachus’s life was saved because of advice from Mentor on at least one occasion (Long, 2002; Merriam, 1983).

Several versions of “mentoring” based on this historical meaning of the relationship between Mentor and Telemachus have been considered for implementation in various settings and contexts, as described in the literature (Jacobi, 1991). From this variety of mentoring, Caffarella (as cited in Hansman, 2001) described mentoring in a general sense as “intense caring relationships in which person(s) with more experience work with less experienced person(s) to promote both professional and personal development” (p. 28). In most cases, two individuals usually form such a mentoring relationship.

Some of the earlier definitions considered the relative ages of mentor and mentee as an element in mentoring relationships, while today the level of expertise and experience of the participating individuals has emerged as the major criteria in recent publications (Clutterbuck 1992; Foster, 2001; Jacobi, 1991). In their elaborated definition, Klasen and Clutterbuck (2002) described mentoring as a process by which a mentor encourages and supports another individual, the mentee, in management of his or her own learning so that the mentee eventually becomes self-reliant in the acquisition of new knowledge, skills, and abilities, and develops a continuous motivation to do so (p. 16).
In spite of the fact that most of the publications in mentoring-related literature use the term “mentor” for the experienced person involved in the relationship, no common consensus exists about the term for the younger or less experienced person (Learner, Student, Mentoree, mentee, protégé, etc). The most commonly used terms in these publications are “mentee” (Campbell & Campbell, 1997; Smith, 2000), “protégé” (Beyene, Anglin, Sanchez, & Ballou, 2002; Hansman, 2001; Myers & Humphreys, 1985), and, in one case, “learner” (Gibb, 1999). Although some authors have not seen any problem using these terms interchangeably (Long, 2002), Klasen and Clutterbuck (2002) argued that differences between terms (mentee, protégé) differentiate them from each other based on two points of view: (1) the powers of each participant that they may bring into the relationship and (2) the role of a person who receives the mentoring and his or her contribution to the more experienced person’s development.

According to these authors, despite the more neutral implication of the term, mentee, “protégé” sounds as if the person receiving mentoring is somewhat more protected and suggests an unequal power distribution between the two participants. Thus, in their discussions, authors sometimes concluded that participating individuals should have equal power to bring about a mentoring relationship. Additionally, any inequality of power between the participants could be problematic for a successful mentoring relationship. Therefore, any inequality should be put aside. The second argument against use of the term “protégé” is that it seems to imply that the person being mentored has little or no knowledge on the subject and, thus, has little to contribute to the mentoring relationship. However, Klasen and Clutterbuck (2002) have pointed out that a less-knowledgeable or less-experienced person being mentored may not be able to contribute significantly to his or her
own learning, but a mentor, as the experienced person, may be able to learn a lot from the mentee.

Based on the literature on this subject and the principles of social learning theory, the term mentee seemed more appropriate to describe the role the less-experienced person within the concept of mentoring as we commonly think of it today. Details of the theoretical framework given in the following sections will further illuminate our position on this decision.

Development of Mentoring in Different Settings

Over hundreds of years of development, mentoring has become a widely accepted and growing approach used for different purposes in different contexts and in a variety of organizational endeavors such as business, education, and healthcare (Bullard & Felder, 2003; Campbell & Campbell, 1997; Foster, 2001; Gibb, 1999; McNally, 1994; Shea, 2001). A number of studies have investigated different types of mentoring applications (one-to-one, group mentoring, team mentoring, etc.) in different settings and have provided useful insights about mentoring structure, the formation of relations between participants, individuals’ roles, mentoring processes, successes and failures, and other factors (Benard, 1992; Beyene, Anglin, Sanchez, & Ballou, 2002; Foster, 2001; Patton, Pagnano, Griffin, Dodds, Sheehy, Arnold, Henninger, Gallo, & James, 2005; Willbur, 1987). In spite of the fact that these studies were carried out in wide-ranging contexts and mentoring structures in terms of purpose, age group, roles, and other factors, the common point that most of them agreed on is the effectiveness of the mentoring approach, the one-to-one approach in particular, in development of individuals in their professions and other areas of life (Kram &
Isabella, 1985; Whitely, Daugherty, & Dreher, 1991). Although several reasons could be listed here that address reasons why the mentoring approach is so “powerful,” the most commonly-accepted reason cited in the literature is that mentoring structures are mostly established among small groups of people, two or three in most cases, within a real environment. Mentoring is, therefore, an effective way to identify a less-experienced person’s needs in a more accurate and timely manner and to provide more individualized and direct assistance with little or no cost to that person.

In education, one of the fields in which mentoring is often used (Jacobi, 1991), a wide variety of mentoring structures have been established in terms of structural type (formal or informal), expected outcomes, and participants’ roles in addressing different needs in educational systems (Campell & Campell, 1997; Jacobi, 1991). Among these applications, several structures are used commonly: an experienced teacher will mentor less experienced teachers, often new teachers (David, 2000; Holloway, 2001; McNally, 1994; Yost, 2002); teachers will mentor disadvantaged students so that they become part of the community (Benard, 1992); students mentor other students to achieve success in their academic tasks; and students mentor faculty members in an area of technology (Heuer, Duffrin & Faskowitz, 1997). Studies reported that most of these mentoring structures have been developed and used successfully (Franklin, Turner, Kariuki, & Duran, 2001; Jacobi, 1991).

A closer examination of these mentoring structures in educational environments reveals that traditionally we almost always see a direct relationship between age and the roles of participants in most of the mentoring relationships, as discussed earlier. Older people (a teacher with many years of teaching experience, a higher-grade student with superior knowledge in some subject, or a senior faculty member with more professional experience)
have found it natural in such structures to mentor younger people (a new teacher who needs assistance in classroom management and teaching, a younger student who needs help achieving development, and a new junior faculty member with less experience in organizational structure, project management, etc.) (Benard, 1992; Foster, 2001; Patton, Pagnano, Griffin, Dodds, Sheehy, Arnold, Henninger, Gallo, & James, 2005; Ramsey, 2000).

However, because of the changing needs of society and expectations of educational systems, an explicit shift has been identified in recent mentoring-related publications in education. This shift is from a traditional mentoring view, in which an older person mentors the less experienced or younger person, toward more collaborative structures based on participants’ experiences on different topics that support both sides’ improvement through open communication channels. In short, this means both sides in a mentoring relationship regardless of age, have something to teach each other (Hargreaves & Fullan, 2000; Reigeluth & Garfinkle, 1994).

For example, with the rapid diffusion of technology in almost all layers of daily life, the pressure on educators to use technologies for instructional purposes has become unavoidable (U.S. Department of Education, 2000). Thus, the need for learning how to apply these technologies in both teaching and learning has been perceived as a necessity not only for new or less experienced teachers, but often also for teachers with many years of experience (Fulton, Glenn, & Valdez, 2003; Russell, Bebell, Dewyer, & O’Connor, 2003). Considering limitations such as lack of funds, lack of professional development opportunities, or lack of qualified personnel in some schools, mentoring, especially the one-to-one type, has been strongly suggested by many as an effective approach in assisting teachers and teacher educators with their need for training in various technologies. Studies
specifically focusing on this type of mentoring relationship, technology mentoring, clearly
depict the shift as described here.

The idea of using the power of the student/new teacher’s expertise through a one-to-
one mentoring approach to help teacher education faculty address their need for technology
training has been widely-accepted in higher education (Fulton, Glenn, & Valdez, 2003;
Shoffner, Dias, & Thomas, 2001). Several institutions have adopted this approach and used it
successfully for many years (Chuang, 2004). Most of this type of mentoring, usually called
technology mentoring, has been developed between undergraduate or graduate students
(mentors) and faculty members (mentees) based on the assumption that younger generations
who grew up within the world of technology often have more advanced knowledge and
experience with the latest technologies.

More than a decade ago, the Department of Curriculum and Instruction at this
Midwestern university adopted a mentoring approach, developed its structure, and has being
using it successfully over the years to address the technology needs of teacher educators.

The Structure of Faculty Technology Mentoring

The faculty technology mentoring program in the Department of Curriculum and
Instruction has been in place since 1991. The primary goal of the mentoring program is to
help faculty members with their individual needs in integrating technology into their teaching
and professional activities. The main structure of the project is organized around two visible
components: a graduate level course, “Technology in Teacher Education,” open to masters
and doctoral candidates, and weekly mentor-mentee (graduate student – faculty member)
meetings.
Graduate students who register for the Technology in Teacher Education course are required to work with one or two faculty members either in the College of Human Sciences or in the student’s own college for about one hour each week during the semester as a field component of the three-credit course. Additionally, at the end of the semester, each student is required to write a publishable case-study paper about his or her mentoring experience. The general profile of registered students in this course shows that most of the students come from the College of Human Sciences; however, a number of graduate students studying in other fields such as agricultural education, foreign languages, and other social sciences also enroll.

Each fall semester, several faculty members in the College of Human Sciences volunteer to participate in this project at the invitation of the course instructor. They provide brief descriptions of their technology needs including information about themselves such as their department and specific topic or topics they want to work on with a graduate student during the semester. The participating faculty members’ collective demographic profile is very broad in terms of age, professional interests, positions, teaching subjects, research areas, and level of expertise in information technologies. It is not unusual, for example, to see both a retiring professor in his last semester of teaching participate in the project to learn how to use the online course management system (WebCT), and a new faculty member in her first year in the college. Another aspect of the participating faculty profile at the college is that several professors have participated to the project multiple times. One professor, for example, does not hesitate to express her feelings of appreciation about technology mentoring resulting from her 14-year involvement as a mentee and her willingness to work on new technologies with a graduate student mentor.
Defining Concepts in Faculty Technology Mentoring

The structure of a mentoring relationship in this case, as given earlier, is mainly established between two persons: a graduate student and a faculty member. In this relationship, the graduate student is expected to take responsibility for helping the assigned faculty member with respect to his or her technological needs at any level and to address those needs and concerns in appropriate ways. Based on given discussions from the literature described in the previous sections and studies investigating this issue, we use the term “mentoring” in this study to refer to a relationship formed (but not limited to) by two persons (a graduate student and a faculty member) and characterized as a process of exchanging knowledge, experiences, and expertise through open dialog that helps both participants to grow in academic, professional, and social aspects.

Within this definition, we need to note that, contrary to the mentoring relationships used in a variety of fields in social science, the relationship between a graduate student and a faculty member in the present context actually produced some signals that differentiate technology mentoring from other traditional mentoring views. One person (the mentor) mainly carried the relationship and took on the heaviest responsibilities. Because both sides engaged in the technology-mentoring relationship in this specific context had different levels of knowledge and experiences on different subjects such as teaching, research, technology or leadership. Thus, both the graduate student and the faculty member had a chance to equally contribute to the relationship and to support each other’s development on various subjects of interest. Furthermore, because of this collaborative relationship between student and faculty member, we found that other members of the community contribute to and benefit from this relationship in either direct or indirect ways as well (Chuang, 2004).
In terms of the nature of the relationship, several important aspects have been listed in individual case studies and research reports (Faculty Technology Mentoring, 2006). Among those findings, Chuang (2004) pointed out that one of the most important components of the technology mentoring relationship in this context is that the relationship is not established in a hierarchical manner. Accordingly, participating faculty members at the college were very well informed about their roles and aware of not abusing their positions of authority or any previous relationship with the graduate student mentor. A major professor of a mentor, for example, might voluntarily cede the leadership position to the mentor during the first mentoring meeting by saying “Ok, I’m ready to start working. You [graduate student and her advisee] lead me and tell me now what to do.” However, considering the major professor’s presumed knowledge and expertise in research, teaching, and technology, leaving the leadership role to the graduate student mentor doesn’t necessarily mean that this particular faculty member has nothing to contribute to the mentor’s development. Collected data and artifacts over the fourteen years have show that graduate students participating in this project have been very appreciative with respect to faculty members’ contributions to their academic and professional achievements.

Based on this fact, Klasen and Clutterbuck (2002) discussed the mentoring concepts and the nature of relationships in faculty technology-mentoring structures. In this study, as in previous ones, we assigned the term “mentor” to the graduate student as the more experienced person with respect to information technologies. Since both graduate student and faculty member have equal chances and capability to contribute to the mentoring relationship in which they are engaged, the term “mentee” as opposed to “protégé” seemed to be more appropriate for a faculty member who needs individualized assistance on a technology
element. In brief, we used the term “mentor” to refer to graduate students and the term “mentee” to refer to participating faculty members in this study.

The Evaluation of Mentoring Relationships

Mentoring has obviously emerged in the literature as one of the most popular professional development models, serving for the wide variety of purposes in various organizations (Jacobi, 1991; Kariuki, Franklin, & Duran, 2001; Kram & Isabella, 1985). Although the growing body of the literature on mentoring has reported a number of “success stories” of mentoring in different contexts, the literature also has posited that not all mentoring relationships are successful (Donaldson, Ensher, & Grant-Vallone, 2000; Eby, McManus, Simon, & Russel, 2000; Foster, 2001; Myers & Humphreys, 1985). Because of diverse aspects of the various mentoring structures (Campbell & Campbell, 1997, 2000; Jacobi, 1991) such as formality or informality, variability of relationships between participants, knowledge and experience of participants, personality differences, differences in outcome expectation for individuals vis-à-vis organizations, and other factors, no study yet found in the literature describes a particular evaluation criteria that can be used to determine whether or not any given mentoring relationship is successful from the individual as well as the organizational point of view.

Some businesses, for example, in order to grow and compete, invest significant financial and human resources to establish formal mentoring structures for their new or less-experienced employees (Hansman, 2001). In the educational arena, schools often create formal mentoring programs between teachers and students who need personal or academic counseling, etc. In both these cases, it is important for program coordinators to seek some
tangible evidence that demonstrates the level of effectiveness of the mentoring programs in terms of outcomes for their employees or students as well as for the organization itself.

In spite of the recognition of a need for common ground for evaluation of various mentoring approaches, an extensive literature review carried out on a variety of mentoring approaches with respect to various environments did not reveal any solid evaluation framework other than identifying a few elements that could be used in the evaluation process depending on such variables as environment, structure, goals, etc. (Benard, 1992; Donaldson, Ensher, & Grant-Vallone, 2000). Despite the difficulty of finding descriptions of the desired evaluation framework in current mentoring literature (Gibb, 1994), Foster (2001) proposed using common themes described in mentoring studies to create a general framework for evaluation of mentoring applications in terms of their effectiveness on both individuals and organizations. Thus, based on the extensive literature review, the following themes have been found in studies in different fields, with most coming from the education field.

The Structure of Mentoring

Different versions of mentoring structure have been adopted by various fields (Campbell & Campbell, 1997) and categorized into two main groups: formal and informal mentoring establishments (Gibb, 1999; Hansman, 2001; Jacobi, 1991). Although most mentoring structures have been established informally without any support from organizational administration, the number of formal structures has increased and is expected to grow considerably in the future (Gibb, 1999; Hansman, 2001). Since formal and informal mentoring structures may be different in terms of their established goals, expected outcomes, roles of individuals, administrative support, cost, and other elements, investigation of the
mentoring structures within the variances in each structure certainly plays a crucial role in the evaluation process (Hargreaves & Fullan, 2000; Holloway, 2001). In these categories the following subtopics would also include, but not be limited to, identifying needs of individuals and organizations, availability of resources for addressing needs, goal settings, planning and implementation of mentoring relationships, providing support, expectations of individuals, and the role of community.

Quality of Interactions

Since a mentoring approach is not a mechanical process but a possibly intense interpersonal relationship (Eby, McManus, Simon, & Russel, 2000; Jacobi, 1991), the core theme at the center of mentoring structures in general is focused on the quality of the mentor/mentee relationship regardless of the field in which mentoring is used, how it is to be structured, and who played which roles (Beyene, Anglin, Sanchez, & Ballou, 2002). Although there are several factors that could affect the nature of this interaction, studies (Jacobi, 1991) have listed several factors that are essential components of a good interaction between participants.

- Reciprocal: Interactions between mentor and mentee should be reciprocal rather than one way (Benard, 1992; Ragins, 1997; Johnson & Ridley, 2004).
- Openness: To be able to permit a contribution by each participant, the mentoring relationship should be based on the idea of openness. For this reason, the hierarchical differences of participants in some cases needs to be taken into consideration as one possible problem (Hansman, 2001; Patton, Pagnano, Griffin, Dodds, Sheehy, Arnold, Henninger, Gallo, & James, 2005) and individuals need
to be careful to not to use such differences in the relationship, as discussed earlier by Klasen and Clutterbuck (2002).

Through two-way and reciprocal interactions, participants will be able to better understand each other and to contribute equally to the mentoring relationship. As a result of such participant collaboration, the mentoring relationship should become more sustainable and last for longer than planned in formal structures. In addition, participants and organization may better achieve their goals because of a good relationship between participants.

**Selecting Mentors-Mentees (Protégés)**

To establish a reciprocal relationship as recommended previously and to produce successful results from a mentoring relationship, it is important that participants who form the mentorship have similar backgrounds in terms of interests, personalities, and other features, depending on the mentoring structure, such as goals, environment, etc., as shown in several studies (Foster, 2001; Hansman, 2001) Thus, considering these factors during the matching process of individuals is important in forming most mentoring structures is important (Benard, 1992; Hargreaves & Fullan, 2000; Patton, Pagnano, Griffin, Dodds, Sheehy, Arnold, Henninger, Gallo, & James, 2005). The following issues found in the literature are some of the points to be considered in this area: experiences of participants, personalities, commitment, understanding of mentoring, expectations, organizational roles, expectations, organizational positions (hierarchical), communication skills, problem-solving skills, organizational skills, and so on.

Although the themes given here have been formed in a broad sense that would address needs as much as possible in many structures, the investigation of such themes in any
single mentoring situation would be complex and could lead to differing results from one case to another because every mentoring case is unique. Furthermore, since these themes primarily come from publications that investigated formal mentoring structures, they may not be comprehensive enough to describe informal mentoring experiences.

Despite these limitations (diversity in mentoring structures and difficulty of identifying and investigating these themes), the majority of publications discussing the mentoring concept over the years have built a strong consensus that all these themes, ultimately, are connected to the concept of “benefits” to individuals and organizations (Chuang, Thompson, & Schmidt, 2003; Clemson, 1987 as cited in Beisser, Kurth, & Reinhart, 1997; David, 2000). Therefore, although any single aspect given in the themes may not provide a significant clue about the effectiveness of the mentoring relationship from an isolated perspective, it is invaluable input to the entire evaluation framework when we connect the factors to the concept of “benefit.”

The importance of providing benefit at different levels has thus been investigated from different perspectives as a single dominant theme (Lacey, 1999; Smith, 2000; Ward, West, & Isaak, 2002). In most mentoring cases, however, the concept has mostly been investigated from the perspective of the less experienced participant (mentee), and few studies have touched on the impact of mentoring both at the mentor level and at the organizational level (Donaldson, Ensher, & Grant-Vallone, 2000; Franklin, Turner, Kariuki, & Duran, 2001; Gonzales & Thompson, 1998). Kram and Isabella (1985) and others, for example, pointed out that not only is the less experienced person’s benefit important but providing benefits to both participants engaged in the mentoring relationship is “vital and significant” in terms of the sustainability of the relationship. Therefore, the benefit should be
conceptualized and investigated based on the impact on both participants as well as the organization. In our literature review, although we found that there is a growing interest in mentoring studies on the idea of investigating benefits of mentoring to both participants, it still remains an issue to be studied (Meggison, 2000).

In recent studies, we found that the concept of mutual benefit has been identified as the most important evaluation criteria on the effectiveness of mentoring structure. However, these studies generally failed to provide detailed theoretical discussions to illuminate how they measured mutuality in their studies (Beyene, Anglin, Sanchez, & Ballou, 2002; Smith, 2000; Tom, 2000; Willbur, 1987). Although we were aware of the complexity and difficulty of investigating relationships, we strongly believed detailed investigation of mutual benefit would be one of the strongest methods that we could use to evaluate the effectiveness of mentoring. To accomplish this goal, a theoretical landscape in which to describe the experiences of individuals participating in the mentoring activities was an absolute need.

In this study, with the recognition of importance of participants’ benefits, especially to more experienced persons, we chose to focus on the benefits to participating graduate students (mentors) engaged in a mentoring relationship with one or two faculty members to help them with their technology needs. To enhance the contribution of this study to the mentoring community, especially those in technology mentoring, we intended to report not only whether or not technology mentoring is beneficial to mentors but also to investigate the factors that have impact on mentors’ perception of benefit.
Process Versus Outcome Oriented Approach in Mentoring Relationships Related to the Concept of Mutual Benefit

As discussed in the previous section, the concept of mutual benefit has been found to be the most important theme to help us explain issues of effectiveness of mentoring applications in different settings and to identify the conditions for successful and sustainable mentoring relationships (Clutterbuck, 1992). Several studies in the mentoring literature have developed their own strategies around the concept of benefit to evaluate their mentoring approaches and have formed conclusions as to whether or not their approaches were effective (Cambell & Campbell, 2000; Gibb, 1994; Gonzales & Thompson, 1998; Kariuki, Franklin, & Duran, 2001). As we took a more in-depth look at their approaches, we found that most of them used an outcome (product) oriented approach in their assessment strategy. As a result, they reported success in changing capabilities of less experienced persons (improved student behavior, increase in grades, improvement in employee’s performance, etc.), but they lacked discussion as to whether or not any mutual benefits were produced between participants in the relationship.

Since the mentoring was used in different settings, the perceptions of individuals on the concept of benefit would likely be different from one case to another. In this wide spectrum of diversity, it may thus not be easy to identify mutuality in the relationships in some cases at first look. In business, for example, individuals might see such benefits as a step up to a higher position in the organization or an increase in salary as a result of their participation to mentoring, while the organizational benefit might be an increase in sales, increase in profits, or better preparation for the future. In an educational setting, depending on the structure of the mentoring (teacher-student, teacher-new teacher etc), participants
might have benefits of a different type, such as gaining new knowledge, improving skills, and establishing a social environment that supports their growth in various ways. The school as an organization would become an organization whose improved learning provides opportunities for its members’ growth.

Despite the fact that consequences of different mentoring structures might vary in terms of their benefits to individuals, as shown in the given examples, the nature of the process gone through by each individual in most mentoring structures to reach promised benefits is similar if not the same (Campbell & Campbell, 2000; Long, 2002; Smith, 2000). Individuals in mentoring relationships construct their own benefits based on their needs, backgrounds, knowledge, and experiences with respect to the subject through a modeling process in which observation, conversation, and demonstration are the primary activities. An individual who needs formal or informal assistance in his or her environment often finds a person that who can model the valuable knowledge, skills, attitudes, and other desired values for him or her. Individuals in business, for example, may go through one-on-one conversations, discussions, observations, and some other “vicarious” activities with their manager or a more experienced employee to get to the desired point in terms of knowledge or skills required by the organization. Similarly, new teachers in educational systems develop their understanding of teaching, classroom management, leadership, and other activities from more experienced teachers at their schools through similar activities to those of business people, e.g., talking, discussions, observations, and so on.

In the above examples, from an outsider’s perspective, one may perceive the benefits for the less experienced person at an initial look but one may not be able to see any mutual benefits experienced individuals get from the relationships.
Because of limitations of observability of all benefits that mentoring provides, an investigation of the benefit concept from a more theoretical standpoint in some cases became a very useful approach for investigating these unobservable benefits. The social learning theory’s approach (Bandura, 1977) to conceptualization of the “unobservable” events and the human learning process has been found the most appropriate theoretical landscape to investigate the interactions and unobservable outcomes in mentoring relationships. Thus, the details of the social learning theory and the representation of faculty technology mentoring are discussed in following sections.

**Social Learning Theory: A Theoretical Approach to Explain Unobservable Gains**

As found in a number of mentoring studies, the ultimate purpose of the mentoring relationship is to help individuals in their learning process with respect to specific needs. Although some of the learning activities may positively influence a particular person’s performance of his or her tasks, it may not be so in some other cases. The learning outcomes for a less experienced person, for example, seem to be more supportive of their performance, Mentors’ learning outcomes might not result in any obvious direct effect on their performance, as we discussed earlier. To explain what the more experienced persons might learn, Albert Bandura’s social learning theory provided us a framework for investigation from a more process-oriented point of view of the mentoring relationships that individuals and organizations go through to reach benefits (Bandura, 1977).

According to Bandura’s view of learning, a great deal of human learning occurs as a result of observing, talking, and listening to others in the learner’s close environment. Although changes in individuals’ performance, behavior, and other areas would be an
indicator of learning, people, according to the social-learning view, also may learn without demonstrating any tangible or observable changes at all. Because of personal and environmental reasons, the effects of the learning process may take longer to emerge in the form of observable outcomes. Therefore, social-learning theory strongly opposes the idea of explaining all human learning processes in terms of observability.

Albert Bandura’s social learning theory (1977) was selected as a theoretical framework, for several reasons given below, to investigate whether or not participating graduate students in faculty technology-mentoring roles benefited from the relationship, to identify major themes for a successful mentoring relationship, and to identify issues that may support or hinder the effectiveness of the program.

First of all, social learning theory provided a framework to explain the process through which mentoring participants learn from each other and receive benefits. Through the theoretical lens, we examined the interactions among members of the community and investigated how personal and environmental factors act together and affect mentoring participants’ thoughts and actions (present and future).

Secondly, social learning theory explained why sometimes formal and informal professional development mentoring models were more powerful and effective than some others (workshops, training sessions etc).

Thirdly, social learning theory provided a theoretical landscape with which to investigate how more experienced persons, mentors in faculty technology-mentoring, benefited from the program and to explain unobservable outcomes of mentoring that would shape our perceptions of benefits and the strategies we choose for measurement.
Foundations of Social Learning Theory

Social learning is a theory of learning described by Albert Bandura in the 1960s. Social learning theory simply has a different view of describing the human learning process than other traditional theories such as behaviorism and cognitive theories. Scholars from the behaviorist tradition, for example, described learning as changes in observable behaviors and put more emphasis on the influence of external factors on this process, while those representing cognitive theory, in general, placed more emphasis on the role of internal factors such as human thoughts, beliefs, and values on the learning process (Schunk, 2000).

In the behaviorist tradition, learning is mostly developed within the relationship between one’s own actions (responses) to events (stimuli) and the impact of their consequences on the person’s behavior. Successful consequences of an action in this view strengthen the behavior while unsuccessful consequences produce less effect on or even weaken the behavior. Thus, environmental factors in this tradition play major roles in organizing the external events so that a person acts in an intended manner and demonstrates appropriate behavior under certain conditions (Bandura, 1977, 1986). In contrast to the behaviorist point of view, cognitive scholars were more interested in a human’s cognitive functioning, beliefs, and so on, and their roles in learning (Schunk, 2000). In this view, human cognition is the only force capable of changing or affecting the environment, not the reverse view that the environment affects the human.

In both these traditional theories, learning is described as an isolated personal activity rather than as a social phenomenon (Patton, Pagnano, Griffin, Dodds, Sheehy, Arnold, Henninger, Gallo, & James, 2005). According to Bandura (1986), these are the theories that traditionally described learning as a process taking place through one’s own action driven by
“instincts, drives, traits, and other motivational forces” within that person or by environmental factors in which a person lives “as an autonomous force” (Bandura, 1986; Wood & Bandura, 1989).

However, Bandura (1977) argued that learning can neither be solely explained within the terms of the relationship between stimuli-response regulated by external forces nor by cognitive functions. According to Bandura, theorists from these tradition developed their arguments mainly on a one-sided deterministic and one-sided interaction framework, in which the environment in behaviorism theory and the person in cognitive theory only determines the results of the learning process and there is only one-way interaction between the person and either environment (\(B=f(E\rightarrow P)\)) or environment to person (\(B=f(P\rightarrow E)\)). Instead, social learning theory contends that several factors, both internal and external, play a role in the human learning process in different ways, mainly taking place in a social environment, and interactions among these factors are bidirectional (Bandura, 1977, 1986, 2001; Wood & Bandura, 1989). Thus, Bandura stressed that there is “a continuous reciprocal interaction between cognitive, behavioral and environmental determinants” in which learning occurs (Bandura, 1977, pp. 11-12).

Learning in Social Learning Theory

Based on the arguments given earlier, Bandura conceptualized his view of learning in a way that bridges between these two main traditions of psychology (behaviorism and cognitive theory). Therefore, instead of accepting only one idea rather than another proposed in these views, social learning theory acknowledges the roles of both internal and external factors in the learning process. Social learning theory has thus been seen as complementary
rather than competitive with other traditional views. However, social learning theory places more emphasis on the role of social interactions (Davis & Luthans, 1980).

According to Bandura (1986), “…people are neither driven by inner forces nor automatically shaped and controlled by external stimuli. Rather, human functioning is explained in terms of a model of triadic reciprocality in which behavior, cognitive and other personal factors, and environmental events all operate as interacting determinants of each other” (p. 18).

![Figure 1. The schematization of interactions of person, behavior, and environment (Adapted from Bandura, 1986, p. 24).](image)

In this model (see Figure 1), behavioral, personal and environmental influences are not independent from each other; rather they are all interdependent and “operate as interacting determinants of each other” (Bandura, 1986, pp. 18, 23). People in this triadic model produce environmental conditions through their actions that ultimately affect their thoughts and behaviors in a reciprocal fashion. Although there are reciprocal interactions, which refer to “mutual action” between given factors in this model, this does not mean that the factors are all of equal strengths and occur simultaneously. The relative influence of each of them, therefore, will vary for different activities, different individuals, and different circumstances (Wood & Bandura, 1989).
For many of us, watching television or a movie at a theater, for example, is a routine activity. In this activity, of course, we do not watch everything but only the shows that we prefer due to personal reasons. Bandura used this example to elaborate his model of triadic and reciprocal relations between person, behavior, and environment and to ground his arguments in opposition to more traditional views. According to the social learning view, personal preferences of a television viewer (P: person) influences viewing time and program selection from among the available alternatives that individuals select (B: behavior) on television (P→B). Because of the action of viewing a specific television program, individuals play a partial role in shaping future programs in that environment (E) (B→E). By considering the role of other factors in the television environment such as budget, commercials, popularity of program, etc, we see that television (E) also influences personal preferences of viewers (E→P). Because of the triadic relationship depicted in this example, Bandura concluded that “what people watch, exerts some influence on their preferences, thoughts, and actions” (Bandura, 1986).

Within this model, one of the most important distinguishing features of social learning theory emerges in position between the idea of “learning through experiencing” and “learning through observation” (Bandura, 1971, 1977; Wood & Bandura, 1989). Although social learning theory acknowledges the influence of “immediate consequences” of an action on a person’s learning process because of the relationships between the three factors depicted in the model (see Figure 1), it posits that it would not be possible to explore every new element of knowledge through direct experience because of the constraints of time, resources, and other factors. Therefore, social learning theory contends that it is not possible to use a performance-based approach to explain all human behavior and learning processes. It
places more emphasis on the idea that learning takes place not only through actual performance but also vicariously through observing other people without performing (experiencing) new knowledge and competencies directly within its theoretical framework (Bandura, 1971, 1977, 2001; Davis & Luthans, 1980).

According to Bandura (1977):

> Psychological theories have traditionally assumed that learning can occur only by performing responses and experiencing their effects. In actuality, virtually all learning phenomena resulting from direct experience occur on a vicarious basis by observing other people’s behavior and its consequences for them (Bandura, 1977, p. 12).

By observing other people’s actions and consequences, individuals acquire rules and develop their own hypotheses about which responses are most appropriate in which setting (Bandura, 1977). Moreover, they also find opportunity through observations to acquire “large, integrated behaviors” rather than isolated pieces without suffering from negative experiences by trials and errors. Otherwise, “learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do” (p. 22).

The role of social environment on learning is one of the main emphases of the Bandura’s theory (Davis & Luthans, 1980). According to the social learning view, much social learning occurs in one’s immediate environment through observing models (Bandura, 2001; Wood & Bandura, 1989). Therefore, the dissemination of new ideas, knowledge, and skills through modeling in this environment become a fundamental activity for individuals as well as for organizational learning. However, we need to note that individuals may not be able to demonstrate acquired knowledge or skills at the time of learning (Schunk, 2000).
Thus, as “an indispensable aspect” of learning, modeling, has been acknowledged through the years to be a most powerful means of transmitting values, attitudes, and patterns of thought and behavior from one to many people (Bandura, 1977, 1986; Wood & Bandura, 1989).

Faculty Technology Mentoring Through Lenses of Social Learning Theory

To investigate faculty technology-mentoring structure and relationships among its members, we needed to have a clear understanding of how faculty technology mentoring would be represented based on social learning theory principles. Within the triadic concept of interactions between person, behavior, and environment, the following diagram is constructed for each individual participant: the graduate student as mentor and the faculty member as mentee.

Figure 2. Triadic model for faculty member (mentee).
As seen in Figure 2 here, personal, behavioral, and environmental factors interact with each other in a reciprocal manner, representing that all three factors are determinant of each other (Faculty member, changes in his or her knowledge, use of technology, other members of the college, etc). Through these interactions this faculty member may learn from other members of the community and may demonstrate changes in his or her knowledge, attitudes toward using technology, or changes in his pedagogic beliefs as in the case of the given couple above. Depending on several other factors (time, adoption position, need, early results, etc.), the faculty member also becomes an environmental factor that influences others people in the same environment. Although environment in Figure 2 is described as the physical boundaries within which mentoring takes place, we must note that this may also include different environments in which the person has connections.

The following example from this study was chosen to demonstrate how multiple interactions take place among different people in the same social environment at the same time and become important factors in individuals’ learning processes as described in the social learning view (Bandura, 1977). A faculty member had identified her need for a qualitative research package to analyze research data. Based on her search efforts, she ended up using the software package called Transana. Because of the complexity of the software, even in the installation stage, and also because of her lack of knowledge and experiences as she began its use, she decided to work with a mentor using faculty technology mentoring. After a couple of months working on this software package, this junior faculty member shared her happiness and satisfaction with the results she obtained using Transana with other faculty members and graduate students who participated in the program that year at a mentoring luncheon. Within the social network among the faculty members, this news spread
quickly to some other faculty members. Because of the successful results gained and an urgent need for similar software, Dr. A, another faculty member, became more sensitive to the message (Environment → Person). In the following year, Dr. A wanted to become part of the mentoring community by working with a graduate student mentor on Transana. During the semester working with her mentor, Dr. A was using Transana for her research (Person → Behavior). Additionally, Dr. A also required her graduate assistants who were working on the project to learn and use the Transana. Thus, the mentor also needed to spend some time with her mentee’s graduate assistants. A couple of weeks after they started working on Transana, initial results were brought to the mentoring class by the mentor and discussed with other graduate students. Due to positive impressions, the mentors were brought into contact with other mentors in studying Transana, and some of the mentors became interested in checking to see whether Transana could be beneficial in their research (B → E). In addition to the mentor’s interaction with Dr. A and her graduate assistants, she also contacted a former mentor who had spent time on the Transana during her mentoring.

As described in social learning theory, the learning occurring in this example was mostly a result of interactions taking place among the members of the community. For this reason, the focus in our study was on investigating environmental factors that support mentors’ learning. To do this in a manageable manner, we needed, first of all, to identify the physical boundaries of the environment where most mentor-mentee learning takes place.
Defining Borders of the Community

As clearly depicted in the example given above, the interactions among the mentoring participants were complex and bidirectional. Most interactions observed over the years did not take place just between two persons (mentor-mentee) but also were extended to other members of the mentoring process as well as to other people in the same environment (mentee-mentee, mentor-graduate students, mentee-staff, etc). Through this interaction, participant mentors, as the main subject of this study, clearly pointed out that they both teach and learn at the same time in different ways and from different individuals.

Despite the fact that formal mentoring relations were described between mentor and mentee in this specific mentoring structure, Chung’s research proved that interactions were not limited among mentoring participants. Instead, interaction went beyond to involve other members of the community.

Figure 3. Interactions between mentoring and other members of the community (Chuang, 2004).
According to Chuang (2004), one of the central themes that emerged from the research was that the community of learners was built up with individuals from different groups of people in terms of their positions on the college (faculty, undergraduate-graduate students, staff, etc.). Within this environment, members always interacted with each other and shared beliefs, successes, and challenges (p. 82). As clearly depicted in this model, several reciprocal interactions between the groups of people in the community were identified. Because of this social environment, individuals constructed their own understanding of subjects according to their needs for pedagogy, technology, research etc.

The model given above by Chuang (2004) laid out the overall framework and depicted major interactions among people in different groups at this institution’s teacher education program (mentoring program, technology center, undergraduate students, and so on), Although the model provides some insights regarding the impact of mentoring on both the organizational level and the individual level, it may not provide the entire picture of the impact of mentoring at the participating individual level. Therefore, to gain deeper understanding of the intensity of environmental factors on the mentoring relationships and to identify participants’ learning outcomes as described in social learning theory, a closer look at the interactions from an individual basis, among mentoring participants, seemed necessary.

To that end, the following model based on the nature of interactions among participants of mentoring (mentor-mentee) and between mentoring participants and other people in the community was developed.
In this model, two main environmental levels were described based on their physical boundaries as well as on their connection with participating mentors and mentees in the formal mentoring structure. Based on a fact that some of the mentoring participants are from different colleges, they tend to bring different ideas, experiences, and knowledge to other participants in several ways. For this reason, the “Campus Level Environment” was created to investigate possible direct or indirect influences brought into the formal mentoring environment by any mentor or mentee who might have an impact on individuals’ learning.

The direct interactions taking place among mentoring participants have been described in “Formal Mentoring Environment.” This environment was constructed in such a way that it includes all kinds of direct or indirect interactions among active groups of
mentors and mentees as well as between each mentor-mentee pair. To permit investigation of individual mentor’s in-depth experiences, the interactions taking place in this environment were examined based on four groups: (1) mentor-mentee (2) mentor-other mentors (3) mentors-mentees (4) mentee-other mentees. We believed that the interactions among these four groups would provide critical input to assess how mentors learn to identify possible personal and environmental issues and problems that hinder the emergence of more beneficial results and for our determination of conclusions on the overall effectiveness of the program.

Although formal mentoring structure does not require a mentor or mentee to interact with other people at the college, the case-study reports and research carried out in this environment revealed that strong informal relationships are sometimes established between active mentoring participants and other members of the educational community (Chuang, 2004; Faculty Technology Mentoring, 2006). Thus, the “Other Community Members” section was created as the second section of the “College Level Environment” to include the relationship between active mentoring participants and other members of the community (faculty, students, staff) and to investigate the influence of these relationships on mentoring participants.

Based on Figure 2, the example of Dr. A’s learning process and use of Transana, including her influence on the other people can be illustrated within the triadic concept as follows:
In this form, Since Dr. A became aware of Transana through interacting with other members of the community, the process in the diagram was initiated from environmental factors. Positive results shared by another faculty member at the college initiated Dr. A’s learning process. Although only one college-level environmental factor (sharing positive results by another faculty member) is cited here, we must note that several other active factors could have created a single effect on Dr. A’s approach to using Transana (Bandura, 1986). Through interacting with her colleagues, graduate students, and other staff within her social environment who have knowledge and experience using Transana, Dr. A made her decision to use Transana at stage #2. In this process, such personal factors as her knowledge, technical skills, research philosophy, and others could have impacted her decision-making. Between the person-behavior interaction channel (stage #3), Dr. A developed skills and ideas through first working mostly with her mentee on how to use Transana and then actually using...
it in her research. At this stage of her learning process, according to social learning theory, positive or negative results that Dr. A obtains from her use of Transana affected her self-efficacy to decide whether to continue using and learning Transana or maybe other products because of the reciprocality between personal factors and behaviors (Schunk, 2000; Wood & Bandura, 1989). At stage #4, Dr. A became a “technology superstar” whose positive experiences influenced other members (faculty members, graduate students, staff) (Fulton, Glenn, & Valdez, 2003). An important point stressed by social learning theory at this stage is the fact that within the concept of “observational learning,” we actually did not need to see Dr. A’s use of Transana or see other community members experience successful results on advice of Dr. A to conclude that she or other individuals had benefited from mentoring. A single sign of positive change or an expression that indicates the value of Transana would have accounted for benefits she received from mentoring and community.

In Dr. A’s learning process described herein, according to the social learning theory principles, it is obvious that much of her learning took place because of the interactions among personal, environmental, and behavioral factors. As can be clearly seen, the interactions in this case as well as in many other mentoring cases in this specific context were not closed to a “formal mentoring environment” but, instead, spread out to a larger environment. In addition to formal interactions between mentor-mentee pairs, informal interactions in participants’ social environments also have great influence on individuals’ learning processes and their perception of benefits.
Explaining Experienced Person (Mentor) Benefits within the Social Learning Theory

As explained out in previous sections of this study, the literature has described a successful mentoring relationship as one that is beneficial to both mentor and mentees in different ways (Chuang, Thompson, & Schmidt, 2003; Clemson, 1987 as cited in Beisser, Kurth, & Reinhart, 1997; David, 2000). Although most formal mentoring structures are targeted to provide opportunities to less experienced persons based on their individual needs, the current literature is still in need of deeper investigation as to how these structures are beneficial to more experienced persons.

With the recognition of a lack of a solid evaluation model, we intended to investigate graduate students’ experiences based on the social learning theory principles in this study. To be more specific, the interactions between mentor and mentee as well as those between other members of community given in Figure 4 were investigated to find out whether or not mentors benefit from faculty technology-mentoring, to determine the impact on the process of personal and environmental factors, and to determine certain conditions for successful mentoring based on mentors’ experiences.
CHAPTER 3

METHODOLOGY

The purpose of this chapter is to describe the research methodology used in this study. Selection of any research method is based on both the nature of the research questions and the preferences of the researchers (Strauss & Corbin, 1990). The primary goal of this study was to examine the experiences of graduate student participants who mentored a faculty member for one or more semesters. To accomplish this, I chose grounded theory as a qualitative approach because of the fit between the nature of the research focus and the research structure described in this approach. Both social learning theory, as the theoretical framework of this study, and grounded theory, as the research methodology, both share similar interests in individuals’ action and interactions. As given in detail in the literature review section, social learning theory, in brief, contends that much human learning occurs as a result of interactions take place in a social environment and one’s own actions. To be able to investigate the phenomena, whether or not mentors learn something, based on the social learning view, grounded theory draws a detailed methodological path to find and organize these interactions and actions, and the view also gives us a methodological perspective on how to interpret data.

The methodology of grounded theory was collaboratively developed by Barney Glaser and Anselm Strauss in 1967 (Glaser & Strauss, 1967). Glaser (1992) described the grounded theory approach as “general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area” (p. 16). The main purpose of this approach, as indicated in Glaser’s
definition, is to build a theory that is grounded in the data and illuminates the area under study.

Based on the grounded theory framework, this study was conducted with faculty technology mentoring participants acting as mentors over sixteen years. The details of the methodology used in this study were organized in the following subsections: (1) research focus; (2) research design; (3) research site description; (4) participants; (5) data resources/instruments; (6) data collection; and (7) data analysis procedure.

Research Focus

In the mentoring literature, several key aspects of successful mentoring relationships are listed: mutual interest, participation, individual assistance, mutual respect, non-hierarchal relations, etc. Mutual benefit, an important characteristic of any type of mentoring relationship, has been discussed by many authors (Beisser, Kurth, & Reinhart, 1997; Campbell & Campbell, 2000; Hansman, 2001). Yost (2002) stated that “participation in a mentoring program is valuable not only for the novice but also for the veteran mentor” (p. 195). Thus, this study was aimed at understanding mentors’ experiences and perspectives on faculty technology mentoring programs in general based on the following guiding research questions:

1. What do mentors report as benefits of participating in the technology-mentoring program?

2. What kinds of factors influence mentors’ perception of benefit?

3. What are the characteristics of a successful technology-mentoring program from the mentors’ perspectives?
4. Do the mentoring experiences of the mentors reflect their views of a successful mentoring program?

5. What are the strengths and weaknesses of the faculty technology-mentoring program from mentors’ perspectives?

6. Do former mentors use their mentoring experiences in their professional life?

**Research Site Description**

The faculty technology mentoring program in the featured College of Human Sciences (formerly the College of Education) has been in place for about sixteen years. The main goal of the program is to help faculty members in the college meet their individual needs in integrating technology into their teaching and professional activities. The main structure of the project is organized around two visible components: (1) a graduate level course, “Technology in Teacher Education,” open to master’s and doctoral candidates, and (2) weekly mentor-mentee meetings.

As pointed out in detail in previous chapters, graduate students who register for the Technology in Teacher Education course are required to work with one or two faculty members in the College of Human Sciences or a faculty member from the student’s own college for about an hour each week for a semester as a field component of the three-credit course.

Each fall semester, some College of Human Sciences faculty members volunteer to participate in the project at the invitation of the course instructor and, as part of the participation, they provide brief descriptions of their technology plans. These descriptions
include information about themselves, such as their department and what tasks they want to work on with a graduate student during the semester.

First Component: Technology in Teacher Education Course

In the first or second week of the semester, after an introduction to the course, the course instructor shares volunteering faculty members’ descriptions with graduate students and asks students to choose one or two faculty members to work with throughout the semester. The main goal in pairing graduate students and faculty members is to match graduate students’ interests, technical expertise, and other personal expectations to the goals of participating faculty members. However, it should be noted that these are not the only criteria used in developing the pairing process pattern. For example, graduate students who have expertise on specific software might choose not to work with a faculty member seeking skills in using that software. Instead, they may choose to work on another piece of technology which about which they themselves wish to learn.

In other following weeks of the course, graduate students, mentors, and the course instructor come together for two hours and discuss weekly readings for the course and a written article chosen and presented by a student. Another special element of this course structure is the field update or, in other words, the “mentoring update.” Each graduate student, time permitting, shares his or her weekly updated experience with other mentors and the course instructor. Although the updates may vary from the person to person, special attention is given to such topics as conversations, mentoring challenges, new strategies, mentor-mentee accomplishments, among others. Moreover, the class hosts discussions
among the mentors so they can share their ideas, expertise, experiences, theoretical problems, limitations, and news from their various fields of technology.

Although the course had been in place at the college for a “very pragmatic reason,” to help faculty members’ need for an organized faculty development model, the structure of the course was significantly changed over the years. In the early years of the program, faculty were interested in learning basic computer skills, such as organizing computer desktops, creating a PowerPoint presentation, or learning how to use e-mail programs. And, during the early years, the focus of the course was on readings in the general area of technology and teacher education. In the recent years, however, the participating faculty members’ needs for learning different technologies shifted from basic skills to more advanced and complicated ones, such as Web site design, streaming video technologies, video editing, podcasting, and virtual reality technologies.

The course instructor briefly pointed out that “I’ve definitely seen changes in faculty behaviors, and they began to take a little bit more scholarly approach to explaining what was going on, and to providing these tools to students.” Therefore, she pointed out that faculty members’ approach to technology became more sophisticated and advanced beyond the original pragmatic approach of the course. Consequently, the changes in the course structure were necessary. As a result of this process, although the basic approach, one-on-one mentoring, stayed the same, the course structure moved from general readings and discussions about the technology and teacher education toward more theoretical and research-based content. Students in recent years, therefore, were required to write a case study explaining their experiences within the different theoretical frameworks discussed in the classroom.
Because of the ongoing changes cited here, the course instructor describes the course as “a course in development.”

Second Component: Weekly Mentor-Mentee Meetings

The other important element of the faculty technology mentoring structure described above is the weekly mentor-mentee meetings. Mentor-mentee pairs decide on the meeting schedule and location based on their collective schedule. Then, the pairs come together to work on their project, every week if possible, generally at a faculty member’s office or at one of the college’s technology labs. The scheduling of this meeting is not a one-time, easy-to-arrange event over the whole semester. Faculty members especially tend to schedule mentor-mentee meetings at different times each week because of their shifting responsibilities with teaching, research, meetings, seminars, conferences, and other unexpected activities. In terms of meeting places, the Technology in Teacher Education course instructor encourages mentors to meet in mentees’ offices and work on the faculty members’ office computers as much as possible.

The agenda of these mentor-mentee meetings generally are shaped by a mentee’s needs or directly identified by an individual mentee. However, in some cases the mentor and mentee have conversations to discover what they should work on together based on both the mentee’s needs and activities that might benefit both sides. On one hand, pairs might work on a software and hardware technology issue and/or discuss educational theories and issues related to their project. On the other hand, as has been indicated by some mentors in various course sessions, the pairs often have very friendly conversations about their personal lives, sports, various cultures, or various educational systems during their meetings.
In addition to the course and mentor-mentee meetings, another important hidden component of faculty technology mentoring is the social and physical network that connects faculty members and graduate students as well as preservice teachers at the college. Within this network, the technology center located on the ground floor of the building plays an important role in terms of bringing community members and new technologies together. The center has four computer laboratories equipped with Macintosh and Windows personal computers, all connected to the internet through the university network structure. The center serves faculty, students, and staff from morning to night on weekdays and half-days on Sundays. Everyone can get help on many specific software and hardware problems through the help desk, located at the main entrance of the center and easily accessible from all labs. The center has the important dual role of both supporting the continuity of mentoring relationships and advancing mentees’ skills in the relevant technologies. For those mentees who have not previously used these facilities, the center provides an opportunity to become familiar with the resources readily available to support their professional technology growth throughout the year.

Researcher

In grounded theory, the researcher’s conceptualization of the phenomena is important in terms of developing the theory. Therefore, the researcher’s individual background would be a critical component of the research methodology. I am a male, using English as a second language. I am from a developing country where I received my earlier education, and I came to the United States about five years ago to study for both master’s and doctoral degrees. I have been a doctoral student in the Department of Curriculum and Instructional Technology
in which this study has been conducted. I have a well-rounded background in technology and most commonly used applications of that type. I have a Master of Science degree from the Department of Curriculum and Instructional Technology, and while working on a doctoral degree during this study, I had a very wide range of interests; however, most of them related in one way or another to the use of technology in education and teacher education.

I participated in the faculty technology mentoring project in the fall of 2002 as a masters student. Afterwards, I decided to work on the faculty technology mentoring project for my dissertation study. In addition to my first-hand experience in that first year, I was also actively involved in mentoring actively in 2004 and 2005) as well. Like the other mentors, I was involved all parts of the mentoring project.

Some possible biases may exist in this study because of my active participation in the mentoring project; since my ideas, thoughts, critiques, and similar factors most likely impacted the structure of the study. Thus, the selection of the research area, research questions, structure of interviews, analysis, and other components in this study might seem subjective to some and perhaps biased in various ways. However, in contrast to quantitative research methodology, in which the researcher must be objective and the purpose is to verify a theory, the role of the researcher in qualitative studies does not require the researcher to remain totally objective. According to Merriam (2002), one of the characteristics of all types of qualitative research methodologies is the role of the researcher as the primary instrument for data collection and data analysis, and the study’s purpose is not so much to verify a theory as to understand and make sense of phenomena from the participant’s perspective, as is the aim of this study.
In grounded theory, the role of researcher is not much different than that described by Merriam (2002). The only major difference that should be noted here is that a researcher described in ground theory methodology should theoretically be sensitive to both the environment and the data (Glaser, 1978).

Participants

Graduate students who enrolled in the “Technology and Teacher Education” course were participants. The list of those graduate students participating in the mentoring program since 1997 was obtained from university offices. Since college administration had archived student registrations and class lists belong to past years, the earlier records of mentoring participants from 1991 to 1996 were not available to us. Because of a lack of contact information, several people at the college (secretaries, faculty members, graduate students) were contacted and an internet search performed to obtain more detailed contact information for some former graduate students. Following these efforts, the final list, including e-mail addresses, was created and each person was asked to volunteer for participation in this study through an e-mail or a regular mail message. There were total fifty-nine (n = 59) former mentors in the final contact list, all of whom we invited to participate to this study by taking the mentor survey.

In addition to the larger body of mentors invited to participate by taking the mentor survey, some of these mentors, mostly participants from recent years, also agreed to contribute to the research process by giving me permission to observe them and interview them. Because of my presence at the research site and my participation in mentoring activities during 2002, 2004, and 2005, I personally contacted fourteen mentors who
participated to the mentoring program in 2004 and 2005 and verbally explained the purpose of my research, asking each one for his or her permission for me to be in the class and collect data through observation, video-taping, and other activities as described in the consent form.

All 2004 and 2005 mentors were given the consent form at the beginning of the semester. All of them agreed to the conditions and personally signed the consent document. Other participants who are not available on-site were sent the consent forms by e-mail. Additionally, all participants who took the online technology mentoring survey were directed to read the consent form and were allowed to take part in the survey so long as they agreed to the conditions described in the form. Throughout the study, pseudonyms are used to guarantee participants’ confidentiality.

Technology in Teacher Education course student registration records from 1997 show that students from different countries and cultures who participated in the faculty mentoring project was substantial, suggesting that the level of diversity in the project had to be taken into consideration in this research. These different educational backgrounds, as well as experiences with different educational systems, cultures, backgrounds, and interests were a good source for research focused on understanding the phenomena from different perspectives.

Theoretical sampling was used to identify the participants in this study to ensure a variation of experiences, ideas related to the topic, and needs for specific data at different stages of the research. Glaser and Strauss (1967) described theoretical sampling as “the process of data collection for generating theory whereby the analyst jointly collects, codes and analyzes his data and decides what data to collect next and where to find them” (p. 45). To develop a theory in grounded theory, the researcher must carry out the data collection and
analysis simultaneously. In this development process, a researcher has the flexibility to choose participants according to their contribution to the study (Glaser, 1978; Strauss & Corbin, 1990).

In this study, based on the initial analysis of data collected through observations, multiple interviews, and survey responses collected from all volunteers, additional participants were chosen to be interviewed in order to get enough detail about their experiences to saturate specific categories, as described in grounded theory methodology. As given in details in Chapter 4, Total nine mentors were interviewed in this study. At an early stage of the study, for example, the qualitative data collected during the pilot study also indicated that students with different educational experiences in different cultures would provide different insights about the program. In order to include these experiences, special attention was given to inclusion of international students in the study’s sampling.

One of the important aspects of this process of selecting appropriate individuals was identifying “unique” mentoring cases highlighted by initial data analysis, including examples such as graduate student mentoring her major professor, graduate students from different departments, or a new graduate student in the master’s program who had significantly limited knowledge in the area of instructional technology and research.

Procedure

In grounded theory, Glaser and Strauss (1967) pointed out that “no one kind of data on a category or technique for data collection is necessarily appropriate. Different kinds of data give the analyst different views or vantage points from which to understand a category and to develop its properties” (p. 65). Therefore, grounded theory does not restrict
researchers to follow a certain procedure and use of data collection. According to Glaser and Strauss (1967) “there are no limits to the techniques of data collection, the way they are used, or the types of data acquired” (p. 65). Depending on the information needed to develop the theory under study, use of a wide variety of data sources is certainly beneficial because more information is provided than when only a single way of data collection is used.

Within the given boundaries of the study, several data collection techniques were deployed to collect data from different people in this study. The major sources and techniques were classified into two sections: (1) primary and (2) secondary.

The primary sources were (a) observations, (b) interviews with some of the participants, and (c) survey responses. Secondary sources were (a) the literature of the field, (b) some of the participants’ reflective journals, (c) online discussions among participants, and (d) the artifacts produced by mentor-mentee pairs, and other materials (articles, software, hardware, technology news etc) brought to class by mentors.

**Primary Data Sources**

*Observations*

One of the initial major data collection techniques used in this study was field observation. During my first participation in mentoring in 2002 as a graduate student, I was in contact with mentors of 2002 and worked with a few of them on the elements of the course requirements. Being a part of mentoring community this first time, I had a chance to observe, listen, and get to know some of the reflections shared by other mentors in the class and outside the class.
Engaging in this kind of relationship without any intention to collect data for research is actually stated as a perfect strategy in grounded theory for beginning to investigate phenomena. As pointed out by the grounded-theory developers Glaser and Strauss (1967), the very first step essential to carrying out grounded theory research, has to do with the researcher’s approach to the subject to be studied. In this framework, grounded theory requires researchers to enter into the research environment without any preconceived research questions that could possibly limit their understandings of the phenomena. Therefore, a researcher using this approach needs to be conscious about being open to ideas as widely as possible.

For these given reasons, it should also be noted that my informal, unattended observation session was likely effective in terms of identifying the phenomena that needed to be investigated. Since there was no intention to use theses data at the time, no written record was kept at this stage.

Based on my initial experience and understanding of the mentoring structure that I developed through informal observations and conversations with other participants, a decision was made to investigate mentors’ experiences a few years later. To get additional details about mentors’ experiences, my first strategy was to stay in the mentoring community and remain connected with other mentors. During participation in two additional active mentoring sessions with other mentors in 2004 and 2005, the observation technique was again used as one of the major tools with which to collect data during each fall semester. At the beginning of the semester, the course instructor introduced me to her students and explained why I was there. Field notes were used to keep records of the data produced in these sessions in contrast to the previous sessions where no records were kept.
In addition to observations in the classroom, I also collected data through observing participants in different activities (mentoring social events and activities that took place outside the formal mentoring sites like the Center for Technology in Learning and Teaching laboratories where some mentors worked either with their mentee or by themselves to get ready for their mentoring meetings).

The data collected from observations were kept in the field notes. These field notes mostly were in shorthand format taken during the class sessions and later elaborated with my interpretations based on the input coming from other activities right after the class or in the week the class met as noted earlier. Because of the principles of grounded theory, the field notes in the second year (2005) were more focused on specific topics than those taken in 2004.

**Interviews**

Valerie Janesick (1998) described an interview as a “meeting of two persons to exchange information and ideas through questions and responses, resulting in communication and joint construction of meaning about a particular topic” (p. 30). Interviewing is a very important technique for collecting data in different traditions of qualitative research (Creswell, 1998). In fact, some even consider interviewing the most popular technique in social research (Esterberg, 2002; Glaser, 1992). In many qualitative research approaches, including the grounded theory approach, observations can reveal the researcher’s interpretations, but observations are usually not enough to understand phenomena from the subjects’ perspectives. Thus, good grounded theory methodology requires researchers to
include interviewing in the study along with observations (Glaser, 1992). For this reason, I
selected interviewing as another primary tool with which to collect data in this study.

Because of access issues and the need for specific data at different stages of the
research, the interviewees were selected mostly from the group of students who were easily
accessible, as long as they were judged to be the appropriate ones to contribute to the study
under investigation. Based on the initial analysis of the data from the mentor survey and
observation sessions, it appeared that mentors’ levels of technical and academic knowledge,
pedagogical experiences at different levels as well as some other factors were important to be
considered in the study. To have a better understanding of mentors’ experiences and have
fully saturated categories created from data, those individual mentors with different levels of
knowledge and experiences in given areas were purposefully selected so that we could create
conceptual categories as described in the grounded theory. Since I was a doctoral student in
the same department where the faculty technology mentoring program took place and where
many participants were graduate students, I had sufficient access both to the research field
and to some of the study participants. The existing personal relationships between me as a
researcher and other participants allowed me to play a “gate-keeper” role in accessing
participants both in and out of class and to interview them in within the constraints of their
very busy schedules.

According to Glaser (1992), a researcher using the grounded theory approach should
focus on the general area of interest and on understanding the subjects in the field so he or
she can have a broader perspective with which to see “the true problems in the area” and
become open to “emergence of the problem” rather than focusing on a “preconceived”
problem. The specific interview questions, for these reasons, were arranged in a format that
does not force the data and its collection. Therefore, one in-depth, semi-structured interview was conducted with each of the participants. The central purpose of these interviews was to gain deeper understanding of the participants’ perspectives on the faculty technology mentoring project in which they had been involved and to identify characteristics of successful technology mentoring from their perspectives.

As described in the grounded theory approach framework, I developed and used a semistructured interview technique in this study. Esterberg (2002) defined a semistructured interview as “much less rigid than a structured interview” and stated that the goal in this type of interview is to “allow interviewees to express their opinions and ideas in their own words” (p. 87). The general format of this interview began with a general question about the participant’s experiences with the faculty mentoring project and then narrowed down to his or her individual ideas, recommendations, assessment, and critiques about specific parts of the mentoring structure that had been touched on in earlier parts of the interview.

The following four interview guiding questions were developed and sent via e-mail to each participant before the interview to provide time for each to think about their particular experiences:

1. What are your thoughts and experiences about faculty technology mentoring?
2. What benefits did you gain by serving as a mentor?
3. What are the strengths and weakness of faculty technology mentoring from your perspective?
4. How would you restructure mentoring to make it more beneficial to both the mentor and mentee?
The interviews in this study were classified into two main groups based on the time at which they were conducted. The first interview session occurred before the final survey was distributed to all participants. In the first interview session, six interviews were conducted with former mentors. The second interview sessions were carried out after the analysis of all collected data including the technology mentor survey results. Three mentors participated in this second interview session.

All participants in both interview sessions were contacted either by electronic mail or in person with a brief explanation of the purpose of the study and asked if they were interested in participating in an interview session. Based upon their agreement to participate in this study, the consent form was sent to them via e-mail unless it had been obtained before. In this second message, they were also asked to send any case study papers that they might have written as a class requirement.

For face-to-face interview sessions, one college building room, which all participants were familiar with and had easy access to, was reserved. Equipment to record the interview sessions was prepared before each participant arrived. The time, place, and medium of the interview were organized through electronic mail communication.

Before starting an interview, Esterberg (2002) recommended a few minutes of friendly chatting with each interviewee so he or she will have time to control nervousness about aspects of the interview such as being tape-recorded and become comfortable with the environment. Thus, at the beginning of each interview we chatted for about ten minutes about what the participant’s current activities, research interests, and other topics we had in common as graduate students. In both interview sessions, following an introduction to the interview as recommended by Esterberg (2002) above, two interview formats were used
related to the possible presence of additional data about each interviewee’s mentoring experience.

The interview sessions carried out with those individuals participating in mentoring earlier than 2002 were expected to be limited due to lack of detailed information about their individual mentoring cases. Thus, these interviews were naturally based on the guiding questions sent them in the e-mail message and followed by immediate questions captured during the interview session. Conversely, since there was additional field data collected earlier (through field notes, reflective journals, online discussion postings, case study papers etc), the interviews with those who participated in the 2004 or 2005 mentoring activities were based not only on the guiding questions but also elaborated with very specific questions based on analysis of data developed thorough several sources.

All interviews were tape/video recorded for later analysis and transcription with the permission of the participants. All names were replaced with pseudonyms to maintain participant confidentiality.

*Technology Mentor Survey*

To enable investigation of mentors’ experiences in as much detail as possible, there was a need to access all participants at different locations. A survey instrument was developed (Appendix A) to discern all participants’ perspectives on the major elements of the model identified through initial observations, literature review, interviews, and other sources. Several sources were used in the development process. Each major source, listed in chronological order, is described in the following section.
Development process. Several resources were used in the development phase of this instrument (See also Appendix B):

- Personal experience: With three years of active participation in the mentoring community and in working with two different faculty members, I found the opportunity to experience mentoring relationships at a first-hand level as each mentor did during participation. Therefore, my personal reflections and experiences that I developed through several activities that took place both inside and outside the mentoring structure were effective in the development of this survey instrument.

- Literature review on the subject: In the Fall 2004 semester, I began to collect resources on technology mentoring and related topics (mentoring as a professional development model, technology in teacher education, issues of technology integration, educational change models (i.e., CBAM, Diffusion of Innovation, Systemic Change) through the library and the internet. After collecting these articles, I examined them through careful reading and identified the central themes related to mentoring relationships. Several main and sub-themes based on this literature review are given below:
  - Technology skills (enriching technology skills, time spent by mentors to learn a specific technology, opportunity to recognize mentors' own technology expertise, limited expertise of mentors and mentees resulting in more benefits to both mentor and mentee, and trouble shooting abilities)
  - Role modeling
  - Pedagogical experience
  - Professional and academic growth and experience
• Professional connections
• Development of leadership skills
• Opportunity to put obtained skills into practice
• Share ideas and skills
• Issues (time management, personal fit, mutual interests, mutual respect and trust, mutual participation)

• Input from analysis of initial data: The initial analysis of data collected from the “Technology and Teacher Education” class through observations in the Fall 2004 and Fall 2005 semesters, interviews with several graduate students, individual journals, document analysis, and other sources provided crucial inputs into the survey instrument design. The issues, limitations, successes, and other topics brought to the class by mentors, and their thoughts on these aspects were classified under several themes (benefits, issues, and technology, etc.) resulting in creation or modification of several survey items. For example, Diana’s expressions of her limited knowledge in using the software that her mentee needed and the help she was provided by other mentors was classified under “benefits to mentors.” Statements listed below are some of the items principally based on class observations:
  • “Joint planning of the project by the mentor and the mentee is important for a successful mentoring relationship.”
  • “Mentees’ willingness to learn new technologies is important for a successful mentoring relationship.”
  • “Having a mentor community within the C I 610 course helped me to
learn new technical skills from fellow mentors.”

- “Mutual respect, care, and trust between the mentor and mentee are important for a successful mentoring relationship.”

- Expert revision: Once the first draft of the survey was created, two professors provided feedback. These faculty members were from a department in which they had experience with both graduate student mentors and faculty members. Based upon their experience with this topic, as well as research concerns, the first draft was modified, some new items were added, some were removed, and some were changed. One of these professors continued to offer her input as an expert during this process during the development of later drafts of the instrument. Some examples from the survey for this section include the following:

  - “During which of the following range of dates did you participate in the mentoring program?” This item was added based on one of the professors’ experiences with the program. His point was mainly about the resistance to the process of faculty members during the early years of the program. This was a very important point, and it was also expressed later at one of the mentoring luncheons based on her experience as a project leader.

  - One of the professors examined the survey very carefully and put her recommendations with respect to duplicate items, wording, format of the survey, measurement scale, etc., into later drafts of the instrument.
• Expert review on statistical issues: One professor from a quantitative research tradition examined the survey and contributed the following ideas and suggestions to the instrument’s design process:

  - Discussion on using a four-point scale instead of a five-point scale categorization by removing “Neutral” item from the measurement scale. The main reason behind this decision was to force respondents to decide on one of the four options (Strongly disagree – Strongly agree) that might give us better sense of to what extent they benefited from their mentoring relationship.

  - In anticipation of data analysis in general, Rewriting some items was discussed.

  - Because of the limited number of potential respondents, and the common rule of 5 respondents for each survey item, the appropriateness of the number of survey items and the number of potential respondents were discussed.

• Review by major professor based on research questions: The final draft of the instrument was examined by major professor with respect to compatibility between the survey instrument and the purpose of the research. With her recommendations and input, some research questions were reworded.

• General feedback from a group of graduate students: This survey was also distributed to a group of graduate students in the department to read and provide feedback on format of the items, format of the instrument, and other identified issues.
• Pilot study with a group of mentors: The online version of the survey instrument was distributed to the participants in the pilot study of the 2004 mentors. They were asked to provide their feedback in terms of clarity of the questions, missing items, and any other issues they saw. Based on their feedback, the survey was modified again, but no major changes were made in the overall design.

• Committee feedback: Before and during my preliminary exam in summer 2005, my doctoral committee members examined the survey instrument and provided several useful comments with respect to rewording some items, reformatting, or other clarifications.

• Final modification: After obtaining comments from committee members during the doctoral preliminary exams, I began working on the research proposal. Based on the theoretical framework of the study, social learning theory, the survey was re-examined to determine whether or not the instrument is appropriate and would provide useful data in accordance with social learning theory. In this process, each item was rechecked and a few more items were added and removed based on the principles of social learning theory.

Secondary Data Sources

Literature Review

Although some discussion continues to take place about whether or not particular literature should be used and how literature in general can be used in the grounded-theory approach, Glaser (1992) and Strauss and Corbin (1990) stated that the use of literature in any research based on the principles of grounded theory would be helpful in improving the
“theoretical sensitivity” of a researcher. Theoretical sensitivity improves the researcher’s ability and skills in developing concepts, categories, and theory. However, the researcher must be conscious of the possible negative effects of literature study on his or her theoretical sensitivity. According to Strauss and Corbin (1990), theoretical sensitivity is “the ability to recognize what is important in data and to give it meaning,” and is achieved through two sources: being well-grounded in the technical literature and professional and personal experience.

Even though I first identified the need for understanding of mentors’ experiences in 2002 with no intention of doing research on the subject, more recent literature on faculty technology mentoring and related subjects have impacted my understanding of existing studies and identifying possible research areas, intentionally or unintentionally. Thus, the method of collecting data, interview structure, questions, and analysis of the data could be affected by the literature and would be subject to criticism in terms of possible biases and possibly inappropriate use of grounded theory methodology. However, according to Strauss and Corbin (1990), a researcher may use literature and related documents as a secondary data source in deriving a list of interview questions to ask respondents. As noted earlier, the use of a literature review during the development of the survey instrument was very helpful in terms of improving my understanding of the subject in general terms, and providing me a chance to compare my understanding with that of others in the field.
Mentor Reflective Journals

Based on my initial conceptualization of the phenomenon and the results I gained from data obtained through different sources described here, I found out that there were more insights needed from mentors to address or discuss some of the themes in details emerging from initial analysis of the data. Therefore, I requested that course instructors ask mentors to keep reflective journals on a weekly or biweekly basis as much as possible from the beginning of the 2005 Fall semester. To obtain more specific data, I created a journal guide (Appendix C) and sent it electronically to the 2005 mentors after getting approval from the course instructor.

Online Discussions, Artifacts, and Other Materials

As another source for data collection, online discussions, postings in WebCT, written materials, software/hardware technologies, demonstration sessions and related materials, handouts, news from national and international media related to new technologies, and other electronic and paper-based materials were collected and used in this study.

Data Analysis

A researcher using the grounded theory approach may also use data sources (interviews, field observations, personal journals, etc.) and techniques similar to those used in many other qualitative approaches (Denzin & Lincoln, 2000). However, the analysis of data and development of theory is different. According to Glaser (1978), grounded theory analyzes data by a “constant comparative” method that uses a systematic approach to collect and analyze the data from the beginning to the end of the research until a theory emerges. As
data collection and analysis proceeds, the analyst moves between data and the initial analysis results and then decides whether more data is needed, how to collect it, and where it may come from (Glaser & Strauss, 1967; Merriam, 2002).

In this method, the analyst develops his theory by constantly comparing each incident with other incidents to produce emerging conceptual categories and by reducing similar categories into a smaller number of highly conceptual categories (Glaser, 1992; Merriam 2002). This process is facilitated by three levels of data coding procedures: open coding, axial coding, and selective coding (Strauss & Corbin, 1990). Jones and McEwen (2000) described the three levels of data coding:

The first stage of coding [open coding] involves breaking down data and beginning the process of categorization. Axial coding takes initial categories and makes further comparisons that describe relationships between categories. Using selective coding, saturation of categories, which occurs when further analysis produces no new information or need for additional categories [is examined]. (pp. 167-168)

According to Strauss and Corbin (1990), open coding in grounded theory is “the analytic process by which concepts are identified and developed in terms of their properties and dimensions” (p. 74). To conceptualize these phenomena, a researcher must create codes from the raw data, a concept that represents phenomena grounded in the data. It breaks down the data into discrete parts that are closely examined and compared for similarities and differences between each incident, event, and other instances of the phenomena. Thus, it is common in this approach to see many codes, concepts, and categories emerge from data through a constant comparative encoding in early stages of the analysis process (Glaser, 1978; Strauss & Corbin, 1990). In this analytical process of creating categories from
concepts, the properties and dimensions of each category are important in terms of
developing relationships between categories and subcategories in later phases of the research.

Strauss and Corbin (1990) described properties as “attributes or characteristics pertaining to a
category” and dimensions as “location of properties along a continuum” (p. 61). In their
example, they summarized the relationship between a category and its properties and
dimensions. The “color” of several flowers from a garden would be labeled a category during
the open coding process with properties such as shade, intensity, hue, etc., and the
dimensions of each property as intensity ranging from high to low, hue ranging from darker
to lighter; etc. In their conclusion, Strauss and Corbin made this point more specifically by
pointing out that “each category has several general properties, and each property varies over
a dimensional continuum” (p. 70).

To enable creation of all these codes, concepts, and categories with their associated
properties and dimensions, Strauss and Corbin (1990) proposed using three different open
coding approaches: (1) line-by-line, (2) sentence-by-sentence or paragraph-by-paragraph, and
(3) an entire document. Although they saw no problem in using any of these three coding
approaches, Strauss and Corbin stressed the importance of using the line-by-line approach at
earlier stages of the process because of its feature of being more generative (Strauss &
Corbin, 1990; Dey, 1999). Because of the importance of the open coding process on overall
conceptualization of phenomena by a researcher, it is strongly suggested that he or she create
as many codes and concepts from the data as needed until the pattern of concepts begins to

Once initial categories are developed at the first phase of coding, open coding, the
next step in the data analysis process is to identify a single category as a central phenomenon
and to make connections between this core category and its subcategories created during earlier stages of the research (Creswell, 1998). This stage is called “axial coding” (Strauss & Corbin, 1990). In Strauss and Corbin’s definition, axial coding is “a set of procedures whereby data are put back together in new ways after open coding, by making connections between categories” (p. 96). Although the process seems similar to that of open coding in terms of the way categories are created, axial coding is more focused and targeted toward discovering and development of core categories beyond simply properties and dimensions by utilizing a coding paradigm that involves conditions, context, action/interactional strategies and consequences (Strauss & Corbin, 1990).

In the selective coding process, the analyst terminates open coding for all categories and focuses more on core variables that are saturated with data. At this level of coding, the researcher must look at all categories in selective fashion, find the relationship between them, and produce an explanation as to what is going on (Harry, Sturges, & Klinger, 2005).

In this data analysis process, several statistical procedures were used to analyze mentors’ responses to the technology mentor survey. In addition to descriptive statistics (i.e. mean, standard deviation, minimum and maximum values), several nonparametric tests were used to investigate the relationships among the different variables because of the violation of normality assumptions. At that stage of the analysis process, I expected to gain deeper insight about mentors’ overall mentoring experiences, personal and environmental factors that supports or hinders successful mentoring relationship, ideas about mentors’ benefits, the pattern of relationship between mentor and mentee, and some others factors that would explain or support the ideas that emerged from other sources. Shapiro-Wilk for normality tests, Mann-Whitney U for group comparisons (i.e. between degree and overall technical
benefit), multinomial logistic regression models (between the theory and research background item and academic benefits) and some others were the major statistical tests used to analyze the survey responses. As pointed out earlier, this study had two groups of interviewees that were selected before and after the distribution of the survey. Therefore, the results obtained from the analysis of the survey data and other initial sources (field notes, first interview session) were an important factor in the selection of second groups of interviewees.
CHAPTER 4

RESULTS

The purpose of this study was to investigate graduate students’ experiences with one-on-one faculty technology mentoring in the college of Human Sciences at a large Midwestern research-based university and to describe important dynamics of a successful mentoring relationship based on the perspectives of mentors. This chapter begins with the participants’ demographic characteristics based on the data and analysis process described in the methodology chapter, and then presents the major findings organized around the following guiding questions:

1. What do mentors report as benefits of participating in the technology-mentoring program?

2. What kinds of factors influence mentors’ perception of benefit?

3. What are the characteristics of a successful technology-mentoring program from the mentors’ perspectives?

4. Do the mentoring experiences of the mentors reflect their views of a successful mentoring program?

5. What are the strengths and weaknesses of the faculty technology-mentoring program from mentors’ perspectives?

6. Do former mentors use their mentoring experiences in their professional life?
Data Analysis

The results from data analysis process are presented in this chapter. The first section of the chapter summarizes the participants’ demographic characteristics, then follows quantitative and qualitative data analysis results for each research question.

Secondly, in order to give an overall perspective as to what mentors thought about each specific question, each section created by a research question started with the analysis of survey responses related to that specific question. Based upon the results from statistical tests, the analysis process was continued with the data from qualitative data sources. Major categories (themes) and their subcategories in each main category were created and discussed within the consideration of the quantitative results.

Participants’ Demographics

As explained in detail in Chapter 3 of this study, a total of 60 individuals enrolled in the CI 610 “Technology in Teacher Education” course between 1997 and 2005 were invited to participate in this study at different time periods (some mentors were involved in more than one data collection activity). Based on the timeline of the data collection process, all participants \( n = 59 \) were classified chronologically into different groups according to their involvement with the specific stages as: a) participants in observation sessions, b) participants in interview sessions, and c) survey participants.
Participants in Observation Sessions

Fourteen mentors contributed data to this study by giving me permission to carry out classroom observations. In the beginning of the Fall 2004 and Fall 2005 semesters, $n = 14$ mentors who enrolled in the CI 610 course were contacted in person in the classroom environment and their permissions were obtained to collect data through formal and informal classroom observations and interviews, as well as to collect materials they produced such as diagrams they created to demonstrate their understanding on a specific issue, web site links they developed with their mentee and so on in and out of the class. Thus, the data were by nature more qualitative than quantitative, coming from field research and collected from these participants. In addition, the same group of mentors took the online survey at the later stages of data collection. Of the participants, six were pursuing a Master’s degree and eight a Doctorate degree; all except one were majors in the Department of Curriculum and Instruction; seven were educated in the United States, and seven in the international education system.

Participants in Interview Sessions (Interviewees)

As noted in Chapter 3, two main groups of interviews were conducted. The first group of interviewees included six mentors who enrolled in the CI 610 course in various years, mostly in 2005. Of these interviewees, three were pursuing Master’s degrees and three doctorate degrees, all were majors in Curriculum and Instruction, three were educated in the United States, and three in the international education system. The second group of interviewees was made up of three mentors who had reported or demonstrated different mentoring experiences than others. The demographic backgrounds of these individuals were
as follows: two of them were pursuing Doctorate degrees and one the master’s degree. Although two of them were majoring in Curriculum and Instruction, the one doctoral student was from a different college.

Survey Participants

The whole body of former mentors (n = 59), including those cited in “Participants in Observation Sessions” and in “Participants in Interview Sessions (Interviewees)”, participated in the mentoring program between 1997 and 2005. The final list of participants in this group, with their contact information, was created with the help of college alumni personnel and of several people at the college who had the most currently updated contact information. The online version of the mentor survey was created with an Open Source survey package called Unit Command Climate Assessment and Survey System (UCCASS) developed based on the PHP: Hypertext Preprocessor (PHP) and MySQL database software. The online version of the survey was tested multiple times on both MAC and PC platforms and on several Web browsers (FoxPro, Netscape, Internet Explorer) to ensure that it exhibited no technical problems before sending it to participants.

After the online survey was tested, 52 mentors (88%) were sent an invitational electronic mail (e-mail) message to take the online survey. Because of the absence of e-mail information, 7 former mentors (12%) were sent an invitational letter to their home enclosed with the survey, a consent document, and a return envelope. Following the first e-mail message, two weeks later another friendly message was sent to participants who hadn’t responded. A total of 43 respondents out of 59 former mentors who received one or both
invitations took the survey. The response rate to the survey was thus 73% ($n = 43$). Detailed demographics of survey respondents are given in Table 1.

Table 1

*Background Information about Survey Participants*

<table>
<thead>
<tr>
<th></th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master’s</td>
<td>17</td>
<td>39.5%</td>
</tr>
<tr>
<td>Doctorate</td>
<td>26</td>
<td>60.5%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>27.9%</td>
</tr>
<tr>
<td>Female</td>
<td>31</td>
<td>72.1%</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>40</td>
<td>93.0%</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>7.0%</td>
</tr>
</tbody>
</table>

As shown in Table 1, a majority of the survey respondents were doctoral students ($n = 26, 60.5\%$) in the College of Human Sciences (93\%) at the time they participated in the mentoring program.

**Mentoring Participation Year**

As noted earlier, the participants of this study were from mentoring programs offered from 1997 to 2005, excluding the year 2003 due to course professor’s sabbatical leave. Because several years had passed since the earlier mentors' participation, it was difficult for participants to remember the exact year in which they had participated in the mentoring program. Therefore, before we started the data analysis process, we checked the respondents’ participation year as reported in the survey response with those obtained from the college record office. We found that several respondents actually indicated the wrong participation year in their responses, so all were corrected in the data. In the distribution corresponding to
participation year in the mentoring program, the highest response rate was for mentors of 2002 and 2004, with \( n = 8 \) (18.6\%) each, and the lowest response rate was for mentors of 1997, with \( n = 2 \) (4.7\%). Among the rest of the 43 respondents, five (11.6\%) were from 1998, five (11.6\%) from 1999, four (9.3\%) from 2000, six (14\%) from 2001, and five (11.6\%) from 2005 mentoring programs (see Figure 6).

![Figure 6. Survey respondents’ mentoring participation year.](image)

Mentors’ Teaching Experience

In the survey, respondents were asked to provide information about their teaching experience background at different levels of higher education programs (undergraduate, graduate) and K-12 level prior to their mentoring participation. The average number of semester of teaching experience for each mentor was found about between four and six
semesters ($M = 1.98$, $SD = 1.28$). The majority of the participants ($n = 40$, 93%) reported that they had had at least one semester of teaching experience prior to their mentoring participations. About 42% ($n = 18$, 41.9%) of those 43 respondents had 1-3 semesters of teaching experience prior to their mentoring participation.

![Bar chart showing the distribution of teaching experience](image)

**Figure 7.** Respondents’ teaching experience in semesters prior to mentoring participation.

Those who had more than 3 semesters of teaching experience were almost evenly distributed among “4-6” semesters ($n = 7$, 16.3%), “7-9” semesters ($n = 7$, 16.3%) and “10 or more” semesters ($n = 8$, 18.6%) of teaching experience (see Figure 7). Except for 3 doctoral students (7%), all respondents had teaching experience prior to their mentoring participation.
The results revealed that there was little difference between master’s and doctoral respondents in the number of semesters of teaching experience.

Mentors’ Background in Education Theories, Research, and Related Subjects

One of the instrument’s items (Item #5) that provided more background information about the participants was the self-evaluation by participants of their backgrounds in education theories, research, and related subjects prior to their mentoring participations. The responses demonstrated that 27 (62.8 %) of those 43 respondents rated their background in theories, research, and related subjects “Good” (n = 17, 39.5%) or “Very Good” (n = 10, 23.3 %), 11 (25.6 %) indicated that they were “Neither good nor bad,” and five (11.6 %) rated their background in educational theories, research, and related subject as “Bad.” None of the respondents reported that they had “Very bad” background related to this item.

Of the five respondents (11.6 %) who indicated they had a “Bad” background in education theories, research, and related subjects, three were master’s (7 %) and two were doctoral students (4.7 %). Five masters’ students (11.6 %) and six doctoral students (14 %) rated their background as “Neither good nor bad.” Although about two out of every three doctoral students rated their background as either “Good” (n = 11, 42.3 %) or “Very good” (n = 7, 26.9 %), this was true of only about one out of every two master’s students, six of whom (35.3 %) rated themselves as “Good” and three (17.6 %) as “Very good” (see Appendix D).
Other Background Information about Survey Respondents

In the first section of the survey instrument, respondents were asked to provide details about the number of semesters they had worked with their mentees (Item #7), whether or not they were actively teaching during the survey process (Item #8) and, if so, at what level, if they produced any publication or conference presentation from their mentoring experience (Item #9) and, if so, whether or not this paper or conference attendance were their first academic activity on their career path (Item #10).

Number of Semesters the Mentoring Relationship Lasted

The majority of the respondents \((n = 32, 74.4\% , n_{\text{master's}} = 14, n_{\text{doctorate}} = 18)\) indicated that their mentoring relationship lasted for about one semester. Seven \((16.3\% , n_{\text{master's}} = 1, n_{\text{doctorate}} = 6)\) of those 43 respondents had a mentoring relationship lasted for about two semesters, and four respondents \((9.3\% , n_{\text{master's}} = 2, n_{\text{doctorate}} = 2)\) indicated that they had a 3-semester long mentoring relationship with their mentees. For some of those mentor-mentee pairs that had a mentoring relationship that lasted more than one semester, the time needed to meet their project goals was one of the key factors to their continuation of the relationship to second or third semester. Among the projects those pairs worked on was creating a website for course delivery the some part of the course content. Because of the time needed for planning and development of those sites, the pairs reported that their mentoring relationship lasted about two semesters.
Mentors Currently Teaching

Respondents were asked whether or not they were teaching at the time they took the survey in the year of 2006. The responses to this item in the instrument showed that almost half of the respondents were actually teaching at different levels. 20 respondents (46.5%, \(n_{\text{masters}} = 9, n_{\text{doctorate}} = 11\)) indicated that they were teaching as opposed to those 23 respondents (53.5%, \(n_{\text{masters}} = 8, n_{\text{doctorate}} = 15\)) were not teaching. Sixteen of those 20 respondents who were teaching reported that they were teaching at different levels of higher education programs (undergraduate, graduate) and four were teaching at the K-12 level. The majority of those 23 mentors reporting no teaching duties indicated that they had mostly different types of academic positions such as working as a research assistant or instructional support person at the college or some other places.

Produced Publication and/or Presentation

One of the important outcomes of the mentoring participation for mentors we observed in recent years was the fact that mentors produced several papers for publications and/or attended conferences to present their mentoring experience. With respect to this point, respondents were asked to provide more insight on this issue so that we could obtain a broader view on another aspect of the mentoring benefits to mentors.
Figure 8. The distribution of the publication/presentations by mentor participation year.

About one out of every three respondents ($n = 14, 32.6\%, n_{master's} = 3, n_{doctorate} = 11$) indicated that they actually had a publication/presentation produced from their mentoring experiences. 29 of the respondents ($67.4\%, n_{master's} = 14, n_{doctorate} = 15$) did not have any publication or presentation. One of the important points indicated by these respondents was that six ($14.0\%$ of all participants, $n_{master's} = 2, n_{doctorate} = 4$) of the 14 respondents who produced a publication/presentation indicated that this artifact was their first one in their academic career path.
Mentors’ Benefits


Based on the extensive literature review and the results from initial analysis of data resulting from different sources such as class observations, interviews, and document analysis, as explained in detail in methodology chapter of this study, several themes related to mentors’ benefits were identified and used in the earlier stages of this study to construct the survey instrument.

The analysis process of qualitative data through using three different coding levels (open, axial and selective) as described in the Chapter 3 of this study provided several categories under which mentors’ benefits were grouped. The major benefit categories are given in Table 2 below.

Table 2

The Major Categories of Mentors’ Benefits

<table>
<thead>
<tr>
<th>Mentors’ perceived benefit categories (from qualitative data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Professional</td>
</tr>
<tr>
<td>- Personal &amp; Social</td>
</tr>
<tr>
<td>- Academic</td>
</tr>
<tr>
<td>- Theoretical</td>
</tr>
<tr>
<td>- Technological</td>
</tr>
<tr>
<td>- Pedagogical</td>
</tr>
<tr>
<td>- Practical experience</td>
</tr>
<tr>
<td>- Future career plans</td>
</tr>
<tr>
<td>- Different skills (mentoring, organizational, project Management)</td>
</tr>
<tr>
<td>- Communication skills</td>
</tr>
</tbody>
</table>

Among those categories, mentors’ growth in learning and using different technologies, in pedagogy, and in professional life and academic growth emerged as the
potential domains in which mentors could receive benefits from a faculty technology mentoring program. Therefore, the analyses of the mentors’ benefits mentioned above are organized as follow.

1. Mentors’ technical benefits
2. Mentors’ pedagogical benefits (growth)
3. Mentors’ academic benefits
4. Mentors’ professional benefits

*Mentors’ Technical Benefits*

As noted in previous chapters, one of the most important objectives of the mentoring program was to help faculty members in their need for specific technology related to their professional tasks. In the given structure of mentoring relationships, graduate student mentors were expected to play a “technology expert” role on specific technology elements their mentee had requested to learn and use, regardless of their background. To meet expectations, mentors, especially those who have limited knowledge and experience with the chosen technologies, must spend considerable time and effort to learn those technologies and to transmit gained knowledge and experiences to their mentees. Because of this, there was a need to investigate whether or not mentors’ efforts and time they invested in the mentoring relationships produce any benefit to them in terms of their own growth in technology-related subjects.

To address this question, items in the second section of the survey were structured in such a way as to provide data for both understanding of the mentors’ overall technical
benefits as well as for investigating the impacts of interactions with different social groups or individuals on mentors’ learning new technologies and developing technical skills.

According to the results given in Table 3 below, the average score for the item regarding mentors’ overall technical benefits (Item #17) was between 3 and 4, which indicated that the majority of the respondents \( n = 43 \) agreed on overall technical benefits they had received from mentoring program \( (M = 3.12, \text{SD}.793, 1 = \text{Strongly disagree}, 2 = \text{Disagree}, 3 = \text{Agree}, 4 = \text{strongly agree}) \). The minimum and maximum values, however, indicated that respondents varied on their responses to the Item #17 from “strongly agree” to “strongly disagree”

Table 3

*Descriptive Statistics for Mentors’ Overall Technical Benefits*

<table>
<thead>
<tr>
<th>Descriptive Statistics for Overall Technical Benefits (Item #17)</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Technical Benefits</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.12</td>
<td>.793</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As a parallel to the results we had for the Item #17 (overall technical benefit), the individual scores for each item in this section of the survey instrument (see Table 4) revealed similar results. This briefly indicated that mentors found the technology mentoring experience beneficial in terms of improving their overall technical knowledge and skills.

Also results indicated that mentors believed that interactions with other mentors (Item #11, #12) as well as with faculty members (Item #13) had positive impact on identifying their
individual strengths using technology (Item #14) and on increasing their self-confidence with learning new technologies (Item #15).

Table 4

*Descriptive Statistics for All Items in Section #2*

<table>
<thead>
<tr>
<th>Item #</th>
<th>(Mentoring Comm. helpful on tech. skills)</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #11</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.05</td>
<td>.844</td>
<td></td>
</tr>
<tr>
<td>Item #12</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.12</td>
<td>.793</td>
<td></td>
</tr>
<tr>
<td>Item #13</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.44</td>
<td>.666</td>
<td></td>
</tr>
<tr>
<td>Item #14</td>
<td>42</td>
<td>1</td>
<td>4</td>
<td>3.33</td>
<td>.754</td>
<td></td>
</tr>
<tr>
<td>Item #15</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.12</td>
<td>.762</td>
<td></td>
</tr>
<tr>
<td>Item #16</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.02</td>
<td>.831</td>
<td></td>
</tr>
<tr>
<td>Item #17</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.12</td>
<td>.793</td>
<td></td>
</tr>
</tbody>
</table>

The highest mean score came from Item #13, “*Working with a faculty member provided me opportunities to learn/improve my knowledge on different technologies*” (*M* = 3.44, *SD* = 0.67). Following Item #13, Item #14, Item #12, Item #15 and Item #11 had higher average scores respectively. The lowest mean of agreement among respondents was the Item #16, “*I improved my skills on technical troubleshooting as a result of the mentoring program*” (*M* = 3.02, *SD* = 0.83). Based on these scores, it was clear that mentors’ experiences indicated a process of learning through which mentors enhanced their knowledge and skills rather than developing only technical troubleshooting skills.
For further investigation of the data, there were several statistical procedures carried out to find out if mentors’ background (teaching experience, education theory background, degree program, and number of semesters mentoring relationship lasted) had any impact or relationship on their scores for the items related to their technical benefits. For this reason, Shapiro-Wilk for normality tests, Mann-Whitney U for group comparisons (i.e., between degree and overall technical benefit (Item #17)), multinomial logistic regression models (between the theory and research background item and Item #17) and some other statistical tests were run, but none of them revealed any statistically significant results (Appendix E).

In addition to the survey results (see Table 3), the analysis of qualitative data we collected throughout the study demonstrated a strong consensus among mentors on their technical benefits because of their mentoring participations. Findings not only supported the overall conclusions on mentors’ technical benefits indicated in summary tables above but also provided very important insights on different aspects of the technical benefits mentors gained.

As a result of analysis of qualitative data, (a) Learning (trying) new technologies, (b) hands on experience (practice), and (c) new ideas (technology adoption) emerged as the important subcategories of technical benefits in which we discussed the commonalities and differences of mentors’ thoughts on the issue and defined our conceptualization of how faculty technology mentoring program was beneficial to mentors with different backgrounds. The details of each of these subjects are given below.
Learning (Trying) New Technologies

Most of the mentors, including those who had well-developed backgrounds in technology, indicated clearly in their journals, interviews, or case study papers that their mentoring participation certainly provided them an environment in which to become aware of new technologies and learn about them, mostly with the help of fellow mentors, mentees and other members of the community. One of the participants, Jessica, pointed out that

I’ve always been more of a technophobe so this course really helped me try new things. I learned a lot about technology that I never would have otherwise. Now I’m able to help other people with their technology problems as well as trying new technology myself.

Jessica’s thoughts on her experience was not the only case that proved the importance of mentoring experience on some individual mentors’ technology learning activities. Kathie’s, and Frank’s cases were also examples that demonstrated how they found mentoring experience beneficial to them in terms of learning new technologies as part of their overall growth on technology related subjects.

Kathie, a new master’s students with some years of teaching experience but limited technology background on the software application that her mentee had wanted to work on, noted that;

I got a lot of technical knowledge … I can post to WebCT some of the technical questions I had some of the people responded. Today in fact I have a Photoshop issue that I had e-mailed Sara about. So, I have 5 more people [mentors] that are resources for me…
Frank seemed to consider himself as having a good background in different technologies or at least enough background so that he could learn by himself. However, he pointed out that he had also found technically some benefits from the relationship. He noted that;

I might know some applications well, but to use them into teaching, it requires more deeper understanding of the real situation, the contact, sometimes the content. To apply technology into these settings, it helped me to learn better about technology.

Although Jessica, Kathie, and Frank represented different levels of technical expertise and knowledge, they all agreed on the idea that they found mentoring experience beneficial in improving their technical skills and knowledge, just as many of the other mentors did (including the whole group of survey respondents indicated earlier).

Despite the fact that the majority of mentors shared similar thoughts on receiving technical benefits, and specifically on learning new technologies, they varied in their views of describing the concept of the benefit based on their background and knowledge. While Jessica and Kathie, for example, were in favor of expressing their benefits of learning new technologies more as building new skills, Frank had a broader view of his learning experience of new technologies beyond just building new skills, i.e., building them according to his pedagogical beliefs. Improved confidence level as a result of mentoring experience in trying new technologies of which they had previously been afraid was also one of the central concepts stressed by Jessica and several other mentors as their benefits in the process of learning new technologies.

The impact of the community in this learning process was highlighted by several mentors as a crucial factor. As we found in analysis of the survey results (Item #11, Item
Kathie, for example, was not the only mentor who was very appreciative of being connected to other people in the community and receiving their contribution to her learning experience. The factor analysis results also indicated that the mentoring community would be a factor on mentors’ learning process. Principal Component Analysis with varimax rotation resulted in two meaningful factors, which accounted for 84.34% of the total variance. The two items (Item #11 and #12) loading heavily on the second factor measure “impact of community on mentors’ learning process” (see Appendix F).

Using social learning theory, this is an example that shows how environmental factors can play a role on bringing new ideas to individuals’ attentions and permit them to absorb these ideas with the help of other people around them.

**Hands on Experience (Practice)**

One of major subcategories related to technical benefits was with respect to the opportunities that a mentoring program provided to mentors through which they could develop direct hands-on experiences in different technologies and in authentic environments which mentors might not obtain otherwise. Although these opportunities varied from one case to another, the main ones could be listed as

**Access to tools (hardware/software resources).** Technology mentoring participation provided mentors appropriate software and hardware technologies that they may not be able to obtain on their own such as Smartbord technologies, video streaming technologies, WebCT and so on.

**Real life projects (authentic problems).** The mentoring program, as mentioned earlier has been based on the promise of addressing faculty members’ immediate needs to use
different technologies they may choose. Therefore, mentors indicated that having a real-life problem presented by a faculty member tended to push them to identify their own limitations with respect to given specific technologies they previously had knowledge about, and to learn about more advanced functions and use at a more practical level.

*Experience on technology integration (adoption).* We found that one of the most important subcategories of mentors’ technical benefits was providing an authentic educational environment with real teachers and students in which some mentors worked directly with their mentees on real educational problems and experienced the technology integration process into educational settings at a more concrete level. Therefore, as one mentor noted,

> With [my mentee], I reviewed different ideas about technology integration into teaching and further explored and evaluated the application of WebCT in her specific subject area. Involvement in the course design process enabled me to understand the obstacles involved for faculty in technology integration.

Mentors find opportunities to not only develop direct experiences in the technology integration process but also to face real challenges for faculty.

Additionally, because of the use of chosen technologies, mentors had chances to experience directly which technology did and which did not meet their specific objectives. In this process, as one mentor indicated “*It [mentoring] is a good experience with which to teach my mentee about what I’ve known about technology applications, and to find out what I need to improve and strengthen in terms of both technology and related educational principles, theories and practices.*” Mentors became more active in exploring different technologies and aware of their own limitations in terms of level of knowledge and skills
they had on different technologies. They also took required actions to learn new technologies through the using the human resources in mentoring community in most cases.

Although the first dimension of hands on experience, *access to tools (hardware / software resources)*, would not be necessary for every single mentor such as those with a good technology background and access to the technology, the last dimension, *direct hands on experience on technology integration process into educational settings*, seemed to be the strongest and broadest concept that a majority of mentors agreed on regardless on their backgrounds or any other factors.

Carol’s case provides a clear example in terms of demonstrating different dimensions of hands on experiences in one single case of mentors benefiting from the mentoring program. Carol was one of the mentors whose mentoring journey we observed closely. As an international student with several years of teaching experience, she pointed out

…[mentoring experience] brought my knowledge to more concrete level, more practical implication level, because you see when I came here most things I did technology was on the level of theory or on the level of let’s say limited practical experience level. Just because, we did not have much access to that. So, I really didn’t have a chance in my country to try practical in many of these things. So for me, it is really possibility to test many things here to see practical implications.

As can be seen, she found the mentoring experience provided the opportunity of giving her access to technologies which she previously had no chance to use, to learn their use, to integrate them into her mentee’s teaching activities, and ultimately to test her ideas in the mentee’s classroom.
New Technological Ideas

As we discuss in detail in the literature review chapter of this study, the role of “vicarious” activities (within the simplest form, observing, listening, talking to others) in the human learning process as described within the social learning theory framework, was crucial, and learning can be in unobservable form. In our data analysis, we found that some mentors not only learned and practiced new technologies, but also got new technological ideas from class discussions, mentors, or from other individuals connected to the mentoring community through “vicarious” activities even though they didn’t mention any immediate action to use these ideas or technologies. Class discussions among mentors, especially, seemed to be a very important part of the mentoring structure in terms of mentors’ increased awareness of new ideas for using technologies. As Mary, one of the mentors who had very good technical expertise with respect to different technologies, expressed in her journal that “one thing I can say that I learned [in terms of technology] from this class is related to my work place. Podcasting seems like it is a hot topic now and we talked about podcasting in the class and I took this idea to our staff meeting…”.

Based on the evidence we have, there is no doubt that mentoring in the given framework was a means that not only bridges human and other resources to build certain skills, but also was a means of diffusion of innovative technological ideas among the members of the community.

Although the majority of the mentors reported positive thoughts on receiving technical benefits from mentoring participation, a few of them didn’t agree on the idea of receiving technical benefits (see Table 3 and Table 4). Each of the items in the second section of the survey had some negative responses (see minimums, 1 = strongly disagree),
which basically indicated that there were some mentors participating in the mentoring program who were not satisfied with the results related to their growth in some if not the whole part of the technology domain.

The closer analysis of the individual cases in the data set revealed that the most important factor for negative responses was mentors’ technical expertise levels with respect to different information technologies they brought into the mentoring program. This implies that mentors who had a very strong information technology background on various applications (software, hardware) seemed to be less satisfied with the technical benefits of the offered program in contrast to those students with less technology background. Answers to open-ended items from respondents from both degree programs (Master’s, Doctorate) in that section of the survey instrument (Item #19) briefly summarized why some mentors didn’t think that they had received more technical benefits.

Mike, a doctoral student, described his level of expertise on the technology he and his mentee worked on. He pointed out that “My technology expertise was not improved because I did not work on a different or advanced technology other than I had already known.” Jack, another mentor who was a master’s student during his mentoring participation noted that “The technology we worked on with my mentee was not actually a big deal for me. I think that I had good background of technology. But seeing some different applications from other mentors encouraged me to learn them by myself.”

Jamie, a doctoral student, noted that

I learned some new software and hardware, but I don’t feel that this mentoring program enhanced my problem-solving/troubleshooting skills other than providing opportunity to practice my skills. I already considered myself comfortable and
competent with technology and troubleshooting. Learning new software was only mildly challenging.

Although there could be other factors that might have impact in those mentors’ thoughts, these three mentors simply pointed out that mentors with high level of technical expertise would not get as much benefit as other mentors with less experience. However, the important point we need to stress here is the fact that some of the mentors, including the three given above who did not agree that they received technical benefits, seemed to have a limited perception in describing their benefits at skill development levels, as discussed earlier. As one of the limitations of this study, the lack of data from these specific mentors on this issue, we were handicapped in explaining in more detail the reasons behind their dissatisfaction. Additional data from mentors, including mentors’ technical backgrounds and mentoring experiences, would certainly be helpful in investigating those factors and whether they had any impact on mentors’ perception of benefits. A closer investigation of survey results revealed that there were only 7 mentors (out of 43) that rated Item #17, overall technical benefits, in a negative manner. However, their responses to other items in the technical benefits section of the survey indicated some level of agreement on some other benefits such as the role of other mentors or faculty members in contributing technical benefits.
Mentors’ Pedagogical Benefits

The second group of benefits identified was mentors’ pedagogical growth as a result of their mentoring experiences. The results revealed that some mentors with various levels of teaching and technology experiences found the mentoring experience beneficial to them in terms of improving their knowledge and experience by using different technologies in teaching and learning activities with their mentees.

According to Mishra and Koehler (2006), pedagogy is the process and practice or methods of teaching and learning (p. 1025). As it can be easily found in several mentoring cases, teaching and learning activities involving the mentoring participants represented the central theme of the relationships and ultimate goal of the overall mentoring structure. Since some faculty members needed to incorporate different information technologies into their teaching, some mentors were directly involved in planning, designing, and implementing different information technologies into classroom teaching activities of their mentees through open dialogue and conversations. In this process, data revealed that mentors found opportunities to grow pedagogically in different ways as discussed in this section.

Results in this section will begin with the overall summary of survey responses regarding mentors’ pedagogical benefits and then will proceed with more detailed analysis of qualitative data.

To gain an overall understanding of mentors’ growth in pedagogy and related subjects (teaching and learning with technology, using technology in classroom, teaching to others), items #19, 20, 21, 22, 26, and 27 was created in the survey instrument and data were collected from 43 respondents.
Analysis of the survey results shows that the majority of respondents indicated that the mentoring experience was beneficial to them in terms of their pedagogical growth ($M = 3.12, SD = 0.54$). Thirty-nine of 43 respondents rated item #27, “Overall, I benefited from this mentoring relationship in terms of my pedagogical growth,” either “agree” or “strongly agree.” As seen in Table 5 below, mentors indicated a strong consensus that they received pedagogical benefits from the mentoring program.

Table 5

Descriptive Statistics for Items Related to Mentors’ Pedagogical Growth

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>#19</td>
<td>Experience use of tech in teaching</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.37</td>
<td>.578</td>
</tr>
<tr>
<td>#20</td>
<td>See advantages/disadv of using tech in education</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.28</td>
<td>.666</td>
</tr>
<tr>
<td>#21</td>
<td>Chance to share my ideas with mentee</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.37</td>
<td>.655</td>
</tr>
<tr>
<td>#22</td>
<td>Building confidence to teach others</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.37</td>
<td>.618</td>
</tr>
<tr>
<td>#26</td>
<td>Apply pedagogical beliefs</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.00</td>
<td>.577</td>
</tr>
<tr>
<td>#27</td>
<td>Overall, pedagogical growth</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.12</td>
<td>.544</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The average agreement (mean scores) on the items in this section among 43 respondents were greater than 3.00, falling between “agree” and “strongly agree” in the four-item Likert scale used in the instrument, except for one case with an exact mean score of 3.00.

Question Item #19, “Working with a faculty member was effective in helping me experience issues related to the use of technology in teaching,” Item #21, “The one-on-one mentoring program was effective in providing me with a chance to share my ideas on my mentee’s use
of technology in teaching or other activities,” and Item #22, “The one-on-one mentoring program was effective in building/improving my own confidence and ability to teach others,” had the highest agreement level ($M = 3.37$).

In comparing the some scores (overall items, minimum/maximum scores) for mentors’ benefits in two different domains (technical and pedagogical), it was clear that although overall technical and pedagogical benefits among mentors had the same agreement level ($M = 3.12$), the items in the pedagogical benefit section had fewer negative responses compared to those in the technical benefit section.

To investigate if there was any difference among mentors on their scores on pedagogical benefits due to their degree programs, education theories and research backgrounds, or their teaching experiences during the time they participated in mentoring, several additional statistical tests were employed (see Appendix G). However, no significant difference was found due to these reasons.

Based on the results obtained from the survey, the analysis of the data was continued with qualitative data to identify major categories and concepts that explained whether or not mentors benefited from mentoring program in terms of improving their pedagogical knowledge and experiences. The overall results revealed that mentors’ growth in pedagogical subjects was positive with varied experiences at different levels in terms of the process mentors went through to reach those benefits. The following subcategories under which we examined different aspects of the pedagogical benefits from mentors’ perspectives emerged as being important; (a) moving from thought to action (beliefs to reality), (b) pedagogical considerations of teaching and learning with technology and (c) exposure to different pedagogical approaches and strategies (modeling).
Moving from Thought to Action (Beliefs to Reality)

Considering mentors’ teaching experiences during their mentoring participations (see demographic data), there was no doubt that most of them came into the mentoring program with their own personal pedagogical beliefs and experiences at different levels. However, for several reasons, such as lack of opportunities or equipment, among others, several of them indicated that their knowledge were mostly at a theoretical (abstract) level and their experiences with different pedagogical approaches were limited in terms of teaching and learning in general and with technology more specifically. As given in Table 5, mentors found mentoring experiences to represent an opportunity for sharing their pedagogical beliefs with their mentees as well as with other mentors and to practice these beliefs in authentic environments.

As a result of mentor interactions they found themselves, as one mentor noted in her journal above, in a position of assessing their general pedagogical beliefs on teaching and learning as well as their effectiveness in real environments.

Natalie and Carol, two mentors who participated in the mentoring program in different years and worked with different faculty members on different applications, relate in the following two examples their experiences that clearly demonstrate the process by which mentors go through the steps of implementing their pedagogical beliefs into mentoring meetings and subsequently redefine them at later stages of the relationship based on experiences gained from the mentoring relationship. Natalie pointed out that;

This was my first experience with mentoring a professor in using technology. I revised several of my teaching strategies in order for the mentor/mentee relationship
with Dr. Anderson to be a success. I worked to make these challenges invisible to Dr. Anderson and to deal with them professionally.

First, I had to learn to be the guide on the side, the cheerleader, supporting and encouraging my mentee. Reflection on the mentoring activities brought to the forefront the fact that my initial mentoring style was my high school teaching style/paradigm. In this paradigm, I operated at “giving instruction” more than facilitating, coaching, and being the guide on the side, not the “sage on the stage.”

This was a mistake I was glad I caught early in the mentoring relationship. I was able to adjust my style to becoming more student-focused (mentee-focused). In this way, my skills as a mentor were further developed and expanded.

In a very similar manner, Carol’s experiences with implementing her pedagogical beliefs in the mentoring relationship also indicate how mentoring experiences have been beneficial to mentors in terms of their pedagogical growth through moving thought to action. She expressed this as follows:

The thing I was trying to figure out is the way how we should organize our learning together. I had a feeling that I tended to dominate, to “teach” when I talked about [A project] and blogging. I guess it was some impact of my 17 years of teaching. I need to think it over as it is not appropriate in this case. I believe that a more constructivist approach will be better, so I need to think of the resources I am going to provide and setting for our meeting. I realize why it is not that easy to create a learner-centered environment and let learners to drive the class activities…

Based on experiences similar to those of Natalie’s and Carol’s given above as expressed or demonstrated by mentors, it would thus be correct to conclude that the mentoring program
provides opportunities to mentors to implement and test their own pedagogical beliefs and experiences directly in real environments. This process makes it possible for them to determine whether or not their approaches or strategies are effective and provides opportunities to revise them according to their experiences gained from the mentoring relationship.

In this type of experience, working with a faculty member, mentors bring their own previous pedagogical beliefs and experiences to the mentoring relationship and use them to transfer their technological knowledge to faculty members. Therefore, these experiences were more in the mode of direct experience and the benefits as results would be mostly in the form of pedagogies of adult learning.

Specific Pedagogical Considerations of Teaching and Learning with Technology

In addition to broader perspectives on the pedagogy of teaching and learning discussed above, mentors also experienced the concept of pedagogy at a more focused level, that of teaching and learning with technology. As soon as mentors started working with their mentees, some of them became actively involved with process of planning, developing, implementing, and evaluating different types of teaching activities with technologies, which included pedagogical considerations of teaching and learning to college students, preservice teachers. Therefore, as one mentor noted, the pedagogy of teaching and learning using technology then became the “center” of their mentoring meetings. “Talking, not so much about the technology but about the pedagogy” was, therefore, considered as one of the principal topics discussed by mentors and mentees and believed to produce a beneficial experience for mentors.
Comparing the form of the experiences discussed here to those in the previous category, the experiences in this section shift from pedagogies of individualized adult learning more toward pedagogies of classroom teaching. Also, this is not a pedagogical approach in which mentors’ experiences are the only determinants but one developed within collaborative efforts of both mentor and mentee. Therefore, it was a shared pedagogical approach in which both mentor and mentee bring their individual beliefs and experiences to the discussions.

On one hand mentors in this form found opportunities to talk, listen, and inquire about underpinnings of faculty members’ pedagogical approaches through informal conversations in regular mentoring meeting sessions. On the other hand, they were also able to observe the implications of pedagogical approaches of experienced faculty members in using different technologies to teach their students in real settings through mentors’ active participation in the mentees’ classroom activities. Moreover, the close relationships with faculty members allowed some mentors to reflect back on faculty members’ approaches on use of technologies and to propose alternative ideas.

In this form of pedagogical experience, some mentors seemed to be bringing to the discussions not only their teaching experiences but also their student experiences and learning perspectives.

Nancy’s mentoring experience as a mentor who had been teaching and mentoring in the same semester would be one example that demonstrates how some mentors were involved and contributed to discussions on pedagogical issues with both their teaching and student experiences. Because of the heavy content of her mentee’s undergraduate class and time limitations, Nancy and her mentee had worked on developing a CD product to help her
mentee save time yet not skip any significant part of the content she had planned to cover because of the lack of time. In the process of planning and designing the product, Nancy had attended her mentee’s class and recorded several sessions to be later used in the development of the CD product. Nancy and her mentee, as she indicated, had discussed different considerations regarding teaching and students’ understanding of the content and sought how they would reach a solution in which both students and the professor would be satisfied. In this stage of her role as mentor, as well as others, by including students expectations as well as her own learning perspectives into the design process Nancy became part of the overall teaching process, which made it possible for her to use her previous pedagogical beliefs and experiences in an authentic case.

For the given reasons, it is obvious that being a part of a process of developing instructional activities and materials for faculty members’ teaching activities was certainly an opportunity for mentors to share their own pedagogical beliefs with experienced faculty members and to use them in an authentic case. More important, this process allows them to observe and learn different aspects of the pedagogy of teaching and learning using technology from a more experienced person’s perspective.

Therefore, seeing mentees’ “creative uses” of technologies and “discussing how she [faculty member] was using technology can be incorporated to reach a variety of instructional objectives” were viewed the most important benefit by a majority of mentors in terms of

- Reconsideration of their previous perspectives on use of technology based on the new or revised pedagogical beliefs and experiences,
- Discussing issues related to the use of technology in teaching and learning,
Experiencing advantages and disadvantages in use of technology in authentic environments,

- Reflecting back (experiencing) on pedagogical and technological conflicts/limitations.

*Exposure to Different Pedagogical Approaches and Strategies (Modeling)*

Discussions in categories (a) and (b) above were basically about mentors’ experiences in general pedagogical subjects (teaching and learning) as well as in one case related specifically to the use of technology in instructional activities. As can be seen, both sections were developed based on the fact that mentors were actively involved with teaching and learning activities either at the individual level (working with faculty member) or at the group level (working for faculty member’s classroom teaching activities). Mentors at both levels found opportunities to experience directly their own pedagogical approaches and/or mentee’s approaches.

Except for these or similar direct experiences, some situations such as weekly mentoring updates shared by all mentors in the classroom, or social events where faculty members had a chance to share their thoughts, pedagogical considerations and reasons behind the projects (technologies) they worked on with their mentors, demonstrated that mentors also benefited indirectly from mentoring experience in learning. This was more observational in form as described within the SLT framework, as in exposure to different pedagogical approaches and strategies. Although these exposures had no direct impact on mentors and didn’t require mentors’ immediate action, several mentors indicated that they certainly found them to provide valuable insights.
Mentors whose teaching experience, knowledge of theory, and knowledge of technology was previously limited clearly indicated that having more advanced students in the class and sharing their perspectives and experiences with their mentees on theories and approaches regarding effective use of technologies had an absolutely positive impact on their understanding of technology use for teaching and learning.

**Mentors’ Academic Benefits**

The name of the program, faculty technology mentoring, and the emphases given in the publications and research agenda naturally reflects one aspect of the program, focusing on faculty experiences. However, there is no doubt that progress of graduate students in different subjects in the program is the second main focus of the program, equally important as the faculty members’ progress in use of technologies. As mentioned in previous chapters, graduate students in this mentoring structure were required to register for a graduate level course and to meet the course expectations to obtain a good grade. As in many other courses, this course has also a variety of subjects and academic activities (article discussion and presentation, writing a case study, technical workshops, participation in online discussions, etc.) organized to provide mentors deeper understanding and experience with respect to different subjects in the field. To do so, the mentoring structure has over time embraced several additional activities (writing case studies, use of WebCT, organizing mini hands-on type workshops) to make sure that mentors keep up with current discussions and skills in the field and achieve their goals.

To give overall insight as to what mentors think about their academic growth, we developed several items (#23, 24, 25, 30, 33, and 34) in the second section of the survey.
Although these items are not inclusive enough to cover all aspects of the mentors’ academic growth arising from their mentoring experience, we believe that these items provide information on principal components (i.e. research, theoretical knowledge) directly related to the mentors academic growth in the structure.

Table 6

*Descriptive Statistics for Mentors’ Academic Benefits*

<table>
<thead>
<tr>
<th>Descriptive Statistics for Items Related to Mentors’ Academic Benefits</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #23 (Recognize weakness on Research and Theory)</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>2.95</td>
<td>.764</td>
</tr>
<tr>
<td>Item #24 (Improved education research)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.93</td>
<td>.704</td>
</tr>
<tr>
<td>Item #25 (Experienced research process)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.00</td>
<td>.816</td>
</tr>
<tr>
<td>Item #30 (Writing case improved understanding of mentoring process)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.28</td>
<td>.666</td>
</tr>
<tr>
<td>Item #33 (Reading case studies helpful understanding mentoring concept)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.09</td>
<td>.610</td>
</tr>
<tr>
<td>Item #34 (Discussing articles helpful understanding mentoring process)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.35</td>
<td>.613</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 gives the overall means of mentors’ thoughts with respect to those academic items in the survey. According to these descriptive statistics, there were diverse scores with respect to mentor’s academic benefits ranging from strongly disagree (1) to strongly agree (4) reported by respondents. All scores above contained both negative and positive rating scores. Because of the fact that all questions used here were created in a positive manner, with minimum (1=Strongly disagree) and maximum (4=Strongly agree), the scores above demonstrate that, although some of the mentors were in favor of reporting that they received
benefits from mentoring program in terms of their academic growth, others didn’t report such growth. Four of the 6 items above included at least one mentor who strongly disagreed (Minimum = 1) with the idea of receiving the academic benefits described in that specific item.

To determine mentors’ average agreement score in this section, we conducted factor analysis (see Appendix H) and found only one factor which indicates that we could create an index variable calculated from items (#23, 24, 25, 30, 33, and 34). From this composite index variable, as a parallel to other sections on mentors’ benefits given earlier, there was a positive consensus among mentors (n = 42) on receiving academic benefits from their mentoring experience (M = 3.10, SD = 0.505).

Comparing the average mean scores for technical, pedagogical, and academic benefits revealed that respondents were very consistent on reporting their benefits in these three domains (Technical $M = 3.12$, $SD = 0.793$, Pedagogical growth $M = 3.12$, $SD = 0.54$).

Based on the analysis of the survey results in this section, we reported that mentors’ thoughts on receiving academic benefits were positive. The items in this section of the survey were specifically designed to measure mentors’ growth in education research, theories, and mentoring concepts during their mentoring participation. The average mean scores for these items in Table 6 above revealed that respondents agreed that their knowledge of research, theory and skills has improved. Parallel to the results from the survey instrument, analyses of qualitative data indicated an even stronger consensus among mentors in academic benefits because of the mentoring experience.
Based on the data, therefore, it would be quite realistic to conclude that mentors had opportunities to improve their understanding of education research and different theories, and also improved their skills with respect to those subjects within the mentoring structure.

From this overall conclusion, we were then able to investigate how and under what circumstances mentors built those academic benefits and the impact of mentors’ previous backgrounds on given subjects.

As we proceeded investigating the issue with more qualitative data, several themes emerged and were divided into three main categories to basically help us answer the questions of just what those benefits were and of how and under what circumstances mentors developed those benefits. Based on the data regarding mentors’ academic benefits, these categories are (a) research, (b) theory, and (c) direct experience in research and development.

**Research**

As mentioned in Chapter 2, graduate student mentors enrolled in the “Technology and Teacher education” course were required to write a publishable case study paper based on the individual mentoring experience. In the earlier stages of the mentoring program, mentors’ case study papers tended to be in the format of mostly story-telling and self-reporting of their own perspective on their experiences, while the case studies in the later stages of the program were at a considerably different level in terms of the variety and richness of the data used and the manner of interpretation of available data within different theoretical frameworks such as change theories, innovation adoption theories, learning theories, motivation theories, adult learning theories and so on. This is discussed in the next section.
As the average mean scores for items #23, 24 and 25 indicated how mentoring experiences were beneficial in improving mentors’ educational research knowledge and experiences, mentors were also very clear in their journals and interview sessions as to the role of mentoring in their growth with respect to educational research at different levels. Some of the concepts derived from the data regarding research categories could be listed as *overall research knowledge and experience, exposure case study approach, qualitative research procedures (data collection, analysis), connections with individual research projects, and mentees research projects.*

Because of the diversity in research background and experience among participant mentors, research-related benefits described by mentors also varied from the basic level, i.e., getting to know what the qualitative research was and its procedures, to a more advanced level such as approaching the mentoring experience from different perspectives, collecting data from different sources, and interpretation of the results at a more conceptual or abstract level rather than just an explanation of skills.

Mary, for instance, as a master’s student during the mentoring participation described her growth in research as;

The other benefit the whole procedure about how to do research, although, how do you say, it's not that formal [pointing case study approach], I mean, procedure is about the research, but because we start a case study, so I get some sense about how to do research and how to write a research paper, based on this case, and also, I haven't taken any qualitative methodology class yet, but they push me to read something about how to do research and how to analyze data, which makes you learn
something else and help me to get a holistic sense about how to do a research, which I think it is important for my academic life…

Mary’s experiences exemplified inclusively the process experienced by mentors with limited knowledge and experience with educational research, who enhanced their understanding of qualitative research and developed appropriate skills with which to implement educational research principles within the mentoring structure.

However, it should be noted that this process for mentors, especially for those who had little or only limited experience with educational research, was not so easy; rather, it was usually challenging and sometimes frustrating. Kathie’s experience with this part of the mentoring structure was one of the several we observed closely. As a new master’s student, she expressed her thoughts about the research component of the mentoring structure and described the process of being responsible for a writing case study as “difficult” because “I have little experiences doing with literature review, you know, I have no experience collecting data or analyze it so that part [case study writing] is tough.”

Among more advanced mentors, although they appreciated the opportunity to work with a faculty member and write a research paper based on this experience, several of them indicated that writing such a case study was not just a valuable experience but also an important artifact to be included in their academic portfolio for demonstrating research knowledge and skills. Several mentors with advanced knowledge and practical experience on education research put more stress on interpretation of their experiences with collected data within their chosen theoretical framework.
Theory

The improvements of mentors with respect to different traditional and contemporary education theories, theoretical concepts related to their interests, and mentoring experiences were cited as one of the most important overall benefits mentors gained from the mentoring program. Among those diverse theoretical approaches mentors used and frequently reported to be beneficial, were use of different learning theories (constructivism, social learning theory, adult learning theory), change theories, innovation adoption models, and instructional design models, among others.

In the process of determining academic benefits regarding mentors’ growth with respect to different theoretical approaches, mentors’ previous knowledge and experiences with different theoretical approaches and the way mentors interacted with different components (mentors, mentees, and resources) of the mentoring structure were found to be the significant factors on mentors’ growths.

To begin with those mentors who had had limited theoretical background, the mentoring experience was an opportunity for them to be exposed to different ideas and theoretical approaches discussed both inside and outside the mentoring graduate level course. Carefully selected articles by course professors and the others brought to article discussion sessions by mentors were identified as a major factor mentors found beneficial in terms of gaining awareness of different approaches and their possibility of use by themselves. As one mentor pointed out;

I would say research, theoretical…I had not even heard some of the theories that we had discussed in class so it is new way of looking at things, you know, like the Concerns Based Adoption Model, I have not even considered that people go through
stages before they change, things like that as far as for research even like [Carol]
helps me or talked to me about things, may be you should of consider this or that you
know things like that.

However, since some of the mentors were introduced to such theoretical approaches for the
first time, this stage would be the initial stage for them in the process of developing those
academic benefits. Therefore, this stage in the overall process of exposure to different
theoretical approaches, was based on a more informal and incomplete format that might not
provide sufficient detail about the specific theoretical approaches. Thus, for deeper
understanding, further individual actions of mentors and collaborative efforts with more
advanced mentors as well as other members of the community, perhaps bringing in some
other resources, were identified as comprising the second stage of this major activity.

Another mentor with limited theoretical background briefly summarizes the process and
provides some insights about the second stage as follows:

Actually when I first started this case study I had no idea what theoretical framework
to take. I went Google and searched several theories such as learning communities,
and what else, I can't remember. Change theories, society change theory, yeah
something like that. So I read, because I have to understand that, I read through the
whole thing and decided, okay it cannot interpret my study, so I switched to other
one. So it’s like I’ve got a lot of sense about different theories. Which one is better to
explain my situations and how to apply this theory to your practical work.

In the second group of participants, mentors with some theoretical backgrounds indicated
that the mentoring experience was also an opportunity for them to not only learn new
education theories and theoretical approaches, similar to what less knowledgeable mentors
pointed out, but also to make connections between knowledge from other courses they had taken and real problems. In most cases, this experience directed them to go back to the literature and examine the theory or model they considered for use in more detail. As a result, as one mentor responded:

It is a good experience to teach my mentor about what I’ve known about technology applications, and find out what I need to improve and strengthen in terms of technology-related educational principles, theories, and practices.

Mentors found themselves in a position of both assessing their previous understandings and of building much deeper understandings on what they had already known. In other words, briefly, mentoring was a chance for mentors with some level of background to bring their previous knowledge into action and to determine their weaknesses in terms of their understanding of different theoretical approaches they chose at more advanced levels.

Direct Experience in Research and Development

Although this category is somewhat overlapped with the ones given above (Research and Theory) and could have been discussed in each of them, we felt that there was more here than simply practicing education research and theory, particularly because of the case study paper requirement. In addition to mentors’ practicing research and education theories through the mentoring experience and writing a case study report, mentors also found the experience beneficial in terms of implementing their theoretical knowledge on instructional design models, or change theories obtained from other courses in real environments and building hands-on experiences with respect to those subjects as well.
Therefore, this category was created not only to address the issue of building hands-on experiences with respect to research and theory, but also to discuss the way mentoring could be beneficial in other ways in terms of building such experience. Mentors with limited levels of knowledge and experiences with respect to different education research and theories in this program indicated clearly that the mentoring experience was an opportunity for them to grow academically with respect to the subjects of education research and theory. Because of the authenticity of the research site, the problems mentors worked on with their mentees, and their roles as mentors and researchers, mentors were motivated and encouraged to bring their own previous knowledge and experience into the relationship, to take appropriate actions according to those experiences, to identify weaknesses as a result of those actions, and to eventually build on them through actual and direct experiences as mentors as well as researchers.

The case study writing as one part of this overall action that pushed mentors to integrate their [academic] knowledge into the process of interpretation of their mentoring experiences, allowing them to experience both research process and report writing. Additionally, some mentors reported that working with faculty member(s) was also an opportunity in terms of upgrading their previous knowledge with respect to different theories and models from other courses to a more concrete level.

Mike and Sara were among the mentors who used previous knowledge in their mentoring relationship to build hands on experiences. While Mike, for example, focused more on his faculty member’s progress and technology adoption level through use of stages of the Concerns Based Adoption Model (CBAM), Sara’s emphasis was on the stages of web
site development through use of the Rapid Prototyping model, to which she had been exposed in an instructional design course.

In addition to these direct experiences on education research, theories, and different theoretical models, some mentors stressed that working with a faculty member within the mentoring structure itself was a beneficial experience because of the importance and increasing popularity of the mentoring concept in business, education, and other domains of the life as a means of professional development and pedagogical technique.

*Mentors’ Professional Benefits*

Bandura’s social learning theory contends that being in a social environment would eventually have an impact on an individual’s learning over the time. One of dynamics of the mentoring program in this specific context was establishing relationships between two “experts” on different aspects of a shared profession.

A mentoring program provides a unique environment, as described in Chapter 2 of this study, within which both parties can bring expertise to meetings and share this expertise with other persons in different ways (demonstration, conversations, etc.). In this process, as the focus of this research study, faculty members with teaching, research and other professional experiences were useful resources enabling mentors to get to know the profession closely. Within the triadic model of social learning theory, mentors would have a chance to benefit from experienced faculty members and build a better understanding of their professional lives.
To understand whether or not mentors in a given context benefited from mentoring program in terms of professional growth, several items in the survey instrument were specifically assigned to measure this aspect.

Table 7

*Descriptive Statistics for Mentors’ Overall Professional Benefit*

<table>
<thead>
<tr>
<th>Descriptive Statistics for Overall Professional Benefits (Item #38)</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Professional Benefits</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.53</td>
<td>.505</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Among those items given in Table 7 above, Item #38, which concerned mentors’ overall scores on their professional growth, indicated that respondents participating in the mentoring program in different years formed a strong consensus toward finding mentoring experience beneficial in terms of their professional growth in the field ($n = 43$, $M = 3.53$, $SD = 0.505$).

Comparing average agreement scores of mentors’ different benefits given before (Technical ($M = 3.12$, $SD = 0.793$), Pedagogical ($M = 3.12$, $SD = 0.54$) and Academic benefits ($M = 3.10$, $SD = 0.505$)), the average score given in Table 7 on overall professional benefit item was the highest. As shown in the details of this section, mentors reported some insights about their professional growth by scoring the items given below.
Table 8

Descriptive Statistics for Mentors’ Scores on Items Related To Their Professional Benefit

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>#28</td>
<td>Building professional friendship</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.63</td>
<td>.489</td>
</tr>
<tr>
<td>#29</td>
<td>Improved communication skills</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.40</td>
<td>.583</td>
</tr>
<tr>
<td>#31</td>
<td>Case study important in experiences/conf. publ.</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.65</td>
<td>.783</td>
</tr>
<tr>
<td>#32</td>
<td>Former mentors published their work encouraged me</td>
<td>42</td>
<td>1</td>
<td>4</td>
<td>2.52</td>
<td>.773</td>
</tr>
<tr>
<td>#35</td>
<td>Hearing stories was helpful</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.49</td>
<td>.631</td>
</tr>
<tr>
<td>#36</td>
<td>Sharing ideas helpful</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.49</td>
<td>.506</td>
</tr>
<tr>
<td>#37</td>
<td>Improved leadership skills</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>3.19</td>
<td>.671</td>
</tr>
<tr>
<td>#38</td>
<td>Overall, professional growth</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.53</td>
<td>.505</td>
</tr>
<tr>
<td>Valid N</td>
<td></td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The highest score among the items was associated with Item #29 ($M = 3.63, SD = 0.489$), which was “The one-on-one mentoring program was effective in building professional friendships.” Also, Minimum and Maximum scores for Items #28, 36 and 38 revealed that respondents ($n = 43$) were all agreed on enhancement of building professional friendships, sharing ideas in a professional manner, and on their overall professional growth because of the mentoring experiences.

As a parallel to the survey results given in Tables 7 and 8 above, the qualitative data also revealed that mentors found mentoring experiences to be beneficial in terms of establishing professional relationship/friendship, developing their own professional principles, developing professional confidence, implementing similar mentoring activities in
their own workplace, and engaging in more professional activities such as publication/conference attendances, among other beneficial factors.

Alice as one of the mentors briefly described her mentoring experiences as an opportunity that provided “a safe environment” for mentors like herself “to grow professionally.”

Dana’s statement about how her mentoring experience was an important one that reflected the different aspects of professional benefits of mentors in one single case, as mentioned above. According to Dana,

The mentoring experience has been useful in my professional life. For example, I worked with a professor in another department on technology integration into her class. We co-authored and published a journal article on our experience. When I looked for jobs, my mentoring experiences were often cited as highlights of my graduate studies in CI&T, the employers were impressed with the mentoring experience.

In our investigation, Dana’s and some other mentors’ cases revealed that the impact of mentoring experience on mentors overall professional growth evolved over time. In addition to the benefits mentors might receive immediately during their mentoring participation or shortly after the mentoring relationship ended, some professional benefits were reported as emerging as mentors graduate and begin working in different environments. Mentors with more responsibilities and commitments in a work environment such as a school or an institution were only then able to see much wider advantages of the mentoring experience in their professional lives.
To be more specific, while some mentors found mentoring experience helped them “take more chances in terms of publishing and presenting conferences” as short term benefits, others like Terry focused more on the long term benefits that emerged at their actual workplaces. She stated that “I am now the technology director for [ABC] Community Schools and the leader of the district technology team. The mentoring experience allowed me to gain valuable insight into working with groups on implementing technology in the public schools.”

Because each mentor had unique personal and professional backgrounds as well as career goals both during and after the mentoring participation, the actual and potential benefits varied. However, the data indicated that more of those professional benefits actually emerge or are likely to emerge over a long term period of time. Establishing a professional and closer relationship with faculty members, for example, certainly had different impacts on several graduate student mentors’ life than having faculty members in their program of study committee, advising them on their research projects, working with them on their publications, or employing those students in several research projects.

In addition to those mentors quoted above, several other mentors who had not yet had opportunity to implement any mentoring ideas clearly point out that they strongly believed in the importance of the mentoring concept in general and technology mentoring specifically because of their experience in the program. Therefore, they had already plans to use the same or a similar approach as a method with which to teach people and/or initiate an effort to adoption of information technologies by teachers or faculty members at their institutions in their future careers. Tom as an international student was one of those mentors indicating that
knowing mentoring itself would be of significant professional benefit in their future career in the long term. He stated;

… I have learned mentoring as a way of teaching and learning, Maybe, This is the most strong benefit of it to me; in future, I think it would be more useful for me … In the future, we’ll be faculty, actually we help each other normally, but this showed us there is a structured way or method for this help mechanism called mentoring. In the future, I may need to read more about it and at least, I can use it in my country or support this kind of initiatives at my work place. When I help a faculty member, I would do it more consciously. I know some students were thinking to use model in their future career. I may be considered to use it as well. At least, it is a benefit to know this program as an international student.

Briefly, the data clearly revealed that mentors with all kinds of knowledge, experiences, and backgrounds found the mentoring experience beneficial in terms of providing different opportunities to grow professionally. Although some of mentors focused more on short term benefits associated with short term relationships (mostly one semester) with faculty members such as getting know faculty life, attending conferences, publishing their case study papers, or learning different professional ideas from their mentees, the majority indicated that mentoring in the long term (at least two semesters) became or most likely would become a part of their academic and professional lives.

Through continuation of the relationship with faculty members, mentors received feedback from them on their research projects, especially reflecting similar interests, and had chances to discuss their future career plans with more experienced faculty, or to develop collaborative working relationships on the mentee’s different research projects during the
mentors’ program of study. Also, mentors reported actual use or strong intentions to use mentoring ideas in their professional work places as a long term benefit. Based on the given discussions, it would be correct to note that longer and stronger mentoring relationships with faculty members often turn out to provide professional benefits both during and after the mentors’ study time.

Factors Influencing Mentors’ Perception of Benefit

Research Question 2: What kinds of factors influence mentors’ perception of benefit?

The word perception has different meanings in different fields. According to the Merriam Webster Dictionary, perception would be described as a mental image (concept) which a person creates by going through an observation process of different elements of his or her environment and interpretation of this process based on his or her experiences (Merriam Webster Online Dictionary, 2006). In this study, we use “perception” to describe a process individuals go through to observe and build a relative understanding of their own benefits based on their previous knowledge and experiences. In this particular research project, we specifically meant the process that mentors went through during their mentoring participation and afterwards to build their own concept of benefits. And, through this study, we sought to have a deeper understanding of the common and influential factors that shaped mentors’ perception of benefits they received from the mentoring program.

Since each individual participant in the mentoring program reflected differences in the backgrounds they brought into the mentoring relationships, and since they experienced different things through different types of mentoring relationships, it would be possible to list many factors that affected their perception of benefits. However, as we pointed out above,
the main focus of this section was to identify general as well as more specific factors that had some impact on a group of mentors.

As the result of data analysis, two main factors were determined that had some influences on mentors’ views of benefits: (a) mentors’ weaknesses and the perceived urgency for improvement, and (b) applicability of mentoring offerings.

**Mentors’ Weaknesses and the Perceived Urgency for Improvement**

One of the common factors emerging from the data was the weakness of the mentors on different subjects such as technology, theory, and research embedded in the mentoring structure and the need for their improvement or for better knowledge on them. As Carol indicated, “… I didn’t have much chance to practice. However, I’m glad I will be learning something new, as I put on my list to do things last year – to learn Dreamweaver,” mentors with needs at different levels of urgency on those subjects seemed to be more focused on those weaknesses and more likely to discuss the ways in which they improved them. For example, in recent years of the program mentors with limited knowledge and experience with web page design tools and the associated terminology found mentoring to be “beneficial” technically because of their weaknesses in web page design and the urgency of the need as a graduate student in a technology related field to develop necessary knowledge and skills in this area.

While Barbara and Kathie, two graduate students from different years of mentoring participation with limited knowledge and experiences on web page design and education theories not only indicated mentoring to be technically but also academically beneficial. While it improved their understanding of different education theories, some others like Mary
and David, who had strong backgrounds with respect to different information technologies mentioned very little if any technical benefit they received from the mentoring program. However, Mary, for example, did find the mentoring experience as personally beneficial because as an international student she had fears or communication weaknesses with respect to faculty interaction.

Based on our cross investigation of different cases we observed and interviewed, it was clear that the interaction effect of the areas (subjects) in which mentors had weaknesses and the perceived urgency of improving those areas was a strong factor with respect to mentors’ perceptions of benefits.

*Applicability of Mentoring Offerings*

The second main factor on mentors’ perception of benefits to be discussed is the level of applicability of mentoring offerings to current and future academic and professional activities. This means that mentors seemed to develop a concept of benefit based on the idea of transforming those mentoring experiences quickly into more concrete and tangible outcomes or, into longer-term activities based on their understandings of current issues and future career plans.

With respect to the short term, mentors in recent years, mostly full-time graduate students with some research and teaching responsibilities, described their mentoring experiences as beneficial if they were able to solve some of the issues they were facing with respect to their academic activities or their work responsibilities, if they could meet some requirements such as using a case-study paper as an artifact in their doctoral portfolio, if they could publish articles or present work at conferences, or if they had other opportunities to be
involved with mentees’ research projects. With respect to the longer term, mentors who had participated in the program some years ago placed more emphasis on the applicability of the mentoring offerings to their current work place in meeting expectations as teachers, technology coordinators, or faculty development staffs.

Characteristics of Successful Technology Mentoring

Research Question 3: What are the characteristics of a successful technology-mentoring program from the mentors’ perspectives?

Mentors’ thoughts on characteristics of successful mentoring relationship varied with respect to the individuals’ prior knowledge, experiences, and their expectations from the mentoring relationship. Although mentors with varied experiences and backgrounds stressed different aspects of a successful mentoring program, they ultimately had a shared definition of a successful mentoring relationship as one that basically provides some progress or change to both participants through an open and non-hierarchical relationship in which mentor and mentee care for and trust each other.

In addition to these common outcomes shared and cited in detail by mentors in several studies, mentors in this study placed more emphasis on characteristics of successful mentoring relationships that deal with the overall mentoring process, personal characteristics of both mentor and mentee, the relationship, motivational factors, and other management/operational issues. According to these findings, these were the main factors that ultimately determined whether or not participants had a successful mentoring relationship within the terms of common outcomes.
Based on the relevance of these factors to each other and their impact on relationships, dynamics of successful technology mentoring relationship were investigated from two different angles (Participant, Organizational structure).

Although there was no clear-cut distinctions between these two approaches that were related to each other in many ways and might be conceptualized differently by others, we preferred to interpret mentors’ experiences within these two dynamics based on our overall understanding arising from the data.

In this section we briefly discuss dynamics of successful mentoring relationships from aspects of both (a) participant, and (b) organizational structure including some details considered to be important in terms of providing intended progress of mentor and mentee.

**Participants**

This category was created to examine mentors’ thoughts on the specific characteristics of successful mentoring relationships that were directly related to participants (mentor-mentee) of each such relationship. More specifically, the focus in this section is placed on investigating the impact of mentors’ and mentees’ previous experience, knowledge, expectations, attitudes, professional beliefs, and other individual factors on the success of the relationship.

To gain an overall understanding of what mentors view as a “successful mentoring relationship”, the fourth section of the survey instrument, with inputs from different data sources (literature, field notes, interviews, expert inputs), was developed. Several items in this section of the instrument were specifically devoted to get mentors’ insights on the issues, some of which are noted above, related to both themselves and mentees.
Table 9

*Descriptive Statistics for Mentors’ View on Participants’ Roles in Successful Relationship*

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #41</td>
<td>Clear expectations from mentors</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.47</td>
<td>.702</td>
</tr>
<tr>
<td>Item #42</td>
<td>Mentee's understanding process</td>
<td>42</td>
<td>3</td>
<td>4</td>
<td>3.60</td>
<td>.497</td>
</tr>
<tr>
<td>Item #47</td>
<td>Mentor's personal comfort with mentee</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.40</td>
<td>.541</td>
</tr>
<tr>
<td>Item #53</td>
<td>Mentee's involvement with tech. issues</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.16</td>
<td>.688</td>
</tr>
<tr>
<td>Item #54</td>
<td>Mentee's willingness to learn new tech</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.51</td>
<td>.592</td>
</tr>
<tr>
<td>Item #55</td>
<td>Mentor's understanding content / project</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>3.00</td>
<td>.698</td>
</tr>
<tr>
<td>Item #56</td>
<td>Mentor's leadership</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>3.12</td>
<td>.550</td>
</tr>
<tr>
<td>Item #57</td>
<td>Mentee’s leadership</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>2.93</td>
<td>.640</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td></td>
<td>39</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to the results given in the Table 9 above, a mentee’s understanding of the mentoring process, willingness to learn new technologies, clear expectations and mentor roles, and lastly mentor’s comfort level with mentee emerged as the most important components in mentors’ views of successful technology mentoring relationships.

Parallel to the results from survey respondents, mentors who participated in the program in recent years also indicated similar points in more detail. A faculty member’s understanding of the mentoring process and his or her role in that process emerged as a most important component of the successful mentoring relationship. A mentee’s limited understanding of the process not only lowers the mentor’s motivation to take a more active role in the relationship but also may cause stress and frustration on the part of the mentor.
Mary and Sara’s cases as observed closely in the classroom were two situations that illustrate the importance of this issue. Mary initially was matched with a junior faculty member. One or two weeks after the program had begun, her frustration was obvious as she reported her weekly updates. The relationship with Mary and her mentee was “stopped for some reason, [She doesn’t] know” in the first month of the program and she was paired with another faculty member. In our interview session at the end of the semester, Mary summarized her mentoring experiences with her first mentee as;

[Because of faculty member’s busy schedule]…so I didn't get much time to be with her. And after she came back, and we talked with her about this mentoring, and the first impression was just some technicians to help her on how to deal with the hardware and software so, I felt like, she not, how to say, she just didn't know how the program is working. It's just like she just need some graduate student help to get set up the hardware and she didn't see how the relationship between the two of us.

And I was kind of frustrated about the project.

One or two weeks after Mary was paired with another faculty member with many years of mentoring experience, Mary’s motivation and satisfaction working with her second mentee was remarkably improved because of mentee’s good understanding of the roles and structure as she reflected in her journal, “I'm so glad that this is not her first time joined the program, which made me felt so comfortable,”

Comparing Mary’s thoughts on two different mentoring cases she experienced revealed the importance of the faculty member’s understanding of the mentoring process in building a successful mentoring relationship.
Although we observed other mentor-mentee pairs at different level in recent years with similar issues, the structure of the mentoring program had demonstrated success in dealing with them more systematically. While mentors had been clearly informed by the course professor in class sessions of their roles in the relationship, faculty members with little or no experience with the mentoring program were given an opportunity to hear and understand both their and the mentors’ roles in the relationship through sharing experiences with other experienced faculty members as well as with the course professor at the first mentor-mentee luncheon held in the first quarter of the semester. Mentors who had mentees with no previous clear understanding about these roles indicated that the mentor-mentee luncheon had a significantly positive effect on their relationship.

Sara, as one of those mentors, stated in our interview session that she had had a difficult time with setting up the relationship and sharing the responsibilities because of her mentee’s limited understanding of the process at its earlier stages. Following the first mentoring luncheon, she expressed the feelings at the time that she had such challenges as “Yeah, I was always concerned that you know, it would be me doing the web site for her. And so after the luncheon, I think it really helped having that first luncheon, she realized then, oh I need to do this for myself, rather than having someone do it for me.”

Based on the data, there was a clear and strong consensus among mentors that understanding of the mentoring process and roles by faculty members as well as by mentors themselves was a critical and important component of the successful relationship. Also, it is critical, for the reasons given, to address such issues at early stages of the relationship for it to be successful.
In addition to understanding of the process in this section, there were several other issues similar to the ones reported in Table 9 above that emerged from qualitative data as important components of the successful relationship as described by mentors. However, the results given below were more general and reflect the broader meanings of human factors in the mentoring structure.

Table 10

*Major Factors (i.e. Attitude, Understanding, Leadership) in a Successful Relationship*

- Mentee’s active involvement with the project, eagerness to learn and try new technologies,
- Mentee’s demonstrating excitement, interests, and appreciation of working with his or her mentor,
- Mentee’s ability to create more personal space for sharing personal lives, backgrounds, interests, and some others.
- Both mentor and mentee’s leadership and creative skills to overcome obstacles solve issues and direct the relationship.
- Mentor’s previous technology knowledge and level of expertise.
- Mentor’s communication comfort level with professionals and other members of the community,
- A community in which individuals (mentors, mentees, others) share and help each other through interpersonal interactions,
- Commitment of mentor’s and mentee’s outside the regular meeting times in exploring, working, or looking for alternative or better solutions for the project they work on.
Organizational Perspective

The second angle we took to investigate dynamics of successful relationships within the mentors’ definition was the organization of different components within a process-oriented framework. To accomplish this, this section was structured to examine the overall mentoring process with respect to the organizational aspect.

Mentors pointed out several important issues to be considered in any structure of a successful technology mentoring relationship. Based on the timeline from beginning of the semester (relationship) and the importance of the subjects, mentor-mentee pairings, adequate information about the mentee’s project, clear purpose, manageable goals, joint planning, active involvement of both sides, collaboration among community members, continued support, adequate time to learn and practice, social gatherings, personal sharings, and other themes were identified by mentors as important pieces.

Based on these overall results, we found that the majority of mentors, as mentioned earlier, took a strong position in describing a successful mentoring relationship as a collaborative effort developed not only between pairs but also among the members of the community. Mentors, therefore, indicated that the structure of a mentoring relationship should be organized based upon considerations such as pairing of mentor-mentee, joint planning, and others, including some noted above, to provide opportunities that maximize collaboration and sharing between mentor-mentee specifically and among other pairs in more general terms.

Data from survey respondents provided overall insights about some of those considerations in the structure of a successful technology-mentoring relationship.
Table 11

Descriptive Statistics for Mentors’ View on Process in a Successful Relationship

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #43 (Appropriate pairing)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.58</td>
<td>.587</td>
</tr>
<tr>
<td>Item #46 (Detailed information)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.40</td>
<td>.660</td>
</tr>
<tr>
<td>Item #48 (Joint planning)</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>3.40</td>
<td>.627</td>
</tr>
<tr>
<td>Item #49 (Joint goal setting)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.44</td>
<td>.666</td>
</tr>
<tr>
<td>Item #50 (Mentee decides needs)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.79</td>
<td>.888</td>
</tr>
<tr>
<td>Item #52 (Mutual benefits)</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.40</td>
<td>.495</td>
</tr>
<tr>
<td>Item #58 (One semester enough)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.35</td>
<td>.752</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

According to the results given in Table 11, the majority of mentors agreed on the importance of appropriate pairings of mentor-mentee, providing the mentor with detailed information about mentee’s goals, joint goal settings, planning on project details, collaborative decision making on needs, mutual benefits of both sides, and the adequate time for mentors and mentees to learn and practice. Based on both qualitative and quantitative data, the following subcategories were created to facilitate detailed discussion of organizational issues.

**Pairing**

In the initial stages of the relationship, mentors strongly emphasize the importance of the pairing process. In addition to the mentee-mentor’s understanding of their roles and process and the mentor and mentee’s personality match, pairing them by the mentor’s technology expertise level and the mentee’s need, their shared interest in teaching, and research would be some of the commonly expressed factors that should be taken into consideration in the earlier stages of the relationship.
Because of her background, Kathie was paired with a faculty member who shared her background and interests. She expressed her feelings about this pairing as “I remember when we sat down we picked all our mentees, I was really excited about the prospect of working with someone who was in [ABC] methods and the [ABC] department, which was good, you know because that it turned out to work my benefit.” Also, Kathie mentioned that having a background in web page design was another factor in her pairing process. At the end of the semester, she found out that “… actually her[mentee] being having a [abc] background had actually nothing to do with what we accomplished over this semester, so it really didn’t matter that we had [abc] backgrounds.” Her technology background, however, turned out to be not as adequate as she had anticipated in helping her mentee. She thus stressed that sometimes her frustration level was very high because of the time commitment she needed to make to learning additional applications. As noted in the first line of her first reflective journal, Carol was very appreciative of being paired with her mentee because of their backgrounds and interests. She had noted that “The first meeting with Suzan showed that we have very much in common: we both have too many interests and things we want to learn.”

The data revealed that, in order to establish a successful technology mentoring relationship, both sides’ personalities, backgrounds in different subjects such as technology, teaching, research, etc., and their common interests need to be taken into consideration in the earlier stages of the relationship.
Goals and Project Planning

Across the cases we observed in recent years it was clear that mentors were more comfortable and actively involved in cases in which the mentee had clear goals in terms of what he or she wanted to accomplish with the mentor. Having clear goals and manageable objectives was found to be one of the critical components of the successful mentoring relationship and also was an influential factor in motivating mentors, especially in the earlier stages of the relationship. Judy briefly views this process of figuring out what the mentee wants to ultimately gain as “essential” in their case.

Although Sara, for example, reported having some challenges with her mentee in the earlier weeks of the relationship with respect to setting up roles, she noted that having her mentee be clear on her goals at the beginning was an important factor in terms of keeping them on the right track.

In addition to the mentee’s having a clear purpose and goals, planning how to move forward was considered to be another necessary step to success. Kathie in her case pointed out that although her mentee was clear about her goals, lack of planning made the relationship less effective than expected. She reflected her thoughts in her journal as:

Julie needs to think about what she wants on the website and we might have to concentrate on that on Wednesday. I think it’s going to be hard to get started without planning something out first. We could maybe mess around with it and she might get an idea from that on what she wants.

Carol, as a mentor with many years of teaching experience, stated that having clear goals established and planning what to do at the next meeting was her “way” to start working. She also pointed out having clear goals and a well-developed plan was especially important in
terms of giving mentors time to prepare for the meeting and help them stay on the right track. Otherwise, as she mentioned, mentors and mentee couldn’t move forward “even one millimeter” after a one-hour meeting. Therefore, her efforts in the earlier stages of the relationship with her mentee helped them to be clear on the goals and established a starting plan. Her mentee’s e-mail to Carol demonstrated how seriously this pair took the goal setting and planning (Appendix I) in their relationship.

Since one of the main purposes of the faculty technology mentoring relationship was to help faculty members with respect to their needs for different technologies, establishing goals by the faculty member in the relationship, is therefore evidently an expected role from mentees. As mentioned earlier, faculty members inform the course professor about their goals in working with mentors before the mentoring process is started. However, the collaborative efforts on such topics as required technologies, activities, and steps in the product were indicated as important factors by mentors for a successful mentoring relationship. This collaborative decision making not only allows mentors to obtain benefits by using their backgrounds but also motivates them to take “ownership” and voluntarily continue the relationship until the goals are achieved. Several mentors strongly pointed out that having clear goals and manageable objectives related to a well-established plan also lessens the frustration of mentors and keeps both mentor and mentee on the right track in progressing according to their plan.
**Interactions and Community of Support**

The quality of interactions between mentor-mentee and others in the close environment, as given in Figure 4 in Chapter 3, was mentioned by mentors as an obvious component that determines the level of success in the relationship. Although there could be several other aspects involved in this issue, the main characteristics of the mentor-mentee interactions and their impact on the relationship are discussed below.

Table 12

**Descriptive Statistics for Mentors’ View on the Nature of Relationship**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #44 (Open mindedness)</td>
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<td>2</td>
<td>4</td>
<td>3.71</td>
<td>.508</td>
</tr>
<tr>
<td>Item #45 (Nonhierarchical)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.56</td>
<td>.590</td>
</tr>
<tr>
<td>Item #51 (Mutual respect, care, trust)</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.72</td>
<td>.454</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the fourth section of the survey, three items to get overall mentors’ thoughts on the nature of relationship were included. As given in Table 12, all three items in this section had positive scores (between agree (3) and strongly agree (4)) according to the four-point likert scale used in this instrument. Item # 51, “*mutual respect, care and trust between the mentor and mentee are important for a successful mentoring relationship*” received the highest mean from the mentors among all the items in the fourth section of the survey ($n = 43, M = 3.72, SD = 0.454$). The second highest mean score was for Item #44, *Open-mindedness between mentors and mentees is important for a successful mentoring relationship* ($n = 42, M = 3.71, SD = 0.508$).
These results, therefore, indicated that mentors viewed the nature of interactions as the most important characteristics of successful relationships. In their views, mentors, first of all, stressed the importance of relationships based on informality in which both sides respect, care, trust each other, and are open minded.

Based on their experiences, several mentors pointed out that the personal side of a relationship including sharing personal stories, happiness, experiences, etc., was a key point in their relationship in terms of helping them to overcome hierarchy and be more comfortable with the faculty member. According to one of the mentors, “Good communication between pairs is an important piece of the successful mentoring relationship. Mentor and mentee need to understand each other. To do so, I think both sides need to have good leadership skills.”

In addition to this overall establishment of interaction protocol between mentor and mentee, the impact of activities throughout the relationship also play a crucial role in the success and continuity of the relationship. Faculty members showing appreciation of time and effort committed by mentors, excitement, interests, eagerness to learn and develop new skills from the relationship, and placing value on the mentor’s knowledge and experience were some of those actions commonly detected in several cases.

In addition to the specific interactions between mentor and mentee, the interactions among the other pairs were also indicated as a crucial component of successful mentoring relationships. As one mentor pointed out “collaboration and sharing with other paired mentors/mentees is extremely important for successful mentoring program.” Several mentors who were frustrated due to lack of technical and academic knowledge, experience, and some other factors emphasized strongly the role of other mentors in helping them in various ways. Interactions outside of the class sessions, spending hours together in solving technical issues,
discussing alternative ways to approach a mentee, and sharing resources were some of the specific situations mentors noted in their journals that demonstrated the importance of interactions with other people in the community.

Good communicants not only among the mentors but also among the mentees were also found to be a significant factor. Mentors, as mentioned in previous sections, indicated that interactions among mentees also had a positive impact on their relationships. Social gatherings, like a mentor-mentee luncheon, for example, were pointed out by several to be an effective strategy in deriving some mentees’ understanding of their roles from other mentees. Also, some mentors stated that more social gatherings should be included in the structure of the mentoring.

Motivational Factors

In the data analysis process, several mentors indicated that mentors’ motivation emerged as one of the commonly expressed components leading to sustainable and successful mentoring relationships. Although several motivational factors described by mentors have already been discussed in other themes above, it is important to have an overall look at the issue with respect to sustainability of the mentoring relationship.

Because of the mentors’ well-developed motivation, the data revealed that several mentors, as mentioned in the demographics section of this chapter, extended their mentoring relationship with their mentees voluntarily into the second semester, and in some cases even into the third semester. Some others, on the other hand, worked for only one semester and had to spend more time and effort to meet their goals.
Although mentors were all informed and aware of the fact that they were not necessarily supposed to end up with a product at the end of the semester, their experiences revealed that several of them were highly motivated by the goal of having a product or a tangible outcome such as a website, video clips or a WebCT site at the end of their relationship. In the case of complex and time-demanding projects, being able to stay on the right track according to plans was also a strong motivational factor and indicator that demonstrated some kind of progress and positive development in the relationship.

Mentors, for the reasons given, cited several factors that affected their motivation directly or indirectly. Some of these factors are given in Table 13 below;

Table 13

Major Motivational Factors in a Successful and Sustainable Mentoring Relationship

| - Observable outcomes (product, skills) | - Regular scheduled meeting hours |
| - Personality match | - Personal connections and sharing between mentor-mentee |
| - Mentee’s understanding of the process and roles, | - Mentor’s good technology and theoretical background |
| - Clear goals and manageable objectives, | - Mentor’s good understanding of the mentee’s need for assistance in his or her development of required technical skills |
| - Good planning | - Positive feedback from mentee |
| - Mentee’s active participation | - Active use of software, or product in teaching, research or in other professional activities |
| - Collaboration between mentor-mentee and other pairs | |
| - Mentee’s appreciation of mentor’s time, effort, and knowledge | |
| - Mentee’s demonstration of excitement, interest, and eagerness to learn | |
| - Mentee’s time commitment on the project | |
Did Mentors Experience Successful Mentoring Relationships?

*Research question 4: Do the mentoring experiences of the mentors reflect their views of a successful mentoring program?*

As a parallel to the fourth section of the survey instrument organized to investigate mentors’ thoughts based on their experiences on characteristics of successful mentoring relationships, the fifth section of the survey instrument was created with eighteen items (one open-ended) to examine whether or not mentors had a successful mentoring relationship based on their agreement levels on the items in the previous section.

According to the results in Table 14 below, mentors overall seemed to have positive thoughts with respect to the success of their mentoring relationships. It is clear to see, based on the scores on the items below, that mentors reported experiences built on mutual respect, care, trust (Item #69), benefit (Item #70) and shared responsibilities (Item #68). In these experiences, the average scores indicated that mentor and mentees in most cases had understood their roles (Items #60, 61) and had an appropriate pairing (Item #62).

Many items in Table 14 below had mean scores larger than 3 (agree). Some scores were lower than the average agreement level (3). Because of negative wording, however, two of them, (Item #67 and 76), were expected to be lower. Mentors indicated that planning together on project details and having adequate time to learn and practice required skills were important characteristics of successful mentoring relationships.
Table 14

Descriptive Statistics for Mentors’ Experiences with Mentoring Relationships

<table>
<thead>
<tr>
<th>Item #</th>
<th>Description</th>
<th>N</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>#60</td>
<td>Mentor understood roles &amp; expectations</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.05</td>
<td>.688</td>
</tr>
<tr>
<td>#61</td>
<td>Mentee understood roles &amp; expectations</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.05</td>
<td>.532</td>
</tr>
<tr>
<td>#62</td>
<td>Had a appropriate pairing</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.37</td>
<td>.618</td>
</tr>
<tr>
<td>#63</td>
<td>Mentee was openminded</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.37</td>
<td>.691</td>
</tr>
<tr>
<td>#64</td>
<td>Mentor had detailed information</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.79</td>
<td>.773</td>
</tr>
<tr>
<td>#65</td>
<td>Comfortable with mentee</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.49</td>
<td>.592</td>
</tr>
<tr>
<td>#66</td>
<td>Had joint planning</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.21</td>
<td>.638</td>
</tr>
<tr>
<td>#67</td>
<td>Mentee planned</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.49</td>
<td>.621</td>
</tr>
<tr>
<td>#68</td>
<td>Shared responsibility</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.26</td>
<td>.551</td>
</tr>
<tr>
<td>#69</td>
<td>Mutual respect, care &amp; trust</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.49</td>
<td>.691</td>
</tr>
<tr>
<td>#70</td>
<td>Mutually benefited</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.37</td>
<td>.684</td>
</tr>
<tr>
<td>#71</td>
<td>CTLT lab was useful</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.93</td>
<td>.887</td>
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<tr>
<td>#72</td>
<td>Mentee active in troubleshooting</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.65</td>
<td>.734</td>
</tr>
<tr>
<td>#73</td>
<td>Mentee eager to learn</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.28</td>
<td>.785</td>
</tr>
<tr>
<td>#74</td>
<td>Mentor understood mentee's content area</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.05</td>
<td>.757</td>
</tr>
<tr>
<td>#75</td>
<td>Mentor wished to know more on mentee's content, research etc</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.63</td>
<td>.734</td>
</tr>
<tr>
<td>#76</td>
<td>One semester was enough</td>
<td>42</td>
<td>1</td>
<td>4</td>
<td>2.26</td>
<td></td>
</tr>
</tbody>
</table>

Item #76, one of the other items with low mean scores, was basically developed to learn whether mentors had enough time, one semester, to accomplish their goals. 28 of the total number of 42 respondents reported that one semester was not enough time to meet their objectives ($n = 42, M = 2.26, SD = 0.734$). This low score provided a strong consensus among mentors that time was an important component and the activity should be extended at least one additional semester to increase likelihood of a successful mentoring relationship.
To permit a comparison between items in section four and five of the survey instrument, the following table was created, with items in both sections based on relevancies as to what mentors view as the more important components for successful mentoring relationship and whether or not that specific component was present in their own mentoring relationships. (I) indicates an item ideally necessary for successful mentoring relationship, and (A) represent the actual scores based on mentors’ experiences.

In Table 15, the first column labeled “Component” represents various characteristics of successful mentoring relationships as used in the survey instrument. For each of these characteristics, items (mainly two, in some cases more than two) were matched. One (the first) score in each row in the table with notation (I) represents the mentors’ thoughts on the importance in their view of that specific characteristic in terms of an ideal, successful mentoring relationship. The second (other items) score notation (A) represents the mentors’ scores on whether or not that specific characteristic existed in their actual mentoring relationship. For example, as one of the important characteristics of a successful mentoring relationship, we created “Clear expectations from mentor” in the first row of the table based on our data. In the row dedicated for this specific characteristic, Item #41 (I) and Item #60(A) were matched. Item #41 (I) in this case was an item representing mentors’ thoughts on the importance of the “clear expectations from mentor” characteristic with respect to their view of successful (ideal) mentoring relationships. The second item, Item #61 (A), in the same section was one that represented mentors’ thoughts on their position with respect to understanding of their role in the actual mentoring relationship.
Table 15

Descriptive Statistics for both Section #4 and Section #5 of the Survey Instrument

<table>
<thead>
<tr>
<th>Component</th>
<th>N</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear expectations from mentor</td>
<td>Item #41 (I)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.47</td>
</tr>
<tr>
<td></td>
<td>Item #60 (A)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.05</td>
</tr>
<tr>
<td>Mentee’s understanding of the process</td>
<td>Item #42 (I)</td>
<td>42</td>
<td>3</td>
<td>4</td>
<td>3.60</td>
</tr>
<tr>
<td></td>
<td>Item #61 (A)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.05</td>
</tr>
<tr>
<td>Appropriate pairing</td>
<td>Item #43 (I)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.58</td>
</tr>
<tr>
<td></td>
<td>Item #62 (A)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.37</td>
</tr>
<tr>
<td>Open-mindedness</td>
<td>Item #44 (I)</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>3.71</td>
</tr>
<tr>
<td></td>
<td>Item #63 (A)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.37</td>
</tr>
<tr>
<td>Mentor’s comfort in relationship (nonhierarchical relationship)</td>
<td>Item #45 (I)</td>
<td>43</td>
<td>2</td>
<td>4</td>
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<td></td>
<td>Item #47 (I)</td>
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<td>Prior knowledge about mentee’s needs</td>
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<td>Joint planning</td>
<td>Item #48 (I)</td>
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<td>2</td>
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</tr>
<tr>
<td></td>
<td>Item #66 (A)</td>
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<td>2</td>
<td>4</td>
<td>3.21</td>
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<td>Collaborative decision making</td>
<td>Item #49 (I)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.44</td>
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<tr>
<td></td>
<td>Item #50a (I)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.79</td>
</tr>
<tr>
<td></td>
<td>Item #67b (A)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.72</td>
</tr>
<tr>
<td>Mutual respect, care and trust</td>
<td>Item #51 (I)</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.72</td>
</tr>
<tr>
<td></td>
<td>Item #69 (A)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.49</td>
</tr>
<tr>
<td>Mutual benefits</td>
<td>Item #52 (I)</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.40</td>
</tr>
<tr>
<td></td>
<td>Item #70 (A)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.37</td>
</tr>
<tr>
<td>Mentee’s active involvement with troubleshooting</td>
<td>Item #53 (I)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.16</td>
</tr>
<tr>
<td></td>
<td>Item #72 (A)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.65</td>
</tr>
<tr>
<td>Mentee’s willingness to try new technologies</td>
<td>Item #54 (I)</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.51</td>
</tr>
<tr>
<td></td>
<td>Item #73 (A)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.28</td>
</tr>
<tr>
<td>Mentor’s understanding of the mentee’s content area</td>
<td>Item #55 (I)</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>Item #74 (A)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.05</td>
</tr>
<tr>
<td></td>
<td>Item #75 (A)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.63</td>
</tr>
<tr>
<td>One semester is sufficient time</td>
<td>Item #58 (I)</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>2.35</td>
</tr>
<tr>
<td></td>
<td>Item #76 (A)</td>
<td>42</td>
<td>1</td>
<td>4</td>
<td>2.26</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a Mentors disagree with the idea that “Mentee decides on his or her technology needs” as worded in this item, so lower scores means more collaboration
b Values recoded as (Strongly agree -> Strongly disagree; Agree -> Disagree; Disagree -> Agree; Strongly disagree -> Strongly agree)
Thus, taking an overall look over this table, it is evident that mentors described their mentoring relationship as mostly successful based on their views of ideally-described successful mentoring relationships. Although scores for each component given in the table are very close to one another, small differences between the first item (score for ideal mentoring) and the second item (score on actual relationship) for some components were obvious. This basically means that, although mentors described their own mentoring experience as successful, there was still something missing that would make the relationship more effective within their definition. Among the several reasons cited here, the most important ones are discussed in the next research question (#5) section.

Strengths and Weaknesses of the Faculty Technology Mentoring Program

*Research Question 5: What are the strengths and weaknesses of the faculty technology-mentoring program from mentors’ perspectives?*

The main focus of the study, as mentioned above, was to investigate mentors’ experiences with the faculty technology mentoring program from different perspectives (technical benefits, pedagogical, academic, and professional growth). In addition to the mentors’ benefits from program participation as given in previous sections, investigation of major strengths and weaknesses of the program were also considered to be important. In this section we therefore examined the data to identify strengths and weaknesses of the mentoring program from mentors’ perspectives.

One of the most important and strongest strengths of the faculty technology mentoring program within its specific structure emerging from data was its effectiveness in providing not only to faculty members, but also to graduate students who acted as technology
mentors, opportunities to grow in different subjects. As described in the literature and discussed in this chapter, mutual benefit to both parties was defined as one of the key components for success in any mentoring relationship. Regardless of mentors’ gender, years of teaching experiences, and technical and academic backgrounds in this specific mentoring structure, mentors stated very strong positions in reporting their benefits in technical, professional, academic and pedagogical subjects. In one mentor’s words, it was “the learning process both ways, I was learning at the same time as my mentee… our collaboration together has not only been beneficial for her [mentee] but it has also enriched my experience as a graduate student.”

One of the key factors in the process of building those benefits was the role of interpersonal interactions among the participants. Based on Figure 4 that basically demonstrates the boundaries of the social environment in which interactions take place among the participants, mentors pointed out both close interactions between mentor-mentee as well as those found in wider social groups (such as mentor-other mentors; mentor-mentees; mentor-other graduate students) were the most powerful dynamic of the mentoring structure. Mentors believed that such interactions created a variety of opportunities for individuals to learn from each other as described in social learning theory and to affect their environments with their knowledge and expertise. Without such community support and collaboration, as one mentor mentioned, “It doesn’t work.”

Mentors learn different skills from fellow mentors knowledgeable in different technologies. Examples include inquiry, confirmation, or adjustment of theoretical, pedagogical or academic positions due to use of technology in teaching, research, and other professional activities as a result of conversations with, and observations of, a faculty
member. For mentors, therefore, one may conclude that social connections with other mentors and mentees were certainly a strong factor leading to growth in different subjects.

However, some of the mentors stated that the proper level of interaction among the faculty members didn’t always happen. While working on faculty members’ individual needs was, according to mentors, a strength of the program, faculty needed to have connections with their colleagues as close as those with mentors. Through closer connections with other faculty members as well as with others in the community, including former mentors, the mentoring process would become more productive and easier to accomplish as individuals shared their experiences and knowledge. To accomplish this and address weaknesses such as a mentee’s limited understanding of the process, mentors proposed use of online learning community options and more social gatherings to support collaboration and sharing.

*Lack of time for mentors and mentees, limited understanding of the mentoring process* emerged as major weaknesses experienced by mentors.

First, the major limitation most commonly stressed by mentors on was the lack of time (one semester) with which to establish a good relationship and to meet the goals given in Tables 14 and 15. According to mentors, since the mentoring is a two-way “learning process,” more time was needed in several cases so that mentors and mentees could make better progress. To make the relationship more effective with respect to both sides, several mentors were not only concerned with the amount of time they themselves needed to spend outside of regular meetings but were of mentees’ needs for more time to “practice [skills] more independently.”

Carol, for example, pointed out that because of time demands on her mentee, her mentee was really concerned about not being able to finish their project in the first semester...
and not having a mentor to continue work on their project in the subsequent semester. Carol, considering the scale of their projects, agreed with her mentee and stressed that there was certainly more time needed to develop a product, implement it in her mentee’s teaching, and provide time for reflection. Also, she believed that “It would be nice to have a re-union in spring to show some kind of more developed products” in terms of increasing the level of sharing among faculty members.

Second, in addition to the overall need for more time during the relationship, mentors indicated that mentors-mentees’ understanding of the mentoring process could become a major weakness and an important barrier in cases in which participants had little or no experience with the mentoring process. Mentors like Janis and Tom pointed out that having more information at the beginning about the mentoring process was necessary in terms of not only becoming a “more effective mentor” but also increasing their own personal benefits. Tom noted his thoughts as “there should be some mentoring discussions about what the concept of mentoring is, mentor is, in sessions at the beginning of course not the other topics. I don’t think I understood correctly mentoring, mentor, and roles, what is mentoring? What is technology mentoring? How can it be done at different programs and at different universities?” Based on his experience, he also believed that “mentoring should be extended for a year not a semester.”

As could be seen in several cases, mentors stressed that it takes time in the beginning to establish a good mentoring relationship in which both sides get to know one another, become familiar with the environment, understand their roles, and set up their project goals.
Use of Mentoring Experience in Professional Life

Research Question 6: Do former mentors use their mentoring experiences in their professional life?

As mentioned before, several graduate student mentors pointed out that having mentoring experience itself was likely to be a benefit for them in their future professional life as faculty members. Because of the limited number of participants in recent years with immediate opportunities to implement mentoring experience, there was a need to focus more on former mentors’ thoughts and their use of mentoring experience in actual work environments.

Several mentors indicated in the survey instrument’s open-ended items that they used some of the mentoring experiences in their workplace to help other people with respect to their need for learning different applications. For example, while one mentor noted her use of mentoring experience as “helping others” on general technical issues in their workplace, others in educational institutions were very specific about the use of mentoring with their own students or with faculty members at these institutions. Although we didn’t have enough data to investigate in detail how they use the mentoring concept, it was obvious that a considerably large group of mentors in different work environments introduced mentoring ideas into their professional work.

Several former mentors in educational institutions indicated that they were using mentoring in their classrooms with both graduate and undergraduate students or to help faculty members or teachers to satisfy the need for professional development in the process of technology integration.

In open-ended questions, mentors noted different ways of using of a mentoring model
in their professional lives (see Appendix J). The most commonly-used mentoring method in different institutions seemed to be one oriented toward helping faculty members or teachers with the technology integration process. In K-12 environments, mentors found mentoring ideas useful in helping other colleagues. One of the mentors implementing such ideas in her workplace pointed out that “After taking CI610 I had the opportunity to work in a project that involved extensive technology mentoring for K-6 classroom teachers. I felt well prepared for the challenge.” Another former mentor in a K-12 environment expressed her use of mentoring as “I am able to "mentor" teachers in technology integration in the K-12 environment.”

The majority of mentors who implemented mentoring ideas in their workplace were at institutions of higher education. One of these mentors working as an instructional designer at a university pointed out that her mentoring experience was great in terms of working with faculty members on the technology integration process at her workplace. She pointed out;

Part of my current position is professional technology mentor for faculty members in a university setting. It is my responsibility to inform faculty of new technologies for learning and teaching, to search for technological solutions to problems they encounter in the classroom and in their research, to provide support and training for technologies, and to maintain computer laboratories and classroom equipment. Mentors with greater teaching responsibilities mentioned that they embraced the mentoring idea in different ways and used it in their teaching with both undergraduate and graduate students. One of those mentors noted her experiences as “The mentoring model that was introduced [at the graduate program] has been very useful in helping me to successfully complete technology-based projects with my own graduate and undergraduate students.”
In later stages of our analysis, one of the former mentors who had implemented mentoring ideas at an institution agreed to share her use of mentoring experience in her professional life in her home country. She pointed out that, even though she was not residing in the United States, and no longer a graduate student, the impact of her mentoring relationship with her mentee was still an on-going process providing her with professional benefits. She indicated that she was still in professional contact with her mentee and working on some collaborative publications. In addition, she also mentioned that she was teaching a graduate-level course whose development was based upon the mentoring framework described in this study. However, the format of the mentoring was somewhat different because of the different organizational culture and structure in her country.

Although there is need for more in-depth data to investigate the issues discussed herein more broadly, the overall mentors’ thoughts point out that former mentors in various workplaces have adopted and implemented mentoring ideas into their professional lives. Although there were differences in implementation from site to site, the overall idea of one-on-one help for those with special needs in technology learning and integration still remained the same. The concept of mentoring seemed to be the initial choice by mentors in situations representing such needs for any professional development model.
CHAPTER 5
SUMMARY, DISCUSSION, AND RECOMMENDATIONS

In this chapter, a summary of the present study as well as major findings are provided. Findings are discussed based on the social learning theory framework. Limitations and recommendations for research on the subject are also discussed.

Summary

Summary of the Study

The purpose of this study was to investigate graduate students’ experiences with one-on-one faculty technology mentoring in a College of Human Sciences at a large Midwestern research-based university and to describe important dynamics of a successful mentoring relationship based on the perspectives of mentors. To be more specific, the overall research methodology (i.e. data collection, analysis, etc.) was organized around the following research questions;

1. What do mentors report as benefits of participating in the technology-mentoring program?
2. What kinds of factors influence mentors’ perception of benefit?
3. What are the characteristics of a successful technology-mentoring program?
4. Do the mentoring experiences of the mentors reflect their views of a successful mentoring program?
5. What are the strengths and weaknesses of the faculty technology-mentoring program from mentors’ perspectives?
6. Do former mentors use their mentoring experiences in their professional life?

To accomplish the purpose of this study, a grounded theory approach was chosen to frame the overall research design and implementation from the beginning, data collection, to the end of the data, analysis process.

The participants in the study consisted of two main groups of mentors. One was former mentors who had participated in the mentoring program from 1997 until 2003, and the second group were mentors who participated in 2004 and 2005. Although the first group of mentors, except for three mentors, only contributed to the study through an online survey, the second group actively participated to the study through classroom observations, interviews, and the survey instrument.

Data collection was initiated in the early stages of the process. As grounded theory recommends, the data collection and initial analysis be carried out simultaneously (Glaser, 1978; Strauss & Corbin, 1990). Results from early observations and interviews were used to inform the development of the survey instrument. In addition to observations, field notes, and survey results toward the end of the process, nine of the mentors were also interviewed at different stages of the process. Because of the need for specific data, the purposeful selection (theoretical sampling) was used to identify those interviewees (Glaser & Strauss, 1967).

As mentioned, one of the major instruments in the data collection was the faculty technology mentor survey (see Appendix A). To get an overall understanding of the larger group of mentors, the survey instrument was developed based on the initial categories (themes) from data analysis and an extensive literature review. Experts on the topic and research methodology in this process were contacted to get their input on the survey
development process. Suggestions were addressed and a final version of the survey was created and distributed.

The constant comparison method was the major technique used to analyze data (Glaser, 1965, 1978). In this process, the collected data were exposed to line by line comparisons of each incident, concept and category with others (Glaser, 1992; Merriam 2002; Strauss & Corbin, 1990). Open, axial, and selective coding were used as the major stages in the process of breaking apart the data and putting them back together in the constant comparisons technique (Jones & McEwen, 2000; Strauss & Corbin, 1990).

Summary of the Major Findings

Research Question 1: What do mentors report as benefits of participating in the technology-mentoring program?

Data analysis revealed that mentors, regardless of their backgrounds, certainly benefited from mentoring experiences in several ways at different levels. The major benefit categories that emerged in the data were (a) technical, (b) pedagogical, (c) academic, and (d) professional.

Table 16

Descriptive Statistics for Mentors’ Overall Benefits

<table>
<thead>
<tr>
<th>Description</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical</td>
<td>43</td>
<td>1</td>
<td>4</td>
<td>3.12</td>
<td>.793</td>
</tr>
<tr>
<td>Pedagogical</td>
<td>43</td>
<td>2</td>
<td>4</td>
<td>3.12</td>
<td>.544</td>
</tr>
<tr>
<td>Academic</td>
<td>42</td>
<td>2</td>
<td>4</td>
<td>3.10</td>
<td>.505</td>
</tr>
<tr>
<td>Professional</td>
<td>43</td>
<td>3</td>
<td>4</td>
<td>3.53</td>
<td>.505</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results given in Table 16 demonstrate clearly that former mentors had positive views on receiving benefits in four given categories. Among them, the professional benefits mentoring experience provided mentors was found to be the strongest one. Despite the fact that several additional statistical tests were employed to investigate whether or not mentors’ background on different subjects such as education theory, research, and technology or their years of teaching experiences had any impact on their benefit scores, the results did not provide any statistically significant impact or difference.

Parallel to the overall survey results, qualitative data also revealed mentors’ positive reactions to receiving different benefits from mentoring relationship. The detailed mentoring experiences in qualitative data, more importantly, helped us investigate how those mentors with different backgrounds varied on receiving different benefits.

Based on the overall data analysis, the following table was created to demonstrate mentors’ benefits with their subcategories.

Table 17

*Overall Mentors’ Major Benefit Categories*

<table>
<thead>
<tr>
<th>Major Benefit Category</th>
<th>Subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Technical (a) Learning (trying) new technologies</td>
<td></td>
</tr>
<tr>
<td>2) Pedagogical (a) Moving from thought to action (beliefs to reality),</td>
<td></td>
</tr>
<tr>
<td>(b) Pedagogical considerations of teaching and learning with technology</td>
<td></td>
</tr>
<tr>
<td>(c) Exposure to different pedagogical approaches and strategies (modeling)</td>
<td></td>
</tr>
</tbody>
</table>

1) Technical (b) Hands on experience (practice) |

| (1) Access to tools (hardware/software resources). |
| (2) Real life projects (authentic problems). |
| (3) Experience on technology integration (adoption). |
| (c) New technological ideas |
3) Academic
   (a) Research
   (b) Theory
   (c) Direct experience

4) Professional

**Research Question 2: What kinds of factors influence mentors’ perception of benefit?**

Since mentors participating in the mentoring program since 1997 had different expectations, backgrounds, and different mentees with different needs, the factors playing a role in constructing their perception of benefits were expected to vary. Based on our data, mostly qualitative in nature, two main factors stood out as most important in terms of impact on mentors’ perception of benefits: (a) mentors’ weaknesses and the perceived urgency for improvement, and (b) applicability of mentoring offerings.

In mentors’ responses to some open-ended items in the survey instrument, field notes, and interview sessions it was revealed that when mentors were asked to describe their benefits, they first pointed out that they had needed to develop some understanding in areas where they had little or no knowledge before the mentoring experience.

For example, Web page design was mentioned by several mentors of an area in which they initially had limited background, a deficiency remedied as they were able to quickly develop appropriate skills in Web design tools. Because of their limited background on research and theory, several other mentors mentioned benefits in those areas as expertise was developed. Based on our data, we found mentors’ areas of weaknesses on different subjects and urgency of developing some understanding of those subjects was a factor in their perception of benefits.
The other factor resulting from the data was the applicability of the mentoring offerings for solving present problems or issues in a timely manner. While mentors who were still working on their degrees stressed benefits related to their academic subjects, mentors in the teaching profession were more likely to cite their benefits emerging in their work places over the long term. Thus, it would be correct to note that, depending on the mentors’ positions (students or staff) and needs, the time taken to apply the mentoring offerings seemed to a factor on their perception of benefits.

*Research Question 3: What are the characteristics of a successful technology-mentoring program?*

Based on the definition of the successful mentoring relationship, the major characteristics of a successful technology mentoring relationship identified by mentors were investigated within two subcategories: a) participant and b) organizational structure.

The role of participants, their understandings of mentoring, commitment levels, communication, and some other elements related closely to human nature were found to be important characteristics of the successful mentoring relationship in this “participant” group.

Based on such human-related characteristics, the organizational structure of the mentoring was also found to be an important aspect. In this subcategory, several different components of the mentoring process were investigated. The characteristics cited by mentors as major organizational characteristics of successful mentoring relationships were (1) pairing, (2) goals and project planning, 3) interactions and community support, and (4) motivational factors.
**Research Question 4: Do the mentoring experiences of the mentors reflect their views of a successful mentoring program?**

Results indicate that mentors were positive about the success of their mentoring experiences. Although several factors were identified as important in successful mentoring relationship, mentors in several cases mainly assessed success of their mentoring experiences by looking at the benefits resulting from their relationships with their mentees.

Mentors did not report any significant relationship problems with their mentees. Also, they reported in Table 15 that the mentoring experience was mutually beneficial to both mentors and mentees. In several case study reports, mentors also expressed a motivation to continue work with their mentees because they had such successful mentoring relationships.

**Research Question 5: What are the strengths and weaknesses of the faculty technology mentoring program from the mentors’ perspectives?**

Although practical points about benefits to mentors were discussed in Chapter 4, the overall conceptual term for the strength of the mentoring relationship for both mentor and mentee s best described as “authenticity.” To further the understanding of mentors’ experiences, the strength of the mentoring structure and its effectiveness as a professional development approach come from the authenticity of mentor-mentee projects, complementary backgrounds of participants, interpersonal relationships, characteristics of the environment in which the mentor-mentee pairs work, the different ideas and products implemented, and the authenticity of challenges faced.

Major limitations would be the lack of “adequate time” and “understanding” on both sides of the mentoring relationship. Based on variation in mentors’ backgrounds and
mentoring experiences, their thoughts as given in Appendix K reflect the strengths and weaknesses of the mentoring structure from different perspectives.

*Research Question 6: Do former mentors use their mentoring experiences in their professional life?*

Although there is need for more in-depth data to investigate the issues discussed herein more broadly, the mentors’ overall reactions illustrate that former mentors in various workplaces have adopted and implemented mentoring ideas into their professional lives. Although differences in implementation from site to site existed, the overall idea of one-on-one help for those with special needs in technology learning and integration remained the same. The concept of mentoring seemed to be the initial choice by mentors in situations representing such needs for any professional development model.

**Discussion**

Was faculty technology mentoring beneficial to mentors? Findings presented in this study clearly demonstrate that graduate student mentors who participated in faculty technology mentoring program described their mentoring experiences as beneficial. Technical, pedagogical, academic and professional growth were the major categories of benefits.

The closer examinations of those benefit categories and their subcategories revealed that mentors described not only “observable” or “tangible” outcomes as their benefits but also changes in their perspectives and ideas as their benefits in given four different categories. Alongside with developing some skills, for example, on different software and
hardware technologies, building a broader understanding of using different information technologies in teaching, learning, and professional tasks was cited by mentors as a benefit. Moreover, mentors’ consensus from different levels of background on education theories, research, and technologies on those “unobservable” benefits were even stronger than that of observable ones.

Within the social learning theory’s concept of triadic model (see Figure 1), mentors’ benefits were not only determined by themselves nor by their single mentees but by the interactions of all different three components: personal, behavioral, and environmental factors. Mentors in this triadic model produced environmental conditions through their actions that ultimately affected their thoughts and behaviors in a reciprocal fashion. One individual mentor’s development (personal) and demonstration (behavioral) of her knowledge and skills on Web design in the mentoring program (environment), for example, would initiate discussion about the technology among other mentors with different backgrounds. With the alternative design and development ideas, discussions that took place in the mentoring environment caused changes on this mentor’s, as well as on some of the other mentors’, ideas about Web design. Even though some of those mentors who changed their thoughts on Web site design did have a chance to implement the new ideas immediately, according to social learning theory, this is the process of “learning through observation” in which mentors learn not through “their own actions” but vicariously through observing other people without performing (experiencing) new knowledge and competencies directly.

Based on the triadic model and social learning theory’s position on describing the learning process not only as the person’s own action but also observations, the findings in
this study indicate that mentors benefit from mentoring experiences through learning from consequences of their own actions as well as from other people (faculty members, mentors, and others) through listening, talking, and observing.

One of the most important factors in developing either observable or unobservable benefits was authenticity of the elements (i.e. technology, teaching, learning, professional life, etc.) of the mentoring relationships, as noted above, and the interconnectedness of all of those elements, which provided mentors with a chance to see what worked and what did not. According to social learning theory, this was the learning process in which mentors had opportunities to acquire “large, integrated behaviors” rather than isolated pieces without suffering from negative experiences by trial and error.

In addition to the first question at the beginning of this section, the second major question we had was how we could evaluate mentoring relationships to conclude if mentors had a “successful mentoring” relationship. As mentioned, mentoring has emerged in the literature as one of the most popular professional development models, serving a wide variety of purposes in various organizations (Jacobi, 1991; Kariuki, Franklin, & Duran, 2001; Kram & Isabella, 1985). Although the growing body of the literature on mentoring reports a number of “success stories” in mentoring in different contexts, it also posits that not all mentoring relationships are successful (Donaldson, Enscher, & Grant-Vallone, 2000; Eby, McManus, Simon, & Russel, 2000; Foster, 2001; Myers & Humphreys, 1985).

To measure effectiveness of the different mentoring structures, different evaluation approaches have been developed and used. However, no general framework in the literature yet found describes particular evaluation criteria that can be used to determine whether or not
any given mentoring relationship is successful from the individual as well as the organizational point of view.

Based on the discussions in the literature, we identified two major points, benefits and process from which we evaluated whether or not any given mentoring relationship was successful. As given above, mentors in this specific mentoring program demonstrated clearly that they benefited from mentoring relationship in different ways. To evaluate mentoring relationships from the second point, a process oriented approach, Foster (2001) proposed using common themes described in mentoring studies to create a general framework for evaluation of mentoring applications in terms of their effectiveness for both individuals and organizations.

Thus, based on an extensive literature review, three main categories emerged: (a) the structure of mentoring including identifying needs of individuals, organizations, availability of resources for addressing needs, goal settings, planning and implementation of mentoring relationships, providing support, expectations of individuals, and the role of community, (b) quality of interactions including reciprocality and openness, and (c) selecting mentors-mentees (protégés) including experiences of participants, personalities, commitment, understanding of mentoring, expectations, organizational roles, expectations, organizational positions (hierarchical), communication skills, problem-solving skills, organizational skills and so on.

The findings presented in this study demonstrated that, based on the three main evaluation criteria mentioned above, the faculty technology mentoring program was successful. The data analysis process revealed that mentor-mentee’s understanding of the
process, pairing, planning and goal setting, interactions and some other motivational factors were identified as the major characteristics of a technology mentoring program.

To summarize, despite the difficulty of finding descriptions of the desired evaluation framework in current mentoring literature (Gibb, 1994), we developed a general evaluation framework that includes two major concerns: (a) benefits to participants and (b) process.

According to the findings presented in this study, the majority of the mentors described their mentoring experiences as successful relationships based on the benefits they received and the process (i.e. organizations, pairings, and quality of interactions) they experienced.

Although the findings presented in this study provide insights about faculty technology mentoring and mentoring in general to different audiences according to their needs, we believe that this study is important because it contributes to the existing literature in three ways by providing details on (a) mentors’ benefits (focus), (b) an alternative approach to the concept of benefit, and (c) a mentoring evaluation approach.

**Mentors’ Benefits (Focus)**

As mentioned in the chapter 2 of this study, there were very few, if any, studies found in the literature that specifically focus on the issue of whether or not mentoring approaches have been beneficial to more the experienced partner (mentor) in the relationship. Because of the importance of the both participants in the mentoring relationship clearly pointed out in literature, we believe that the findings of this study contribute to the existing literature by providing solid research-based insights on technology mentors’ benefits, concerns, and thoughts on successful mentoring relationships.
Alternative Approach to the Concept of Benefit

In addition to the focus of the study described above, another important contribution of this study is related to its theoretical approach on defining concept of benefit from Bandura’s social learning perspective. Although several studies in the literature view benefits of individuals as more observable outcomes of the mentoring relationship, we elaborated this view based on the social learning theory framework not only as an observable outcome but also unobservable changes.

Therefore, we believe that the approach we took in this study to describe the concept of benefit itself and the way we built our interpretations of the findings would have crucial implications in those efforts to evaluate effectiveness of the mentoring relationships and investigate concept of mutuality in benefits.

Mentoring Evaluation Approach

Based on the definition of benefit within the social learning theory, we believe that this study will be helpful for some researchers studying the issues related to evaluation of effectiveness of mentoring programs by providing a research based evaluation approach of mentoring programs. Although it may not be the completed version, we view that this study will be the ground work that lays out important components of the general mentoring evaluation framework. Researchers studying different mentoring structure can then develop their own evaluation framework.
Recommendations

Based on the findings and research process carried out in this study, the major recommendations are given under two categories (practice and future research) below. It is our hope that individuals who have or plan to organize a technology mentoring program will certainly find some useful insights to consider in their mentoring approach. The second group of the recommendations is for future researchers who will study technology-focused mentoring programs.

Recommendations for Practice

Findings suggest the following recommendation for practice:

- Allow adequate time for mentors and mentees to finalize project plans and accomplish their goals. In our specific mentoring program, mentors strongly emphasized that one semester is not enough to finish their projects. Therefore, they suggested that mentoring relationships should be extended to another semester. Although mentors were free to continue to their relationship, mentors suggested that the extension to the second semester should be somehow connected to framework. In other words, working with faculty members in a second semester should be an official requirement. To extend the relationship, some mentors said that having a couple of mentor-mentee meetings in the second semester would serve well for that purpose.

- The communications among the mentors were found to be important factor for several mentors’ growth in different subjects. Therefore, closer communication specifically between mentors who have extensive backgrounds and limited
backgrounds on different education theories, research, and technologies should be encouraged. To do so, advanced students should be encouraged to share their interpretations of their mentoring experience within different education theories.

- Address mentors’ different concerns (i.e., technology, roles, and expectations) in the beginning of the semester to lower mentors’ stress levels. To do so, mini technology workshops, for example, would be useful to help those mentors with concerns about their limited experience on specific software or hardware technology. Reading some articles on the concept of mentoring itself, and examining case study papers at the beginning of the process would be also helpful.

- One of the major challenges reported by mentors was some faculty members’ limited understanding of mentee’s and mentor’s role in the relationship. To address those concerns, distribute a written document that briefly summarizes mentor and mentee roles, expectations, and the importance of meeting regularly, planning together, sharing their thoughts on the projects with their mentors.

**Recommendations for Future Research**

- Since this study was carried out with a large group of mentors, it is possible that some of the details were lost for several reasons. Therefore, based on the same theoretical framework, another study with small group of mentors in the same setting would be helpful to examine the issues in depth.

- Because we did not have direct access to mentor-mentee weekly meetings, the data used in this study were limited to the mentors’ journals and expressions in
the classroom environment about those meetings. To understand the role of interactions between mentor and mentee more in depth, larger-scale studies focusing on the mentor’s benefits and the role of interactions with just one or two mentoring pairs would be valuable.

- To gain a broader approach on the subjects related to the concept of mentoring in general (i.e., evaluation of mentoring relationships, the characteristics of successful mentoring relationship, the benefits of mentors, etc.), it would be useful to have comparative results with this study and some others carried out in different settings.

Briefly, the main purpose of this study was to examine a faculty technology mentoring program at a Midwestern university from the perspective of graduate students’ who served as mentors. Based on the social learning theory framework, data were analyzed within the grounded theory research methodology. Findings revealed that the mentoring experience was also beneficial to mentors in several ways (technical, pedagogical, academic, and professional). According to results, mentors benefits were not limited to the observable or to the ones that were more practical in a short time, such as learning new technical skills; instead, benefits extended to the unobservable and occurred over a longer time period (i.e., professional benefits).
**APPENDIX A. SURVEY INSTRUMENT**

**General Explanation:** The main purpose of this survey is a) to identify how graduate students who participated in the Faculty Technology Mentoring project have benefited from their participation and b) to identify strengths and weaknesses in the project based on graduate students’ perspectives. Because many of the participants were involved in the project years ago, some survey items may require you to respond with the information you had DURING your participation.

**Section 1: General information about participants:** This section is organized to get information about both current and former participants in the Faculty Technology Mentoring project.

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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>What is your gender?</td>
<td>□ Male</td>
<td>□ Female</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>What is/was your major department for graduate study during your participation in mentoring program?</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td>What degree are/were you pursuing while taking C I 610, “Technology in Teacher Education” during your participation in the mentoring program?</td>
<td>□ Master’s</td>
<td>□ Doctorate</td>
<td>□ Other</td>
</tr>
<tr>
<td>4.</td>
<td>How many semesters of teaching experience at any level do/did you have, including teaching assistant (TA) positions prior to your participation in the mentoring program?</td>
<td>□ None</td>
<td>□ 1-3</td>
<td>□ 4-6</td>
</tr>
<tr>
<td>5.</td>
<td>How would you rate your background in educational theories, research and related subjects prior to your participation in the mentoring program?</td>
<td>□ Very good</td>
<td>□ Good</td>
<td>□ Neither good nor bad</td>
</tr>
<tr>
<td>7.</td>
<td>How many semesters did you work with your mentee?</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
</tr>
<tr>
<td>8.</td>
<td>Are you currently teaching? If Yes, at what level?</td>
<td>□ Yes</td>
<td>□ No</td>
<td>Level:</td>
</tr>
<tr>
<td>9.</td>
<td>Have you published/presented at a conference the artifact that you produced from your mentoring experiences?</td>
<td>□ Yes</td>
<td>□ No</td>
<td></td>
</tr>
</tbody>
</table>
10. If your answer was “YES” to question #9, please answer this question.  
Was this conference/paper your first attendance at a professional conference or academic publication?  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

Section 2: Technical skills and issues: This section is about technical skills that you used and gained from the mentoring program and the technical issues that you experienced during the program. For each item, please select your level of agreement or disagreement by putting an “X” in the appropriate box using the scale below:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

11. Having a mentor community within the C I 610 course helped me learn new technical skills from fellow mentors.  

12. Having a mentor community within the C I 610 course allowed me to share my technical with other mentors.  

13. Working with a faculty member provided me opportunities to learn/improve my knowledge on different technologies.  

14. The mentoring program helped me to recognize my personal strengths using technology.  

15. I became more confident in learning new technologies as a result of the mentoring program.  

16. I improved my skills on technical troubleshooting as a result of the mentoring program.  

17. Overall, the Faculty Technology Mentoring program was effective for improving my technical skills.  

18. Please describe specifically how experiences in this program improved your technology expertise.
Section 3: Perceived benefits towards professional growth: This section is about professional growth because of your participation in the Faculty Technology Mentoring program. For each item, please select your level of agreement or disagreement by putting an “X” in the appropriate box using the scale below:

- Strongly Disagree
- Disagree
- Agree
- Strongly Agree

<p>| | | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td></td>
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<tr>
<td>19. Working with a faculty member was effective in helping me experience issues related to the use of technology in teaching.</td>
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</tr>
<tr>
<td>20. The one-on-one mentoring program was effective in helping me see the advantages and disadvantages of using technology in education.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>21. The one-on-one mentoring program was effective in providing me with a chance to share my ideas on my mentee’s use of technology in teaching or other activities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. The one-on-one mentoring program was effective in building/improving my own confidence and ability to teach others.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>23. Being part of a mentoring community of mentors and mentees gave me an opportunity to recognize the weaknesses in my knowledge of education research and theory.</td>
<td></td>
<td></td>
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<tr>
<td>24. I improved my knowledge of education research because of my participation in mentoring.</td>
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<tr>
<td>25. Mentoring gave me a chance to experience the education research process (data collection, reflections, interviews, analysis, writing, and so on) within the real environment.</td>
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<tr>
<td>26. The one-on-one mentoring program was effective in giving me an opportunity to apply my pedagogical beliefs in practice.</td>
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<tr>
<td>27. Overall, I benefited from this mentoring relationship in terms of my pedagogical growth.</td>
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<tr>
<td>28. The one-on-one mentoring program was effective in building professional friendships.</td>
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<tr>
<td>29. The one-on-one mentoring program was effective in improving my communication skills.</td>
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<tr>
<td>30. Writing a case study improved my knowledge and understanding of the mentoring process.</td>
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<tr>
<td>31. This case study was an important step in my academic life in building new experiences such as conference attendance or publishing.</td>
<td></td>
<td></td>
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<tr>
<td>32. Having seen publications or conference presentations done by previous mentors encouraged me to do the same things.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>33. Reading case studies about mentoring was effective in understanding the technology mentoring concept.</td>
<td></td>
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</tr>
<tr>
<td>34. Discussing articles in the C I 610 course was effective in providing a better understanding of the mentoring process.</td>
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</tr>
</tbody>
</table>
35. Hearing stories from other mentors in class provided me with alternative ideas and approaches to help my mentee.

36. Sharing ideas with other mentors was helpful.

37. Working with my mentee improved my leadership skills.

38. Overall, I benefited from this mentoring relationship in terms of my professional growth.

39. Please describe the most important benefits you gained from the Faculty Technology Mentoring program as a graduate student mentor.

40. Has the mentoring experience been useful (i.e. use of mentoring idea in your work place or research on mentoring) in your professional life since CI 610 course? If Yes, Please describe.

### Section 4: Understanding of successful mentoring relationships

This section is about your understanding of successful mentoring relationships. For each item, please select your level of agreement or disagreement by putting an “X” in the appropriate box using the scale below:

- Strongly disagree
- Disagree
- Agree
- Strongly Agree

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>41. Clear expectations and mentor roles are important for a successful mentoring relationship.</td>
<td></td>
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<tr>
<td>42. Mentees’ understanding of the mentoring process is important for a successful mentoring relationship.</td>
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<tr>
<td>43. Appropriate pairings of mentors and mentees is important for a successful mentoring relationship.</td>
<td></td>
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<tr>
<td>44. Open-mindedness between mentors and mentees is important for a successful mentoring relationship.</td>
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<tr>
<td>45. Nonhierarchical relationships between mentors and mentees are important for a successful mentoring relationship.</td>
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<tr>
<td>46. Detailed information about what a mentee does and wants to do with mentors is important for a successful mentoring relationship.</td>
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<tr>
<td>47. The mentor must be comfortable personally with the mentee to have a successful mentoring relationship.</td>
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<tr>
<td>48. Joint planning of the project by the mentor and the mentee is important for a successful mentoring relationship.</td>
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</tbody>
</table>
49. It is important for the mentor and mentee to decide on the goals for the project together.

50. It is important for a successful mentoring relationship for the mentee to decide on his or her technology needs by himself or herself.

51. Mutual respect, care, and trust between the mentor and mentee are important for a successful mentoring relationship.

52. Mutual benefits are important for a successful mentoring relationship.

53. Mentees’ involvement in technical troubleshooting situations is important for a successful mentoring relationship.

54. Mentees’ willingness to learn new technologies is important for a successful mentoring relationship.

55. Mentors’ understanding of the content of the mentee’s course or project is important for a successful mentoring relationship.

56. Mentors’ leadership skills are important for a successful mentoring relationship.

57. Mentees’ leadership skills are important for a successful mentoring relationship.

58. One semester is a sufficient amount of time for a successful mentoring relationship to develop.

59. Please describe any additional characteristics of a successful Faculty Technology Mentoring relationship based on your understanding of technology mentoring.

### Section 5: Your mentoring experience

This section is about your mentoring relationship during the project. For each item, please select your level of agreement or disagreement by putting an “X” in the appropriate box using the scale below:

- Strongly disagree
- Disagree
- Agree
- Strongly Agree

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td>60. I understood my mentoring role and expectations at the beginning of the semester.</td>
<td></td>
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<tr>
<td>61. My mentee understood his or her role at the beginning of the semester.</td>
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<tr>
<td>62. I had an appropriate pairing with my mentee.</td>
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<td>63. My mentee was open to new ideas.</td>
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<tr>
<td>64. I had enough information about what my mentee wanted me to do with her or him before mentoring meetings began.</td>
<td></td>
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<tr>
<td>65. I was very comfortable with my mentee.</td>
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<tr>
<td>66. My mentee and I planned together what to do in our project.</td>
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<tr>
<td>67.</td>
<td>My mentee did most of the planning, decision making, and selecting technology by himself or herself.</td>
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<tr>
<td>68.</td>
<td>My mentee and I shared responsibility for the mentoring relationship.</td>
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<tr>
<td>69.</td>
<td>My mentee and I had mutual respect, care, and trust for each other in our mentoring relationship.</td>
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<td></td>
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<tr>
<td>70.</td>
<td>Both the mentee and I mutually benefited from this relationship.</td>
<td></td>
<td></td>
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<tr>
<td>71.</td>
<td>Help desk staff and other technical staff at the Center for Technology in Learning and Teaching (CTLT) were very useful to me and my mentee.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>72.</td>
<td>My mentee was actively involved in technical troubleshooting.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>73.</td>
<td>My mentee was very eager to learn and use new technologies.</td>
<td></td>
<td></td>
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<tr>
<td>74.</td>
<td>My mentee worked in a content area that I understood.</td>
<td></td>
<td></td>
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<tr>
<td>75.</td>
<td>I wished that I knew more about my mentee’s content area (his/her course content, research interests, study field, etc.)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>76.</td>
<td>My mentee and I had enough time (one semester) to complete our goals for the mentoring experience.</td>
<td></td>
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<tr>
<td>77.</td>
<td>Please describe the most important features that contributed to the success of your mentoring relationship.</td>
<td></td>
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</tbody>
</table>

**Your Name (Optional):**
APPENDIX B. SURVEY DEVELOPMENT PROCESS

1. Draft

Dr. B: Expert ideas on the topic

Dr. C: Expert ideas on the statistical framework

Modifications

2. Draft

Dr. B: Expert ideas on the topic

Dr. C: Expert ideas on the statistical framework

Modifications

3. Draft

Dr. D: Revision of research questions and the instrument
1

Feedbacks from graduate students

Pilot Study

Feedback from subjects in the pilot study & Committee

Literature Review on Mentoring (extended) and Social learning

Modifications
Final Draft
APPENDIX C: MENTOR JOURNAL GUIDE

Journal Guiding Questions:

The long history of faculty technology mentoring has proven that keeping weekly journal in detail can help mentors very much on their case study paper. Thus, following guidance is intended to give you an idea what topics you may want to include in you weekly journals. So, feel free to add different subjects to your journal.

Three main components to include in you journals:

1. **CI 610 course session (Discussions, Readings, etc)**

2. **Mentoring meetings with your mentee (Faculty member)**

3. **Your personal reflections**

1. **Class Session:** In this section, please try to reflect on readings that you read for that week, discussions, and other activities. We expect you to give us a sense about your progress on the subject because of the class (CI 610).

Here are some questions:

   a. How do these readings help your understanding of the topic?

   b. What did you find as interesting in this class session?

   c. Did you learn anything new (theory, technology etc)?

   d. Did you learn any new technology this week? From whom?

2. **Mentoring Meetings:** In this section, you can include anything you experience in your mentoring (discussions, technical issues, scheduling problems, frustrations, etc).

In your case study, you may want to use some artifacts that you collected from your mentoring meetings (e-mail, pictures, graphic website etc). Here are some questions:
a. Overall impression about the meeting (faculty member’s approach to the meetings, formal, informal, professional, etc)?

b. Decision process on the technology (how did you choose the technology? Together, or by faculty member.)

c. What kind of needs does the faculty member have for the technology you chose? (why he/she wants to learn it, for what purpose)

d. Do you have background with the technology?

e. Do you get any help to learn the technology?

f. What is your mentoring meeting’s format? (i.e. do you teach him/her on the computer first then he/she practices. Or he/she tries by himself/herself if he has question he asks you etc)

g. What worked best this week?

h. What were the faculty concerns? (lack of info about the tech, time to learn it, etc)

i. What did you face this week? (technical problems, etc)

j. What type of discussions did you have this week? (i.e. we had a discussion about the use of video clips in his teaching. He didn’t have the idea of using them, but I introduced him….and used the strategy to persuade him that they would be helpful to him…..etc)

3. **Your suggestions** to make mentoring more helpful to both you and your mentee?

   What would be included in this structure?
## APPENDIX D. MENTORS’ EDUCATION THEORY AND DEGREE

<table>
<thead>
<tr>
<th>Education Theories and Research Background Rates (Item #5)</th>
<th>Degree (Item #3)</th>
<th>Count</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Count</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>% within Ed. Backg. Rate</td>
<td>60.0%</td>
<td>40.0%</td>
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<tr>
<td></td>
<td>% within Degree</td>
<td>17.6%</td>
<td>7.7%</td>
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<tr>
<td></td>
<td>% of Total</td>
<td>7.0%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Neither good nor bad</td>
<td>Count</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>% within Ed. Backg. Rate</td>
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<td>54.5%</td>
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<tr>
<td></td>
<td>% within Degree</td>
<td>29.4%</td>
<td>23.1%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>11.6%</td>
<td>14.0%</td>
</tr>
<tr>
<td>Good</td>
<td>Count</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>% within Ed. Backg. Rate</td>
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<td>64.7%</td>
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<td>% within Degree</td>
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<td>42.3%</td>
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<tr>
<td></td>
<td>% of Total</td>
<td>14.0%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Very good</td>
<td>Count</td>
<td>3</td>
<td>7</td>
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<td></td>
<td>% within Ed. Backg. Rate</td>
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<td></td>
<td>% within Degree</td>
<td>17.6%</td>
<td>26.9%</td>
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<td></td>
<td>% of Total</td>
<td>7.0%</td>
<td>16.3%</td>
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<tr>
<td>Total</td>
<td>Count</td>
<td>17</td>
<td>26</td>
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<td></td>
<td>% within Ed. Backg. Rate</td>
<td>39.5%</td>
<td>60.5%</td>
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<tr>
<td></td>
<td>% within Degree</td>
<td>100.0%</td>
<td>100.0%</td>
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<tr>
<td></td>
<td>% of Total</td>
<td>39.5%</td>
<td>60.5%</td>
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</tbody>
</table>
APPENDIX E. ADDITIONAL TESTS FOR TECHNICAL BENEFITS

Comparison of Master’s and Doctoral Students’ Ratings on Item #18

### Test Statistics[^a]

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Item #18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>208.500</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>361.500</td>
</tr>
<tr>
<td>Z</td>
<td>-.341</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
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[^a]: Grouping Variable: Item #3 (Degree)

### Mentor education theory and research background (Item #5) * Overall technical benefits (Item #18) Crosstabulation

<table>
<thead>
<tr>
<th>Item #5</th>
<th>Count</th>
<th>% within Item #5</th>
<th>% within Item #18</th>
<th>% of Total</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td><strong>Bad</strong></td>
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<td></td>
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<td>.0%</td>
<td>.0%</td>
<td>0.0%</td>
<td>1.0%</td>
<td>1.0%</td>
<td>3.0%</td>
<td>5.0%</td>
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<td>.0%</td>
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<td>4.7%</td>
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<td>20.0%</td>
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<tr>
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<td></td>
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<td>Count</td>
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<td>5.9%</td>
<td>47.1%</td>
<td>41.2%</td>
<td>2.3%</td>
<td>3.0%</td>
<td>18.6%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Very good</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<td>18.6%</td>
<td>16.3%</td>
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Normality Test (Item #17)

Tests of Normality

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<th>Sig.</th>
<th>Statistic</th>
<th>df</th>
<th>Sig.</th>
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<tr>
<td>Kolmogorov-Smirnov(^a)</td>
<td>43</td>
<td>.000</td>
<td>Shapiro-Wilk</td>
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<td>.000</td>
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\(^a\) Lilliefors Significance Correction

Multinomial Logistic Regression (Item #5 and Item#17)

Model Fitting Information

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<tr>
<td>Intercept Only</td>
<td>30.495</td>
<td>9.303</td>
<td>9</td>
<td>.410</td>
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<tr>
<td>Final</td>
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<td></td>
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</table>

Parameter Estimates

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<th>S2_Item_17(^a)</th>
<th>B</th>
<th>Std. Error</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% Confidence Interval for (\text{Exp(B)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>Intercept</td>
<td>-1.099</td>
<td>1.155</td>
<td>.905</td>
<td>1</td>
<td>.341</td>
<td></td>
</tr>
<tr>
<td>[S1\text{_Recorded_Item_5}=1]</td>
<td>-18.723</td>
<td>.000</td>
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<td>1</td>
<td>.</td>
<td>7.39E-009</td>
<td>7.39E-009</td>
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<tr>
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<td>7465.589</td>
<td>.000</td>
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<td>.</td>
<td>5.38E-008</td>
<td>.000</td>
</tr>
<tr>
<td>[S1\text{_Recorded_Item_5}=3]</td>
<td>-847</td>
<td>1.574</td>
<td>.290</td>
<td>1</td>
<td>.</td>
<td>.590</td>
<td>.429</td>
</tr>
<tr>
<td>[S1\text{_Recorded_Item_5}=4]</td>
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<td></td>
<td>0</td>
<td></td>
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</tr>
<tr>
<td>Disagree</td>
<td>Intercept</td>
<td>-1.099</td>
<td>1.155</td>
<td>.905</td>
<td>1</td>
<td>.341</td>
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<tr>
<td>[S1\text{_Recorded_Item_5}=1]</td>
<td>.000</td>
<td>1.633</td>
<td>.000</td>
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<td>1.000</td>
<td>1.000</td>
<td>.041</td>
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<tr>
<td>[S1\text{_Recorded_Item_5}=3]</td>
<td>-847</td>
<td>1.574</td>
<td>.290</td>
<td>1</td>
<td>.</td>
<td>.590</td>
<td>.429</td>
</tr>
<tr>
<td>[S1\text{_Recorded_Item_5}=4]</td>
<td>0(^b)</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>Intercept</td>
<td>-1.099</td>
<td>1.155</td>
<td>.905</td>
<td>1</td>
<td>.341</td>
<td></td>
</tr>
<tr>
<td>[S1\text{_Recorded_Item_5}=1]</td>
<td>-1.609</td>
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<td>1</td>
<td>.239</td>
<td>.200</td>
<td>.014</td>
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<tr>
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</tr>
</tbody>
</table>

\(^a\) The reference category is: Strongly Agree.
\(^b\) Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.
\(^c\) This parameter is set to zero because it is redundant.
Multinomial Logistic Regression (Item #7 and Item#17)

Model Fitting Information

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Parameter Estimates

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<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% Confidence Interval for Exp(B)</th>
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<td>Lower Bound</td>
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<td>1</td>
<td>.571</td>
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<td>1.620</td>
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<td>.392</td>
<td>.250</td>
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<td>Intercept</td>
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<td>.320</td>
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<td>.571</td>
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</tr>
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</table>

a. The reference category is: Strongly Agree.

b. Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.

c. This parameter is set to zero because it is redundant.
# APPENDIX F. FACTOR ANALYSIS (TECHNICAL BENEFITS)

## Correlation Matrix

<table>
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<tr>
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<th>S2_Item_11</th>
<th>S2_Item_12</th>
<th>S2_Item_13</th>
<th>S2_Item_14</th>
<th>S2_Item_15</th>
<th>S2_Item_16</th>
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<tbody>
<tr>
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<td>.429</td>
<td>.472</td>
<td>.576</td>
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<td>.1000</td>
<td>.442</td>
<td>.457</td>
<td>.567</td>
<td>.574</td>
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<td>S2_Item_13</td>
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<td>.442</td>
<td>.1000</td>
<td>.756</td>
<td>.695</td>
<td>.630</td>
</tr>
<tr>
<td>S2_Item_14</td>
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<td>.457</td>
<td>.756</td>
<td>.1000</td>
<td>.810</td>
<td>.718</td>
</tr>
<tr>
<td>S2_Item_15</td>
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<td>.567</td>
<td>.695</td>
<td>.810</td>
<td>.1000</td>
<td>.898</td>
</tr>
<tr>
<td>S2_Item_16</td>
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<td>.574</td>
<td>.630</td>
<td>.718</td>
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Sig. (1-tailed):

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<th>S2_Item_11</th>
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<th>S2_Item_13</th>
<th>S2_Item_14</th>
<th>S2_Item_15</th>
<th>S2_Item_16</th>
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Determinant = .006

## KMO and Bartlett's Test

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<th>Bartlett's Test of Sphericity</th>
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<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
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<tr>
<td>Bartlett's Test of Sphericity</td>
<td>Approx. Chi-Square: 196.418</td>
<td>df: 15</td>
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## Communalities

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<td>S2_Item_12</td>
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<td>.742</td>
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<td>S2_Item_16</td>
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Extraction Method: Principal Component Analysis.

## Total Variance Explained

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<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
<th>Rotation Sums of Squared Loadings</th>
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<td>68.343</td>
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<tr>
<td>2</td>
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<td>68.343</td>
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<td>3</td>
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<tr>
<td>4</td>
<td>.240</td>
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<tr>
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<td>68.343</td>
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</table>

Extraction Method: Principal Component Analysis.
### Component Matrix

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</thead>
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<td>S2_Item_13</td>
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<td>-.313</td>
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<td>S2_Item_14</td>
<td>.853</td>
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<td>S2_Item_15</td>
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<td>S2_Item_16</td>
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</table>

Extraction Method: Principal Component Analysis.

- 2 components extracted.

### Rotated Component Matrix

<table>
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<th>2</th>
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</thead>
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<td>.205</td>
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<td>S2_Item_14</td>
<td>.901</td>
<td>.202</td>
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<td>S2_Item_15</td>
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<td>S2_Item_16</td>
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</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

- Rotation converged in 3 iterations.
APPENDIX G. ADDITIONAL TESTS FOR PEDAGOGICAL BENEFITS

Mentors in Master’s Degree Program Scores on Their Overall Pedagogical Growth

**Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3_Item_27</td>
<td>17</td>
<td>2</td>
<td>4</td>
<td>3.12</td>
<td>.485</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mentors in Doctoral Degree Program Scores on Their Overall Pedagogical Growth

**Descriptive Statistics**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3_Item_27</td>
<td>26</td>
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<td>4</td>
<td>3.12</td>
<td>.588</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>26</td>
<td></td>
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</tbody>
</table>

Normality Test (Item #27, Overall Pedagogical Growth)

**Tests of Normality**

<table>
<thead>
<tr>
<th>Statistic</th>
<th>df</th>
<th>Sig.</th>
<th>Statistic</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolmogorov-Smirnov</td>
<td>43</td>
<td>.000</td>
<td>Shapiro-Wilk</td>
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<td>.000</td>
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<tr>
<td>S3_Item_27</td>
<td>.375</td>
<td>Lilliefors Significance Correction</td>
<td>.717</td>
<td>Lilliefors Significance Correction</td>
<td></td>
</tr>
</tbody>
</table>

Mann-Whitney U Test (Degree (Item #3) * Overall Pedagogical Growth (Item #27))

**Test Statistics**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>220,000</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>373,000</td>
</tr>
<tr>
<td>Z</td>
<td>-.031</td>
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<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.975</td>
</tr>
</tbody>
</table>

a. Grouping Variable: S1_Item_3
Multinomial Logistic Regression (Theoretical Background (Item #5) and Overall Pedagogical Growth (Item #27))

### Model Fitting Information

<table>
<thead>
<tr>
<th>Model</th>
<th>-2 Log Likelihood</th>
<th>Chi-Square</th>
<th>df</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>Intercept Only</td>
<td>26.247</td>
<td>11.472</td>
<td>6</td>
<td>.075</td>
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<tr>
<td>Final</td>
<td>14.775</td>
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</table>

### Parameter Estimates

<table>
<thead>
<tr>
<th>S3_Item_27a</th>
<th>B</th>
<th>Std. Error</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% Confidence Interval for Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
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<td>1.225</td>
<td>268.322</td>
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<td>.000</td>
<td>3E+008</td>
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<td>[S1_Item_5=1]</td>
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<td>125.050</td>
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<td>.000</td>
<td>5E+008</td>
<td>13193135.40 2.020E+010</td>
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<tr>
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<tr>
<td></td>
<td>0b</td>
<td></td>
<td>.</td>
<td>0</td>
<td></td>
<td>.</td>
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<tr>
<td>Agree</td>
<td>.000</td>
<td>.632</td>
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<td>1.000</td>
<td>1.000</td>
<td>.098 10.166</td>
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a. The reference category is: Strongly Agree.
b. This parameter is set to zero because it is redundant.
APPENDIX H. FACTOR ANALYSIS (ACADEMIC BENEFITS)

Factor Analysis Results

### Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Item #23</th>
<th>Item #24</th>
<th>Item #25</th>
<th>Item #30</th>
<th>Item #33</th>
<th>Item #34</th>
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<tbody>
<tr>
<td>Correlation</td>
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<td>.420</td>
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<tr>
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<td>.478</td>
<td>.413</td>
<td>1.000</td>
<td>.548</td>
</tr>
<tr>
<td>S3_Item_33</td>
<td>.347</td>
<td>.448</td>
<td>.287</td>
<td>.420</td>
<td>.548</td>
<td>1.000</td>
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<tr>
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<td>.070</td>
<td>.022</td>
<td>.084</td>
<td>.012</td>
<td></td>
</tr>
<tr>
<td>Sig. (1-tailed)</td>
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<td></td>
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<td></td>
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<td>S3_Item_23</td>
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<td>.001</td>
<td>.001</td>
<td>.001</td>
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</tr>
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<td>S3_Item_24</td>
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<td>.004</td>
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<td>.033</td>
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</tr>
<tr>
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<td>.001</td>
<td>.003</td>
<td>.003</td>
<td></td>
</tr>
<tr>
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<td>.001</td>
<td>.003</td>
<td>.000</td>
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</tr>
<tr>
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<td>.033</td>
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<tr>
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<td>.000</td>
<td>.000</td>
<td>.000</td>
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<td></td>
</tr>
</tbody>
</table>

a. Determinant = .087

### KMO and Bartlett's Test

**Kaiser-Meyer-Olkin Measure of Sampling Adequacy.**

.690

**Bartlett's Test of Sphericity**

<table>
<thead>
<tr>
<th>Approx. Chi-Square</th>
<th>df</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>93.305</td>
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</tbody>
</table>

### Communalities

<table>
<thead>
<tr>
<th></th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item #23</td>
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</tr>
<tr>
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<tr>
<td>Item #25</td>
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<tr>
<td>Item #30</td>
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<td>.521</td>
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<tr>
<td>Item #34</td>
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<td>.487</td>
</tr>
</tbody>
</table>

**Extraction Method: Principal Component Analysis.**
## Total Variance Explained

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigenvalues</th>
<th>Extraction Sums of Squared Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>% of Variance</td>
</tr>
<tr>
<td>1</td>
<td>3.144</td>
<td>52.394</td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>.798</td>
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<tr>
<td>4</td>
<td>.613</td>
<td>10.210</td>
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<tr>
<td>5</td>
<td>.383</td>
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<tr>
<td>6</td>
<td>.164</td>
<td>2.731</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.

### Component Matrix

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3_Item_23</td>
<td>.616</td>
</tr>
<tr>
<td>S3_Item_24</td>
<td>.865</td>
</tr>
<tr>
<td>S3_Item_25</td>
<td>.733</td>
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<td>.685</td>
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<tr>
<td>S3_Item_33</td>
<td>.722</td>
</tr>
<tr>
<td>S3_Item_34</td>
<td>.698</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.

- 1 components extracted.

### Rotated Component Matrix

- Only one component was extracted.
- The solution cannot be rotated.
APPENDIX I. A FACULTY MEMBER’S E-MAIL TO MENTOR

Hello [Carol]!

I have finally found a moment to sit down and reflect on what I would like to see us accomplish this semester. I have to say again, that I really have my mind set on getting that electronic portfolio up-to-date, as well as adding the two other "views" of my portfolio, and the reflective component. To break that down into more achievable goals.

1) I would like to learn how to use Dreamweaver to simply update the portfolio that I have created. At this point, it is nearly three years behind.

2) Then, I would like to learn Dreamweaver to create the two other views of my portfolio - the chronological view, and the theme-based view. In the theme-based view, I have created a graphic that I would love to use as the base page and make it possible for individuals to click on the graphic to access different parts of my efolio.

3) Next, I would like to add this reflective component in something like "pop-up" boxes.

4) I would like to investigate some different ways this could be put on the web, password protected so that it may be viewed by my tenure and promotion committee.

And, as we talked about, there are a few other items we can talk about that won't take a great deal of time - how to use the SMART board, how to create a blog, and I have a few questions about putting digital video on WebCT. Other than that, I would like to focus most of our time on this electronic portfolio and bringing it to life!

Best to you,

[Dr. Alice]
APPENDIX J. MENTORS’ USE OF MENTORING IN PROFESSIONAL LIVE

Last summer I instituted a mentoring program at my school, and it was a hit. I had 11 faculty members sign up. While not all followed through, some did, and I think it was a success. Unfortunately, due to an increasing workload, and being a one person department, I had to drop the mentoring program. However, my job requires me to work with faculty everyday with tech support issues, as well as course design and development, so I use the skills gained in my mentoring program at Iowa State everyday.

I have always assist other with technological problems. I am still help others.

The mentoring model that was introduced in CI 610 has been very useful in helping me to successfully complete technology-based projects with my own graduate and undergraduate students.

Although I'm not teaching, my experience has proven VERY useful in working with business executives and understanding their technology questions and concerns. My mentoring experience also helps me better understand how people both approach and accept new technologies.

I drew from my experiences as I helped develop graduate courses at the university of my employment.

At my current university, I am pulling on the knowledge I learned in the mentoring program to apply to our teacher education department as we work with College LiveText education solutions.

After taking CI610 I had the opportunity to work in a project that involved extensive technology mentoring for K-6 classroom teachers. I felt well prepared for the challenge.

The process helped me to see the value of mentoring and I currently do something similar with my students.

I have applied some of the experiences from the mentoring into providing help to my own students.

I work with faculty and teachers on a regular basis.
My present job has a mentoring aspect built into it. So, I have benefited quite substantially.

Absolutely. Part of my current position is professional technology mentor for faculty members in a university setting. It is my responsibility to inform faculty of new technologies for learning and teaching, search for technological solutions to problems they encounter in the classroom and in their research, provide support and training for technologies, and maintain computer laboratories and classroom equipment.

I am able to "mentor" teachers in technology integration in the K-12 environment.
APPENDIX K. MENTORS’ THOUGHTS ON CHARACTERISTICS OF SUCCESSFUL MENTORING RELATIONSHIP

Please describe any additional characteristics of a successful Faculty Technology Mentoring relationship based on your understanding of technology mentoring.

<table>
<thead>
<tr>
<th>time management and self discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>You must be able to trust each other and to develop a good raport with each other. I think the first semester you are just learning about each other and it takes this long to develop some trust and respect for each other. It is easy for the graduate student to trust and respect the faculty members as this is how we are taught but it is quite different the other way around.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>enough time is important for both mentee and mentor to plan and work together</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring process should be longer.</td>
</tr>
<tr>
<td>1. The mentee’s strong interest in technology and keen awareness of students' needs of technology is important</td>
</tr>
<tr>
<td>2. Social interaction (cafe or lunch together) is important in developing a successufl faculty technology mentoring</td>
</tr>
<tr>
<td>3. Mentor's frankness about his/her own frustration with technology is important</td>
</tr>
<tr>
<td>I think it would be more successful or beneficial if mentee-mentor relationship lasts for more than a semester.</td>
</tr>
</tbody>
</table>

| Humor, on both sides. If you can't have fun and laugh at a situation, then you are dead in the water. My mentor and I had a lot of fun. We were able to laugh at ourselves and our mistakes, and there were a few. |

| A successful relationship can be viewed differently by the mentee and mentor. Even though I felt that I had failed as a mentor at the time, I now see that experience as a success. Although I don't feel that we accomplished our explicit goals set forth early on in our relationship, I feel I gained so much more. I hope that my mentee can look back and see her own benefits that may not have been apparent at the time. Unfortunately, I have lost contact with my mentee. I do feel that it is critical for the mentee to trust the mentor so that they can open up about what they truly want to learn. The mentor experience puts them in the vulnerable position of "learner." Likewise, I feel that intimidation is a factor when a student works with a respected faculty member. There is an initial discomfort that goes with mentoring an "expert" in their field of expertise. A change in mindset before entering into the relationship is important. It needs to be a shared experience by both parties. |

| Both parties must be able to meet. The project/goal must be of a reasonable scope. |
I think that I agree with most of these statements. But, I think the mentoring project, process and outcomes will be much stronger if the mentee has a strong idea of what s/he wants to accomplish before the project starts. After that, it’s good communication, and flexibility. Two excellent skills to have, at any rate.

"Mentees’ willingness to learn new technologies is important for a successful mentoring relationship." This is only important if the new technologies/softwares can add a benifit for the mentee and possibly their current and future students. Having a mentee that wants to learn is the most important factor in my opinion.

Collaboration and sharing with other paired mentors/mentees is extremely important for successful mentoring program.

It is very important to me to understand that Mentor is not graduate assistant to the Mentee. It is a partnership that my role here was to "teach" or hand holding to the faculty. It took me a while to get it. Once I got it, the relationship become smoother and I became more comfortable with the faculty. I wish I can spend more than one semester with her.

Changes must be introduced in a timely manner

My mentee had no idea where he wanted to start. One semester would not have been enough to provide him with the knowledge to move forward with technology use in his classroom. By the end of the second semester, my mentee was integrating technology use into all of his classes. He was also extremely happy with the mentoring and what he had learned. It allowed him to move forward after the mentoring was over. The mentoring also helped build a strong professional relationship and a very good friendship.

Good communication between pairs are importnat piece of the successful mentoring relationship. Mentor-mentee needs to understand each other. To do so, I think both sides need to have good leadership skills.

both parties should get benefit as theoretical and/or practical for their professional life.

More time is a good one.
References


