International Journal of Evidence Based Coaching and Mentoring
Vol. 7, No.1, February 2009
Page 119

A Descriptive Study of Mentoring and Technology Integration among Teacher Education Faculty

Linda Larson, McNeese State University, Lake Charles, LA 70609-1865
Contact email: llarson@mcneese.edu

Abstract

This study examines the effectiveness of a mentoring programme designed to help faculty integrate technology into teacher education courses. Effective strategies for implementing a technology integration programme were considered from the perceptions of six teacher education faculty mentees who received technology integration mentoring from educational technology faculty. The main findings are that: (a) no matter what their technology integration skill level, the mentees agreed that most helpful aspect of mentoring was the one-on-one coaching; (b) mentees seem to prefer mentors who can gauge the level of their mentee's technology expertise, and then provide individualized learning experiences with the appropriate degree of challenge and guidance; and (c) mentees found that having a personal relationship with their mentors was a valuable component of the mentoring.

Keywords: mentoring, technology integration, faculty, and higher education.

Introduction

The idea of integrating technology into university teacher education programmes is not new, but it is becoming more relevant as teachers are expected to use technology to support their teaching and to improve student learning. The International Society for Technology in Education (ISTE) created sets of national educational technology standards (NETS) for teachers, students, and administrators to guide school improvement (ISTE, n. d.). No Child Left Behind (NCLB) also encourages improving student achievement through the use of technology. NCLB in its quest to ensure highly qualified teachers established standards for teacher professional development (NCLB, n. d.). While there is an obvious emphasis on technology in education in NCLB and NETS, there is still a need to demonstrate and persuade teachers to see technology as an effective teaching and learning tool in the classroom.

Faculty in teacher education programmes, many of whom were educated before computers were part of their schooling, may not be comfortable or skilled in teaching with technology. This problem can spread throughout the classroom experiences of the teacher education candidates. If students do not see faculty use technology in their courses, they may not have a clear perception of how technology can advance understanding in academic areas (Cuban, 2001; Dede, 1998; Finley, 2003). A study by Finley (2003) reported this lack of perception because many times faculty use older technology such as PC's with overhead projectors and computer applications instead of more up-to-date equipment such as digital cameras and Web 2.0 technologies. This lack of understanding contributes to the lack of confidence in integrating technology. If faculty members in K-12 and higher education are expected to integrate technology effectively into their curricula, they need time to practice with the technology so that they can develop a conceptual model of learning with technology and select appropriate teaching methods that will best facilitate technology integration.

Mentoring

One way that universities can address the challenge of integrating technology and providing user support is through mentoring. Although mentoring has been defined differently in the fields of psychology, human development, human resource management, and education, the integral purpose of mentoring has been the professional and or personal development of the individual or mentee (Luna & Cullen, 1995).

The majority of the studies cited in the literature on academic mentoring describe mentoring as a relationship between a senior member of an organization and a junior colleague. Typically, the senior member actively participates in the career development of the younger professional (Cotugna & Vickery, 1998; Luna & Cullen, 1995). More recently, reverse mentoring (Greengard, 2002) is often used in situations where younger or more experienced technology users provide technology professional development for senior members of an organization who have limited or no experience with technology.

In higher education, several mentoring models exist. For example, in a study of university faculty mentoring students (Campbell & Campbell 1997), several positive effects were noted: higher GPA for mentored students (2.45 vs. 2.29), more units completed per semester (9.33 vs. 8.49), and a lower dropout rate (14.5% vs. 26.3). There was also a positive correlation with the degree of mentor-protégé contact and GPA.

Another mentoring model implemented by Leh (2005) indicated that technology mentoring was successful and that the graduate student mentors and their mentees (university professors) benefited from the experience. The Leh mentoring model is not plausible for this study because the university at which this study took place did not have a graduate programme in educational technology.

The option that worked in the setting of the present study was the peer mentoring model. In the initial planning of this study, I implemented a peer mentoring programme that used experienced educational technology faculty to mentor their peers in order to complete a technology integration project. As the study continued, I observed that many of the mentoring relationships developed into more of a co-inquiry model. At the conclusion of this study, several faculty mentees expanded their relationships with their mentors beyond the completion of the mentee's project. It was interesting to note that the mentorship evolved from a formal mentor mentee association to an informal relationship where participants developed joint research projects and presentations.

While some practitioners move to formalize mentoring programmes to meet accountability expectations, research has established that academic mentors and their mentees prefer informal relationships (Mullen, 2007; Noe, 1998; Scandura, 1998). A drawback to informal mentoring is that sometimes the mentees may not receive the assistance they need (Blake-Beard, 2001; Mullen, 2005). In the present study, to order to ensure that the mentees received the assistance they needed to assure their projects met the grant assessment criteria, I implemented formal mentoring relationships, which evolved from formal to informal.

No matter what mentoring model is used, mentoring supports most of what is known about how individuals learn, including the socially constructed nature of learning and the value of experiential, situated learning experiences (Kerka, 1998; Lave &Wenger, 1991; Tharp & Gullimore, 1988; Vygotsky, 1978). According to the constructivist theory, learning is more effective when it is situated in a context in which new knowledge and skills will be used and where individuals construct meaning for themselves through relationships and interactions with others. Requiring mentees to complete projects related to their personal interests situates learning in a context that is meaningful for the mentee. Mentors can then facilitate learning by modeling problem-solving techniques, providing guidance and advice, and interacting with their mentees.

As the mentees increase their skills and knowledge, the mentor decreases his/her assistance. These processes are reflected in the mentor's roles of guide, advisor, motivator, facilitator, and role model within the contextual setting (Blackwell, 1989; Galbraith & Cohen, 1995; Haney, 1997; Kaye & Jacobson, 1996). Mentors function as experts who provide authentic learning experiences complemented by personal relationship through which social learning takes place (Kerka, 1998; Schmidt & Wolfe, 1980).

Mentoring Project Background

To capitalize on individual learning styles, this study implemented a formal one-to-one relationship in which educational technology faculty mentored the teacher education faculty. The primary focus of the mentoring in this study was to help the teacher education faculty integrate technology into their methods courses. Because faculty mentees had a wide variety of experiences in integrating technology, I encouraged each faculty mentee to design a project to fit his/her technology integration skill levels, interests, and needs. As the professional development coordinator for the mentoring projects and the PT^3 Grant, I also matched mentors and mentees based on their personal requests and content expertise. If conflicts in scheduling or personalities arose, the mentee was assigned to another mentor.

Method

This study utilized quantitative and qualitative methods. Quantitative methods were used to select the interview participants. Qualitative methods were used to examine the higher education faculty (mentees') perceptions of the mentoring they received from one or more of the educational technology faculty. Six individual mentee interview transcript analyses provided insight into the mentees' perceptions regarding the mentoring they received.

Sources of Data

Faculty members from a California State University (CSU) from the Teacher Education Department (TED) volunteered for the PT^3 (Preparing Tomorrow's Teachers to Use Technology) mentoring programme. This group constituted one data source. The Higher Education Faculty LoTi Questionnaire responses made up a second data source, and the interview transcripts from the Mentee Interview Guide (MIG) a third (see Appendix A).

Participant Selection Process

The six mentees interviewed were randomly selected from a group of full-time faculty members who volunteered for the PT^3 mentoring programme and agreed to complete an on-line questionnaire (LoTi). The mentoring programme lasted for three years, and the mentees could join the programme at the start of each semester. Mentees received between 1-6 semesters of mentoring. Mentees received a $1,000 stipend for each project and subsequent report they completed each semester. In the CED, 68 out of 84 faculty members (81%) applied for and received at least one stipend. As the time of this study, 46 out of 68 (68 %) participants completed the required grant report. Using a median split, based on their scores on the LoTi, the informants were divided into two groups. The possible range of scores on the LoTi was from 0-6 with 0 indicating no technology integration and 6 indicating the highest level of technology integration. The purpose of utilizing the median split of the scores was to assure that a full range of technology integration levels was represented in the interview phase of the study. Using random sampling, three key informants from each half of the median split were selected for interviews.

Instrumentation and Data Collection

Data collection used two instruments: (a) the Higher Education Faculty LoTi Questionnaire and (b) the Mentee Interview Guide (MIG). Moersch (2002) developed the 40-item LoTi to assess faculty members' level of technology integration.

The MIG provided qualitative data about strategies of technology integration that the faculty perceived as effective. After the MIG was piloted and subsequently revised, it was field tested on two faculty mentees. All the interviews were videotape recorded and audio tape-recorded.

The open-ended, loosely-structured interview was selected for this study because this format both included all of the questions in the MIG and allowed for interviewer flexibility. This format fostered discussion of topics related to the research questions and the literature review and to issues that emerged during the interview not anticipated by the research design (Arksey & Knight, 1999; Corbin & Strauss, 2008; Patton, 1990).

Quantitative Data Analyses

The following psychometric information was based on a small sample size of 31. Although there were 68 faculty involved in the PT^3 Grant mentoring, only the 36 members of the TED faculty who taught methods courses were selected for the study. Teacher Education full-time faculty returned 31 out of the 36 questionnaires for a response rate of 86%. The questionnaires were completed electronically in the computer lab during a Teacher Education Department Faculty Meeting. Teacher Education Faculty responded to the 40-item questionnaire that assessed eight different levels of technology integration. The 8 raw subscale scores or the 8 levels of technology integration scores from the LoTi profile were mutually exclusive on a response option continuum from Non-Use to Refinement; therefore, the individual subscales scores could not be summed or averaged into a single total scale score. Each level was made up of five questions with response options: Non-Use (0), Awareness (1), Exploration (2), Infusion (3), Integration-mechanical (4a), Integration routine (4b), Expansion (5), and Refinement (6). The eight LoTi subscale scores for each teacher were analyzed to determine whether the subscale scores could be summed and averaged into a single total scale score. It was determined that the total score could be interpreted in several ways.

To solve this problem, items in categories 0, 1, and 2 were reverse scored using the scoring matrix in Table 1. After the item statements consistent with lower levels of technology usage (0, 1, and 2) (Items 2, 4, 9, 11, 12, 16, 17, 19, 23, 24, 25, 38, 42, 45, and 48) were reverse scored, then, the raw score for each of the 8 levels was totaled and a mean total score for each faculty was calculated.

The range of the LoTi mean total scale score was 2.32 with a minimum score of 2.40 and a maximum score of 4.72; the median was 3.45. The mean was 3.56 with a standard deviation of .67. A median split divided the scores into two groups. Low group scores ranged from 2.40 to 3.45.

Table 1: ***Reverse Scoring Matrix***

	Reverse Scoring Higher Education Faculty LoTi Questionnaire							
Original Score	7	6	5	4	3	2	1	0
Rescore	0	1	2	3	4	5	6	7

The high group scores ranged from 3.46 to 4.72. The median split yielded a group of 15 scores for the high group and 16 scores for the low group. After the faculty scores were divided into the two groups, high and low, three names were randomly drawn from each of the two groups. These six faculty were interviewed using the MIG. One faculty selected from the low group declined to be interviewed; another individual from the low group was randomly selected to replace him/her.

Internal Consistency of LoTi.

The subscale scores indicated the mentees' level of technology integration. Table 2 presents the Coefficient Alpha for each of the eight subscale scores of the LoTi n = 31 as estimates of the internal-consistency reliability of the subscales scores. Subscale 6 yielded the strongest evidence of internal-consistency reliability (alpha = .88). The alpha coefficients obtained for two additional subscales (4a and 4b) were moderate or .80.

Table 2: *Internal-consistency Reliability Estimates (Cronbach Alphas)*

Subscale Number	Standardized Alpha
0	.70
1	.45
2	.71
3	.69
4a	.80
4b	.80
5	.60
6	.88

.

The internal-consistency reliability estimate for the total scale score on the 40-item questionnaire was .85, which was greater than the 8 individual scaled scores $n = 5$ which were analyzed separately as expected. It is likely that this increase is due to the larger number of items $n = 40$. In the total scale score, if Item 39 were eliminated, the Alpha Coefficient increased slightly from .84 to .85, and if items 2, 9, 17, or 23 from subscale 1 were each removed one at a time, the alpha coefficient of .85 remained the same. Moreover, if Item 24 of Subscale 1 were removed, the alpha coefficient decreased slightly to .84. This observation suggests that the increased number of items contributed to the increase in the reliability estimate.

Qualitative Data Analyses

Qualitative data were analyzed using the constant comparative method of analysis that was originally developed by Glaser and Strauss (1967) to use in theory building. In addition, the procedural details added to the steps by Lincoln and Guba (1985) were utilized to provide more rigorous analysis of the qualitative data (Maykut & Morehouse, 1994). Data coding and grouping continued through the entire interview process whenever necessary. The data eventually fell into specific categories.

Trustworthiness

Credibility (internal validity). Three techniques were utilized to increase the validity of the study: (a) prolonged engagement, (b) peer debriefing, and (c) member checks. Prolonged engagement added to the credibility of this study (Lincoln & Guba, 1985). I mentored faculty in technology integration and was a faculty member in this CSU campus for six years. Peer debriefing was used in this study to increase credibility. Specifically, an experienced qualitative researcher participated in three sessions and checked the results of the qualitative analyses. Member checks were also used to ensure credibility.

Transferability (external validity). In this study, a “rich and thick description” was used to enable the readers to consider their own situations and determine if the context of the current research matched their situation (Creswell, 2008; Lincoln & Guba, 1985).

Confirmability (objectivity). To aid in the confirmability of the study, an audit trail was maintained in three ways: First, all raw data were kept as evidence to support the findings. Second, all the data reduction and analyses products produced in *NVivo* (QSR, 2002) and *SPSS* (2002) were kept and printed out during the entire analysis process. These products included the reflective notes, quantitative summaries, concepts, and hunches that were written in the reflective journal. Third, the data reconstruction and synthesis products, created in *NVivo,* (QSR, 2002) including the structure of the categories (themes, definitions, and relationships) were printed and maintained. Moreover, reflections on this process were written in a reflective journal that was kept the entire length of the study. These notes were used during the data analyses and during the writing process to clarify and support the findings. This information was discussed with a peer debriefer to increase confirmability and to eliminate researcher bias (Creswell, 2008).

Findings

Pseudonyms were used to protect the identity of the participants. Participants signed a consent form approved by the Protections of Human Subjects Board at the CSU and gave permission for their interviews to be used in research presentations and published research articles.

Effective Technology Integration Strategies

Strategies that the six mentees perceived as effective fall into two major categories: (a) effective project strategies, and (b) effective teaching strategies. Although these subsections overlap, they have been divided for purposes of this study.

Effective project strategies. All six mentees recalled that the first session with their mentors involved setting the meeting schedule for the semester and discussing the mentee's proposed technology project. The mentors were given a one-course load reduction of at least 3 units per semester to participate in the study, but the mentees had to find time in their schedule to meet with their mentors. Teacher education faculty are required to teach, conduct research, and participate in several committees so setting a regular day and time for the mentor and mentee to meet was important in order to provide sufficient mentoring time. Each of the mentees identified the initial meeting as important. The initial meeting agenda required the mentees to articulate what help or resources they wanted from the mentor and to establish a timetable for completing their projects.

Faculty mentees designed and developed projects that reflected their individual needs. In the early stages of project design, when the mentee and mentor developed a timetable, project goals were also clarified. Parameters for the length and complexity of the project were also established at the first meeting. Projects varied in length from one to six semesters. Since some of the projects took more or less time than expected, project timelines were adjusted throughout the mentoring study. Some mentees completed several projects, others completed just one. Although the beginning focus of the mentoring was the mentees' projects, mentors also provided technology mentoring in other areas that may or may not have been related to the initial project.

As mentees decided the length of the meeting times with their mentors, they discovered the importance of scheduling sufficient time during a session to practice their new skills while the mentor provided guidance. Three of the six mentees noted that it was essential to practice the skills they learned in mentoring sessions, or they would forget the skills by the next day. This was a common problem with learning to use complex software.

Mentees also discovered the value of breaking their projects down into small steps. Two of the six mentees new to technology found that learning how to use technology was best done in small steps. Breaking down a complex process into simple steps helped them remember skills until they could execute them without supervision. For example, a mentee trying to integrate Blackboard Course Manage software into his/her classes required several mentoring sessions to learn software basics.

During follow-up sessions, the mentors could teach the more advanced features of the software. Mentees appreciated that the pace was set to fit the mentees' learning styles. One mentee writes that her mentor allowed her to work at her own pace and not at some preordained speed: "Because I am a constructivist and my mentor was a constructivist, the mentor allowed me to learn at my own pace. I'm sure that I had to be some kind of challenge" (Grace).

Setting project deadlines for the semester and for each session was an effective strategy for two of the six mentees. One mentee notes that setting deadlines helped her to make time in her schedule and to make a commitment to finish the project:

> I stumbled on a file the other day. We used to have Cyber Lunch where I worked before, I would walk in the office, and throw the handouts in the filing cabinet. And, I opened it the other day and I said oh! I forgot about that! And, there was good stuff in there about how to use Alta Vista and various search engines to do research and it was funny because I never followed up. I had the best of intentions and then it just kind of went away. With the mentor, she was always there and there was a consistency. I think that pushed me along.
> In addition, I have a very high level of feeling of responsibility when I say I'll do something.
> And so I think there were times when there really wasn't time for me to do it or I didn't plan it so that I could get my homework done for example. And yet, I said I'd do it and I'm a conscientious person and so I would….it would push me to do it anyway. And it's one of those things that I really need to do and I really need to learn and I know it's important and I know it's a priority and sometimes it's just really hard to get it up there on my priority list with all the things that actually get done. And I think having a mentor and having somebody to answer to kind of helped. Both of my mentors were very gentle.
> There were times that I think that since I had to answer to someone else that I actually did learn more…working with somebody else, which helps to make it a priority to get this done. And I put something else on the backburner until I get this done. (Grace)

Grace identified several important points. If a mentoring relationship is going to be successful, a common meeting time must be arranged so meeting becomes part of the mentee's schedule. The mentees are obligated to complete their projects because they meet regularly with their mentors. Grace notes that she gave her word that she would complete some aspect of the project. She was accountable and had an obligation that helped her to delay another task and to assign a higher priority to the project. In some cases, we may decide to complete a "task" because of a relationship with other people. Grace did not have a relationship with a stack of papers tossed in a file cabinet, but she did with her mentor.

Another mentee had the opposite experience because despite the support she received, she did not complete her project. However, five out of six of the mentees interviewed completed their projects. For them, the support of the mentor was enough to ensure they finished their projects. Table 3 summarizes the project strategies the mentee's perceived as effective.

Table 3: Effective Project Strategies

Strategy/Mentoring Feature	No. of respondents (of 6) who thought this was helpful
First session with their mentor, setting meeting schedule for semester and discussing mentee's project	6
Practicing skills learned in mentoring sessions	3
Learning in small steps	2
Setting project deadlines	2
Setting own pace	1

Effective teaching strategies. Since all the mentees also taught teaching methods courses in the teacher education department, they provided their perspectives as both teachers and learners. In their interviews, the mentees identified the teaching strategies the mentors used that the mentees perceived were effective: (a) modeling, (b) providing guided practice or "hands-on" experiences, and (c) encouraging independence, and (d) supplying resources.

The two faculty mentees with the least amount of technology integration expertise, as measured by the LoTi survey, asked their mentors to attended one or more of their class sessions to model strategies and to support the their mentees as they integrated technology. When these two faculty mentees integrated technology into their classes, they relied on the support of the mentor to help with problems that might occur when they brought their classes to the computer lab. Knowing how to use a particular piece of software is a challenge, but teaching someone to use software offers a different set of challenges. Since the mentor can anticipate problems the mentee and her class might experience, the mentor can prepare the mentee for these challenges by observing and supporting the mentees in technology teaching situations. The mentor provided the help the mentee needed to teach their own students and to experience a "real-world" example of technology integration. An added benefit was that the students saw technology integration modeled, and they had the added benefit of discussing the challenges and benefits with their teacher education methods teachers.

Four of the six mentees found their mentors' use of "hands-on" experiences or guided practice was effective in helping them teach technology integration. One mentee noted that was when her mentor explained aloud to her what she was doing and the reasons for using a computer software title or website that she understood why technology was important and how to integrate it into her curriculum. Learning was reinforced when her mentor had her work on her own with the software. Another mentee said she realized the importance of having the "hands-on" experience when she was with her mentor. When she returned to her office after a mentoring session, she found she could not replicate what she had watched her mentor demonstrate:

> "Hands on." And I have to have an opportunity to actually try the strategy or skill. For a while, I remember a couple of times when she showed something but I didn't actually do it myself and I realized that doesn't work. I don't remember it when I went back to my office. (Carol)

Another effective strategy the mentors used was providing ample resources for their mentees. These resources might be web sites, technology and software tutorials, or references related to the mentee's project, research, or interests.

Half of the mentees were pleased to note that their mentors were helping them to develop the technology skills they needed to be more independent; they felt a sense of pride when they could do something on their own; and "if I persisted, I was able to be successful because I wanted to go back [to my mentor] and say, 'See what I did!' that was great."

Another mentee recounted her experiences with her mentor who was teaching her how to be more independent:

> I think that she was trying to make me see that I can explore on my own. She showed me how she explored things—that really helped me to become independent and trying to do things sometimes on my own to figure out how to do it rather than just depending on somebody else all the time. (Carol)

Although the mentors used a variety of strategies, hands-on experiences seemed to be the most utilized strategy. Table 4 summarizes the effective teaching strategies the mentees reported their mentors used most often.

Table 4: Effective Teaching Strategies

Teaching Strategy	No. of respondents (of 6) who thought this was helpful
Hands-On Skills	4
Learning Skills to Be Independent	3
Modeling	2

Most Helpful Aspects of Mentoring

Mentees perceived that the most helpful aspect of mentoring was their (a) individualized learning, (b) mentor's content expertise, and (c) personal relationship with their mentor. Table 5 summarizes the mentees' perceptions of the most helpful aspects of mentoring.

Table 5: Most Helpful Aspects of Mentoring

Most Helpful Aspects	No. of respondents (of 6) who thought this was helpful
Individualized Learning	6
Mentor's Content Expertise	3
Personal Relationship with Mentor	3

Individualized learning. When asked about the helpful aspects of mentoring, all six of the mentees reported that they appreciated their mentor because he/she provided individualized attention and guidance. "The mentors were always there" when the mentees needed advice or "hand-holding." In mentoring sessions, mentees felt they did not have to "go public" when they felt uncomfortable or wanted to ask a question:

> My mentor tried to really understand and if she at any point ever tried to get me to do something and she could sense that I was resisting or that I was closing down, she also was sensitive and would say, "Oh, well. Some things I try don't work" rather than try to make me

> feel bad. And, I felt that she was very gifted in being able to really try to understand her learners. (Sue)

One mentee preferred to work with a mentor who could support her and help her develop her own ideas. Terry comments on her relationship with her mentor: "And with someone who is not necessarily there to tell me something, but just to evoke out of me where I'm headed. That lets my wonderings take shape. I'm going to remember that more because it's so individualized, I think." (Terry)

A perceptive mentor serves an important role in supporting his/her mentee to take his/her "wonderings" to a whole new level. I worked with my mentee for the entire six semesters of the PT^3 Grant. In the beginning, our relationship was a formal mentorship; as time passed, our relationship became more informal. The relationship eventually emerged as one of co-mentoring. I mentored her in technology integration, and she mentored me in professional development strategies. We had many conversations about her plan to open a Museum of Teaching and Learning. Captivated by her ideas, I spent a summer with her researching and discovering what was involved in creating an effective museum. Our mentoring relationship became a "creative" place where we developed ideas together. Since that time, she has continued her work, and the Museum of Teaching and Learning will soon become a reality. This mentoring journey began with a formal relationship and evolved into a friendship. Although all mentoring relationships do not necessarily evolve into friendships, it is very rewarding to both participants when it does.

Content expertise. Another important issue that emerged from the study was that three of the six mentees thought it was essential that their mentor had both content knowledge and teaching expertise. These mentees said it was important that the "person understands how students learn and can apply learning theory...that's important to me." One mentee illustrates the importance of having access to specific content expertise:

> I started out initially with another coach who didn't have an understanding of the concept I was trying to teach. And, I found myself initially taking too much time just trying to justify what I was doing. I worked with another mentor who had a better understanding of what I wanted to do. It was a much easier communication, much easier instruction. I recognized the importance of how the content dictates the technology. It was important that she not only had teaching expertise but also content expertise in K-12 teaching and in my discipline. (Jack)

Although the mentees had access to technology help in the Academic Computing Center, they preferred being coached by faculty colleague who had teaching and content expertise.

Personal relationship. Three of the six mentees spoke about how important a personal relationship was in mentoring. In the following account, the mentee stressed the importance of friendship and willingness to share knowledge in a mentoring relationship:

> I think just the same helpful aspects that come through in a true friendship, a true successful group relationship. Where your own knowledge is respected—you know at whatever level you happen to be. And you need to feel that person cares about you as a human being too in order to have this relationship go on in a successful fashion. (Terry)

Another mentee shared her insights on the mentoring relationship and how the relationship developed into a real camaraderie that extended to all the mentors:

> That there's an experienced expert who understands what you're going through and that you're building a relationship with them. And so I think that makes the biggest difference rather than me just going to a lab and working with someone I don't know on an as-needed basis. So I felt that I could approach any coach to get more mentoring. (Rita)

While mentees did not identify any negative points related to their own experiences, they emphasized the importance of compatibility between mentor and mentee:

Community of learners. Five of the six mentees reported that participating in the PT^3 mentoring helped them grow as a community of learners. Mentors also observed that because of the mentoring project, they had formed several lasting friendships. My experience as a mentor mirrors these relationships. Because it provides faculty with the time and opportunity to share their research and other interests, mentoring creates an environment that fosters learning communities. Inspired by the community of learning that emerged during this study, participants formed an informal mentoring group where they share their research, give each other feedback on their manuscripts. The group provides a milieu where members co-mentor one another.

Discussion

The five factors discussed below emerged as critical variables resulting in the success of this mentoring project.

1. Reality Check

When planning their technology integration projects, mentees realized the importance of discussing project goals and deadlines with their mentors. This discussion helped the mentees understand the complexities of their projects and set attainable, realistic goals. Some mentees with limited technology experience chose a project idea that was not realistic or was too easy given their technology expertise. A perceptive mentor can gauge the level of their mentee's expertise and provide the appropriate amount of challenge and guidance. For example, one mentee's wanted only to learn how to send and receive e-mail. When I met with this mentee, I realized that she did not even have mouse skills. She had never touched the computer in her office. For her learning something as simple as sending and receiving emails was a challenge. By the end of the semester, she was able to open her e-mail and attachments and send messages with attachments. One mentee, however, designed a project that was so challenging that it had to be broken down into small steps so that he could acquire the technology skills he needed to complete his project. This reality check is an essential component of mentoring. It increases the mentees' chances of successfully completing their projects because they begin the process with a realistic understanding of their skill levels and of the technical requirements of their projects.

2. Individualized Learning

Learning technology in typical classroom situation can be challenging. Because of the sequential nature of many software programmes, learners who miss one step in a sequence can be lost until they fill in the missing step. Many times, by the time they learn the missing step, the class has moved several steps ahead. Individualized instruction is a luxury classroom instructors cannot afford.

No matter what their skill levels, the mentees agreed that the most helpful aspect of mentoring was the one-on-one coaching. Typically, the sessions included a curriculum integration discussion, a technology skills demonstration, and time for “hands-on” practice and guidance. In mentoring sessions, the mentor should design instruction to fit the learning style and technological expertise of the mentees. Mentees may have several reasons to prefer individualized tutoring. Mentoring one-on-one, the mentor can tailor the learning to fit the individual skill levels of the learners. In a classroom situation, a variety of learners at multiple levels are working together, often to complete a project designed by the instructor. A mentor can ensure that mentees master a particular skill before progressing to the next skill.

Mentees who were in the less skilled group of the LoTi (technology integration) Questionnaire mentioned two strategies that helped them learn technology skills: learning in small steps and setting their own pace. This finding suggests that mentees with lower technology skill levels require that technology instruction be broken down into smaller sections. In a mentoring environment, mentees determine when they master one section and when they are ready to progress to the next skill level. The mentees’ desire to control the pace of instruction has implications for mentors or personnel who are providing professional development for faculty with limited technology skills. Mentors should first design skill-based technology learning experiences that are self-paced so mentees are not overwhelmed. Mentors should also provide sufficient time during the mentoring sessions for mentees to practice skills so they can confidently use the software or hardware without supervision.

3. Mentee Control

Mentees’ interests and immediate needs determined the project content. Many of the mentees designed projects that supported their research, teaching, and Retention, Tenure, and Promotion (RTP) file. Mentees had many demands on their time, and the individualized projects allowed them to fit the project development into their tight schedules. In addition, mentors were accessible to provide guidance and immediate and continuous feedback to their mentees during the development of the project. With this level of support, mentees did not use valuable time “struggling” with the technology. To provide the time for mentoring, faculty mentors were awarded a reduced teaching load

4. Content Expertise

Half of the mentees noted that the mentors’ teaching and content expertise was a helpful aspect of mentoring. Three mentees acknowledged it was important to them to be mentored by a person who was not only knowledgeable in technology integration, but who also possessed specific content expertise. For example, one mentee was a content methods teacher. He specifically mentioned he had started with one mentor who was not a content expert, and he preferred his second mentor because she had a major in his content area. In his opinion, he did not have to spend time explaining methodology because his second mentor had the academic background to facilitate the development of course content. Because the mentors and mentees were not limited to discussions about technology, discussions could focus on pedagogy and technology integration.

5. Personal Relationship

The mentoring relationships in this study varied in length from one to six semesters. Several mentees said having a personal relationship with the mentor was a valuable component of the mentoring relationship. Bonds that developed in some mentoring teams fostered a community of practice. As mentors and mentees interacted and reflected together, several of the mentoring teams evolved into a community of learners (Lave & Wenger, 1991). Within the learning community, mentoring teams discussed personal experiences, communicated perceptions, collectively problem solved, and developed new concepts. By privileging professional development that encouraged a community of practice, the study provided incentive for mentoring teams to share effective practices with each other and their students. A few teams developed long-term relationships. They continue to mentor one another, and their relationships have evolved into a mutually beneficial experience where each person brings his/her strengths to the interaction (Huang & Lynch, 1995). Several of the mentoring teams are conducting long-term joint research projects, and, as mentioned earlier, several mentors and mentees formed an informal mentoring group to extend this community of learners.

6. Co-Team Mentoring

The formal mentoring model implemented in this study was mentor-mentee oriented. Although it occurred with some of the pairs, the mentor-mentee relationship is not expected to be reciprocal. It is, however, true growth when the teacher becomes the student and the student becomes the teacher. The mentee-mentor relationship shifted from an initial uni-directional relationship to a dyad where the lines are blurred between mentor and mentee, and finally to co-team mentoring. One of my most rewarding experiences as a mentor was watching my mentees mentor me and others.

Suggestions for Further Study

This study provided a groundwork upon which further studies might be built. Its purpose was to examine technology integration strategies that the teacher education faculty mentees perceived as effective. The study could be extended to determine whether additional mentoring decreases, increases, or maintains the amount or sophistication of the faculty technology integration. A study similar to the current one could be conducted to identify ways to expand the community of learners by examining mentees' perceptions as they in turn mentor other faculty members in technology integration and other areas.

Conclusion

This study used the formal one-on one-mentoring model; however, this model evolved over time into a more informal mentoring model with several of the mentoring teams. In a few teams, the model morphed again, and the mentoring teams co-mentored. Teams then participated in joint research projects or provided feedback on each other's individual research projects. The mentoring relationships then morphed again to team co-mentoring. The mentor and mentees valued the mentoring experience enough that they formed a community of learners that provided informal co-mentoring.

Team mentoring is a totally unexpected phenomenon. When the team mentoring members discussed a manuscript or research project, a synergistic energy ignited a series of creative ideas. Participants sparked each others' ideas, and the participant interaction reached heights that were intellectually stimulating. At the end of the process, the idea that emerged was a synergistic artifact that was beyond what any individual could have created alone.

Another observation was the mentees' valued the situated learning experiences. The mentees talked about the importance of having the freedom to develop a project in a context (situation) that met their personal needs and levels of technology expertise. With their mentors, they created project that were realistic and consistent with their technology skill levels.

In reflecting on my experience mentoring numerous faculty members in this study, three mentoring experiences stand out. These experiences shared several factors related to mentoring. Most important, the mentor must determine the needs of the mentee, fit instruction to the mentee's needs, and pace the mentoring process appropriately. Second, one-on-one mentoring is a successful model, and the mentor-mentee relationship evolves over time. Many times the mentoring relationship ends when the project is completed, when one member of the pair moves to another workplace, or when more pressing priorities take over. Sometimes, however, the mentoring continues for an extended period and the mentoring relationship reaches a whole new realm.

Three of the mentees in the study chose to extend the relationships beyond the three-year grant period. These relationships became friendships. We share similar interests so we continued our relationships even after I left to take a professorship at another university in another state. When we interact, we reside in a realm that is a "creative place" where we collaboratively make knowledge, grow ideas, and encourage one another. To me, the creation of this energy is one of the most valuable aspects of mentoring.

References

Arksey, H., & Knight, P. (1999). *Interviewing for social scientists*. Thousand Oaks, CA: Sage Publications.

Blake-Beard, S. D. (2001). Taking a hard look at look at formal mentoring programmes: A consideration of potential challenges facing women. *Journal of Management Development*, 20(4), 331-345.

Blackwell, J. E. (1989). Mentoring: An action strategy for increasing minority faculty. *Academe, 78*, 8-14.

Corbin J. & Strauss, A. (2008). Basics of qualitative research 3e: Techniques and procedures for developing grounded theory. Thousand Oaks, CA. Sage Publications.

Cotugna, N. & Vickery, C. E. (1998). Reverse mentoring: A twist to teaching technology. *Journal of the American Diabetic Association.* 98 (10), 1166-1168.

Campbell, T. A. & Campbell, D.E. Faculty / student mentor programme: Effects on academic performance and retention. *Research in Higher Education*, 38, 727-742.

Creswell, J. W. (2008). *Research design, qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA: Sage Publications.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.

Daloz, L. A. (1986). *Effective teaching and mentoring: Realizing the transformation power of adult learning experiences*. San Francisco, CA: Jossey-Bass.

Daloz, L. A. (1999). *Mentor: Guiding the journey of adult learners*. San Francisco, CA: Jossey-Bass.

Dede, C. (1998). *Six challenges for educational technology*. Retrieved April 4, 2000, from http://www.virtual.gmi.edu/SS_research/edpapers/ascdf.htm

Finley, T.R. (2003). A descriptive study of utilization of technology form a perspective of full-time faculty in Virgina's higher education programmes (doctoral dissertation, The George Washington University, 2003. Proquest Digital Dissertations. (UMI No. AAT 3083800).

Galbraith, M. W., & Cohen, N. H. (Eds.). (1995). *Mentoring: New strategies and challenges. New directions for adult and continuing education*. San Francisco, CA: Jossey-Bass.

Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory*. Chicago, IL: Aldine.

Glennan, T. K., & Melmed, A. (1995). *Fostering the use of educational technology; Elements of a national strategy*. Washington, DC: RAND.

Goldstein, R., (1994). The RAND report. Washington, DC: RAND.
Greenbard S. (2002). Moving forward with reverse mentoring. *Workforce*, 81(3), 15.
Haney, A. (1997). *The role of mentorship in the workplace.* In M. C. Taylor (Ed.), *Work place education*. Toronto, Ontario: Culture Concepts.
International Society for Technology in Education (n. d.). National Educational Technology Standards. Retrieved from http://iste.org/
Huang, A. H. and Lynch, J. (1995).*Mentoring: The tao of giving and receiving wisdom.* San Francisco, CA: HarperCollins.
Joyce, B., & Showers, B. (1980, February). Improving in-service training: The messages of research. *Educational Leadership, 37*, 379-385.
Joyce, B., & Showers, B. (1988). *Student achievement through staff development*. White Plains, NY: Longman Press.
Kaye, B., & Jacobson, B. (1996). Reframing mentoring. *Training and Development, 8*, 44-47.
Kerka, S. (1998). New perspectives on mentoring. *ERIC Digest*. Retrieved July 21, 2001, from http://www.ed.gov/databases/ERIC_Digests/ed428249.html
Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.
Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage Publications.
Luna, G., & Cullen, D. L. (1995). *Empowering the faculty: Mentoring redirected and renewed*. Washington, DC: George Washington University.
Maykut, P., & Morehouse, R. (1994). *Beginning qualitative research: A philosophic and practical guide*. Philadelphia, PA: The Falmer Press. http://www.learning-quest.com/LoTi/disser.html
Moersch, C. (2002). *LoTi Framework and Questionnaire*. Learning Quest. Retrieved March 21, 2002, from http://www.learning-quest.com/
Mullen, C. (2005). The mentorship primer. New York; Peter Lang.
Mullen, C. (2007). Naturally occurring student-faculty mentoring relationships: A literature review in T. D. Alen & L. T. Eby (eds.). Blackwell handbook of mentoring: A multiple perspectives approach. Malden, M. A. Blackwell Publishing.
Nicholls, G. (2001). Professional Development in higher education: New dimensions and directions. Sterling, VA: Stylus Publications Inc.
Noe, R. A. (1998). An investigation of the determinants of successful assigned mentoring relationships. Personnel Psychology, 31, 457-479.
Nunnally, J. C. & Berstein, I. H. (1994). *Psychometric theory* (2nd ed). New York: McGraw Hill.
Patton, M. Q. (1990). *Qualitative evaluation methods,* (2nd ed.). Thousand Oaks, CA: Sage Publications.
QSR (2002). NVivo: Nud*ist Vivo for qualitative research (Version 2.0) [Computer software]. Melbourne, Australia: QSR International Pty. Ltd.
Schmidt, J. A., & Wolfe, J. S. (1980). The mentor partnership discovery of professionalism. *NASPA Journal*, *17*, 45-51.
Speck, M. (1996). Best practice in professional development for sustained educational change. *ERS Spectrum*, *14*, 33-41.
Tharp, R. G., & Gallimore, R. (1988). *Rousing minds to life: Teaching, learning, and schooling in social context*. Cambridge, England: Cambridge University Press.
US Department of Education. (2001). *Preparing tomorrow's teachers to use technology*. Retrieved July 10, 2001, from http://www.pt3.org
US Government. (1995). *The secretary's conference on educational technology* Retrieved April 30, 2000, from http://www.ed.gov/Technology/technology/techconf/1995/index.html

US Government (2000). *The secretary's conference on educational technology: Measuring impacts and shaping the future*. Retrieved June 30, 2001, from http://www.ed.gov/Technology/technology/techconf/2000/index.html

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, Harvard University Press.

Zachary, L. J. (2000). The mentor's guide: Facilitating effective learning relationships. San Francisco, CA: Jossey-Bass.

Appendix A

<u>Mentee Interview Guide (MIG)</u>

Note - the research questions in italics were not included in the Questionnaire. They are included in this copy of the Questionnaire to indicate which Questionnaire item addressed which research question.

1. *What strategies of the technology integration did the faculty perceive as effective?*

1. The first set of questions relate to how your mentor went about helping you to integrate technology.

a. Can you describe a typical meeting with your mentor?
b. Considering how you learn, what strategies did your mentor use that were effective?

2. *What are the faculty members' perceptions of the most helpful and the least helpful aspects of mentoring to facilitate technology integration?*

2. This question follows up on the last set of questions and focuses on mentoring as a method of teaching technology integration.

a. What would you consider the most help aspects of mentoring?

Dr. Linda Larson is an assistant professor in the Burton College of Education in the Educational Leadership and Instructional Technology Department at McNeese State University, in Lake Charles, Louisiana, where, in 2006, she received the Pinnacle Award for Teaching Excellence. Her most recent publications are *Teachers Bridge to Constructivism* in K. McCauley & G. Pannozzo (Eds.) *Annual Editions: Educational Psychology 7/08 Twenty-Second Edition* and *Rubric to determine a quality on-line posting*. In Salmons, J. and Wilson, L. (Eds.) in *Handbook of research on electronic collaboration and organizational synergy*. Hershey, PA: The Idea Group. Her research focuses on professional development, mentoring, and technology integration in higher education and K-12 schools. She is currently conducting research related to Louisiana's Turned On To Learning Laptop Initiative and the Promethean Activclassroom (interactive Whiteboard): Integration for Improving Teacher Candidate Academic Performance.