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ABSTRACT

This paper explores mentorship as a way for college faculty to expand educational computing skills. A technology mentorship program developed at Iowa State University involves pairs of faculty members (who volunteer for the program) working with graduate student mentors; the goal of the mentorship is to provide technological knowledge and skills, to integrate the new learning in a professional context, and to reflect on the learning process. The mentorship involves weekly meetings over one semester and has an established agenda. Both mentor and mentee must be willing to engage in personal learning experiences that reflect differences in rates of learning. The paper cites many excerpts from reflective journals maintained by mentor and mentee throughout the semester; they examine building personal knowledge and skills, integrating new learning into a professional context, reflections on the learning process, and reflections on the computer technology mentorship. The paper argues that in encouraging faculty to use technology in teaching, one-on-one mentorships can be cost-effective, personally rewarding experiences. (Contains 35 references.) (CH)

TECHNOLOGY MENTORSHIPS IN HIGHER EDUCATION: AN OPTIMAL MATCH FOR EXPANDING EDUCATIONAL COMPUTING SKILLS

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Abstract: Mentoring relationships to invite higher education faculty to learn educational computing skills on a one-to-one basis are an "optimal match". An optimal match involves a carefully constructed personal learning experience accommodating the inevitable differences in learning. An appropriate match builds connection with the circumstances that learners encounter and the schemata that they assimilate into their professional repertoire. Faculty technology mentorships build trust between participating individuals in order to implement new skills in non-threatening, meaningful ways to build personal knowledge and skills, to integrate new learning in a professional context, and to reflect on the learning process. Results from a specific technology mentoring experience are described in this paper including the perspective of both the mentor and the mentee.

Lack of University Education Faculty Leadership in Technology

An inadequate number of teacher education programs have faculty modeling instructional methods that integrate computer technology (Handler & Marshall, 1992; Office of Technology Assessment, 1995). Teacher training programs must recognize the need for training in technology, taught either in a specific class or across the curriculum. While scholars have advocated integrating technology in both methods and foundation courses (Berger & Carlson, 1988; Billings & Moursund, 1988; Bitter & Yohe, 1989) coursework needs to be redesigned to integrate technology in relevant contexts. Computer technology should facilitate content learning from carefully designed course goals and objectives which, then, can be developed using appropriate technology-based activities and practices (Todd, 1993).

New teachers learn to teach the curriculum using the technology they have already learned or have seen modeled in their college classrooms. Without faculty role models to observe in methods courses, preservice teachers are deprived of opportunities to witness models for teaching with computers (Bruder, 1989; Fulton, 1989, Beisser, et. al., 1997). According to Wetzel (1993), most college professors simply do not use it, in spite of adopted competencies that education majors should learn how to use computer productivity tools for effective instruction, and how to demonstrate those abilities.

The International Society for Technology in Education (ISTE) and the National Council for Accreditation for Teachers (NCATE) have established Foundation Standards requiring competencies to use and to evaluate computers and related technologies. Learners must operate software, multimedia and hypermedia, and telecommunications to support instruction. They must demonstrate skills in productivity tools for personal and professional use, understand equity, ethical, legal, and human issues related to technology; and stay current in educational applications of computers and related technologies. Despite ISTE/NCATE Standards first initiated in 1991, many universities have not adhered to these guidelines nor have they taken leadership role in this movement (Wilson, 1995).

This poor response to technology may be influenced by the fact that many college of education faculty, themselves, lack requisite skills or experience to model teaching techniques using computers in their areas of expertise. Therefore, it is necessary for them to receive personal assistance in learning how to use computers, as well as implementation of computer technology in their respective courses. Using graduate students to mentor college of education faculty has been shown to be an effective technique for integrating technology into the course work of preservice teachers (Brewer, 1995; DeWert & Cory, 1996; Thompson, Hanson, & Reinhart, 1996; Thompson & Schmidt, 1994; Zachariades, Jensen, & Thompson, 1995; Zachariades & Roberts, 1995, Beisser, Kurth, & Reinhart, 1997).

Background

A technology mentorship program developed at Iowa State University involves a one-to-one experience inviting faculty members to work with graduate student mentors as part of a long term department effort to improve faculty competencies and confidence (Thompson & Schmidt, 1994). Although mentorships last one semester, educators need much more time to fully implement goals and objectives using technology in the instructional process. Experienced computer-using teachers require five to six years to develop a framework for effective use of technology in teaching (Sheingold & Hadley, 1990). The paired mentoring experiences helps university faculty to learn and reinforce skills. University faculty members who volunteer for this semester-long experience are encouraged to introduce technology into their respective courses in a meaningful context.

A mentorship match begins with pairs of students and faculty assigned to work together. The mentorship involves weekly meetings and an established agenda. Crucial to the task, is the successful pairing of individuals willing interact regularly in order to develop technology skills and experiences in teacher education. Pairing should be an "optimal match" (Hunt, 1961), whereby both mentor and mentee are willing to engage in carefully constructed personal learning experiences reflecting the inevitable substantial differences in rates of learning. The appropriate technology-driven circumstances encountered by the mentee and mentor should match the schemata of the faculty member. The experiences assimilated into their professional repertoire must build trust between the two individuals in order to implement new technology skills in a non-threatening, meaningful way. The goal of the mentorship is to provide personal knowledge and skills, to integrate new learning in a professional context, and to reflect on the learning process.

Key Factors in an Developing an Optimal Match

Learning is a sequential, developmental process. The development of skills, understanding in domains of knowledge, and strategies for solving problems are acquired gradually in sequences that are more or less predictable (Hilgard & Bower, 1974). Effective teaching involves a sensitive assessment of the individual's status in the learning process, as well as a presentation of problems that slightly exceed the level already mastered. Tasks must be neither too-easy nor too-difficult to understand. Hunt (1961) describes this as the "problem of the match" which is based on the principle that learning occurs only when there is "an appropriate match between the circumstances that the learner encounters and the schemata already assimilated into his repertoire." In other words, "teaching must start where the learner is (Hunt, 1961, p. 268)." The pace of educational programs must be adapted to the capacities and knowledge of individuals (Robinson, 1983). Mentorships provide an opportunity for starting with the learner's experience and for progressing to exceedingly higher levels of complexity.

Elements of "joy" must be a part of an optimal learning match. Engaging, collaborative, complex, intellectually invigorating learning situations reflect elements of joy in order to sustain efforts (Csikszentmihalyi, 1990). Mentorships allow learners to confront tasks they need and want to complete together. A successful mentor pair must concentrate on mutually-determined regularly scheduled activities. The pair may establish clear goals for the tasks before and during each mentorship session or may freely explore ideas that emerge into an agenda. The intimacy of a private mentor learning experience allows immediate feedback through internalized criteria, trial and error, or explicit responses. They act with a deep yet effortless involvement, removing awareness of other worries and frustrations of everyday life. Both members exercise a sense of control over their actions. The concern for the self disappears, yet paradoxically, each member experiences a stronger emerging sense of self after the experience is over. For example, a scheduled hour of time seems to pass by in minutes (Csikszentmihalyi, 1990).

Mentorships, as an optimal match, account for the needs of the learner. Such a mentoring pairing program may facilitate the development of basic technological competencies, implementation of technology in college course goals and objectives, and reflection of the mentoring process. However, the success of any mentoring relationship is dependent upon several key factors. A successful mentor relationship is dependent upon a developmental, multidimensional relationship (Clemson, 1987). "Spontaneity and personal fit" invites mutual choice for mentor pairs to work together (Clemson, 1987, p. 86). Both participants in a mentoring program should have the freedom to choose one another. Both the mentor and protégé should benefit from the relationship (Clemson, 1985). Mutual respect and trust (MacArthur, et. al., 1995; Clemson, 1987) and mutual participation (Kay, 1990) are key factors.

Open dialogue between mentor and protégé allow each participant to express their feelings, talents, knowledge and expectations (Gehrke, 1988). The more success factors present in a mentoring relationship, the more beneficial the relationship will be to each of the participants.

The Mentorship Experience

Carol M., an Iowa State University reading language arts instructor, volunteered for the semester mentoring experience. Her background included no formal training in technology, little experience using computers in personal or professional work, therefore utilizing the computer primarily as a word-processing tool. Her college teaching experiences included work in a small private college without much technical support or encouragement for using technology in teacher education. At a Midwestern public university she now has exposure to skilled faculty peers and eagerly sought a mentorship experience during her first semester. The following excerpts were from reflective journals maintained throughout the semester.

The Mentee's Perspective: Building Personal Knowledge and Skills

"On the first day, we made sure my e mail was operating and set up my e mail address book. I made a file folder called 'Sally' for communication with my mentor. We labeled [Eudora Pro 3.1.1®] icons and changed them to labeled words. We switched them from the horizontal to vertical and reduced the size to be more accessible and practical. I also learned what they meant. Some I had known before this, but not all. I wanted all of my college classes to be on e-mail. I didn't know how to do that. I was thrilled today when I was able to send all my class an e mail without highlighting each name separately. Sally had left a great message that enabled me to highlight by holding down the shift key. Hurrah!

We started Power Point®. My assignment for next time was to do several slides that I could actually use in class. Sally said she would show me how to "take them on the road" electronically. I am excited about this new aspect of computer technology application!

I felt very good as yesterday I accessed Power Point and started a presentation. I used the automatic method but still have a number of questions such as: How do I get to see what I've done? How do I change backgrounds? I am anxious meet with Sally today! I was very excited today when I was able to figure out how to add slides, pictures and text to those slides in Power Point®. I changed my printer port to a new printer, conveniently located in our office, and it worked! Sally left great instructions on how to do that. She also left me a message on how to access my class list and send a group e mail.

So funny! Today I couldn't even remember what the shift key was called! The brain functions differently under pressure, especially when you feel inadequate about the content area - it doesn't work even with things that you know! When I struggled for the word, Sally whispered the word "shift key" to me. This was real HELP!

I am now up and running with e mail to my classes. I have sent several whole class messages and a number of students are corresponding urgent needs via e mail that could not have been taken care of otherwise. (This is using the media as it is intended - I love it! Real individualized attention too).

Next I learned about borders and shading, finding files, labeling disks, justification, alignment, and page preview. We started on templates, but will finish next time. Between now and then I will make sure I have the format just right for what I want made into a template. I usually hand out a paper to be filled in and handed back. Using a template will save paper and time. I will ask that the students access it and return the completed assignment through e mail. No paper should be used . I will tinker with what I learned today.

My computer monitor quit today. After I had tried to re-start it, I asked my office mate for help. She couldn't diagnose the problem, so we called Lance, the technical specialist. Meantime she taught me the "paper clip trick," a "trick of the trade" to get my disk out of the computer. She bent a paper clip and inserted the straight end into the small hole just beneath the disk hole. The disk jumped right out! Hurrah! Lance responded within 15 minutes to my phone message. He determined that my monitor had died. He said not to worry as it was an old one and it happens. He went right down and got me another one and it was up and running immediately. What service! I was so relieved that I had not 'killed it.' Such thoughts promote computer phobia!"

Integrating new learning in a professional context

"Today was 'D' day because I decided to use Power Point in class. It was my first time using it to produce and present a lesson. In a relatively "safe" environment, I was able to think on my feet, process the steps to hook up the technology, and take it down while I was lecturing and interacting with my students. It went very well and I was amazed that I actually could do all of that at the same time.

I checked out the LCD panel, took the laptop, and went out into the real world ALONE! I went to my empty classroom before class and carefully set up everything by myself. I let the class know that this felt similar to their reading/language arts practicum. I, too, had butterflies and fear that things might not work. They asked me to go back to one of the slides and I never had done that before, so I just pushed the back arrow and it worked! Yes! Problem solving is always a big deal when under pressure. I honestly felt that I could have used regular overheads with the same effect without all the hassle of toting heavy, very expensive equipment in a room so dark.

Fun time with Sally! I was able to make my Power Point scroll or change slides using various styles and rates. It was so simple and I think it really improves the presentation by making it a bit unpredictable (nobody goes to sleep). I will enjoy trying it in my class. I was reminded how to get rid of files, folders etc.

I also learned about a program called 'Inspiration®'. I am so excited about it as it goes right along with webbing and mapping that I am doing in my classes. It is a real graphic organizer that will certainly help us with our work. Once I am familiar with it and feel "safe" I will reserve a computer lab to show my students. I accessed theme units through the Internet search engine Alta Vista. I printed several pages and made overheads of them so that I could show my two classes what was already done on themes. For beginners it would help to have such an organizer. Some students already were very literate about this [Alta Vista], but most were not and were encouraged and thought it helpful.

What a riot! Neither Sally nor I could find how to shut off my computer. Even after we called the computer guru's office they only could say, pull the plug! I had to get on my stomach on the floor to get at the plug. I like Sally's ability to say 'I don't know' and then seek to find a way or ask someone."

Reflecting on the learning process

"I decided today that there wasn't as much carry-over into the real world of useable technology as I'd hoped. I was beginning to feel frustrated again. I am going to keep a little notebook next to me when Sally is teaching me, so that I can write down exactly what steps were taken to produce the needed effect/product/site, date them and then try the steps when Sally isn't there.

I have concentrated on the goal of learning IN MY WAY. I learn best visually, then write ideas down and try it from my notes. Under pressure I really "down-shift." It takes me MUCH longer to learn (if I really ever do!). Most of the time I just muddle my way through it and then finally somehow get an end result , but have no idea how to replicate it. I am always just glad to be done and not to have looked like an absolute fool."

Reflections of the computer technology mentorship

"I am not intimidated by the computer any more. I no longer feel I might ruin the computer, nor am I afraid I will break something. I was worried I would display my ignorance to humanity. I felt the consequences of not knowing were great...especially in the eyes of others--I felt I was losing information in the fast-growing educational technology field at an alarming rate. The mentorship provided instruction and interpretation in a meaningful way. This mentorship helped to bridge the gap. The mentorship was a match for my learning style. I was able to take risks and pursue new ideas. This is very important. Sally was able to adapt to my learning style and make technology important to me. In the absence of threat, I was able to reduce to a low level of stress and engage in new learning that was of benefit to my teaching immediately!

The purpose of a mentorship is to scaffold-to build meaningful experience (Vygotsky, 1933). I liked Sally's role as mentor. She operated under, ' I'll be there for you...Your level of progress is your own. Your rate of learning is OK...I have no expectations for you!'

I needed new skills in small increments. I needed time to process those skills. I needed hands-on experiences. I don't do well with "tell me." I'll lose it otherwise. The regularly scheduled weekly hour was perfect. I knew this was my time to ask questions, to bring my concerns to Sally. It didn't encroach on faculty time. We agreed on "our time" together. There was a starting and ending time. This was a safe environment.

In summary, I've learned that just a little information to open up a vista of opportunities. There was so much I didn't know. It has been a great rapport builder with my students! They have thanked me for the personal attention I have learned the power of Power Point®. I imagined uses and can now explore new uses for meaningful, interactive presentations in class. It added 'class' to my presentations. It has given me vocabulary and new language. Knowledge is power! You hear so many computer terms thrown around...file, folder, attachments, disk, server, upload, download, etc. I can not only name but now use technology terms. I learned in privacy, not in a class or a workshop. We had a chance to talk and to relate this to my personal and professional needs."

The Mentor's Perspective: Building Personal Knowledge and Skills

"Our mentorship began by establishing 'spontaneity and personal fit.' This was a mutual choice for us to work together as mentor pairs (Clemson, 1987). I provided Carol with the freedom to ask any question, figure things out on her own, and establish new skills with technology in her teaching and communication.

Indeed, she has learned new skills in technology. In summary, she has learned specific functions of e mail, word processing programs, files and folders, and management of information on disks and the hard drive. She learned about Power Point® software within the context of presenting content, not as a substitute for overhead transparencies. She practiced using a laptop and LCD panel to present her program to various audiences.

Using Inspiration 4.0® software for brainstorming, she increased the skillfulness of her students using graphic organizers. She searched the Internet for information, bookmarked valuable websites, ordered books from http://www. amazon.com, and learned about technical terms. She was introduced to Hyperstudio® as an authoring tool and has not only begun to experiment with it, but has a useful purpose to create a stack of book sharing slides from each of her students. Last but not least, she learned how to turn off her computer by crawling under her desk.

Clearly, her reflective journaling describes not just what she learned, but the ways in which she learned. I see that she is figuring out solutions to problems on her own."

Integrating new learning in a professional context

"In the process of learning new skills, Carol acknowledged that autonomy and self-reliance were powerful learning tools. Her journaling gradually progressed from episodes of needing help, asking for assistance, and calling the department experts to making attempts to solve problems herself. She began using more specific technology vocabulary and credited herself with learning and using skills.

An "optimal match" is based on the principle that learning occurs when there is an appropriate match between the circumstances that the learner encounters and the schemata already assimilated into his repertoire (Hunt, 1961). Beginning with conversations about her experiences and needs in using computer technology in teaching and learning, we began with her level of interest and progressed gradually to exceedingly higher levels of complexity. The pace of Carol's technology mentorship was adapted to her capacity and knowledge. (Robinson, 1983).

Carol did not learn skills in isolation. To learn Power Point®, she compared Vygotsky and Piaget to illustrate methods of teaching reading. To learn Internet search skills, she found thematic units and ordered literature online. To communicate with her students, she used e mail, word processing, and various software programs."

Reflecting on the learning process

"Hawkridge (1983) summarizes that schools primarily adopt technology for *social* and *vocational* purposes to be sure learners are aware and unafraid of using technology. They know students should understand computers and their role in society. They want students to implement technical skills for employment in the twenty-first century. While Carol began the mentorship semester with social and vocational goals in order to overcome a perceived lack of skills, she finished the semester, using technology skills as teaching tools to influence the quality of learning in her classroom.

Hawkridge (1983) states that few schools implement technology with a *pedagogical rationale* in an effort to understand that there are known advantages to using computers in learning as compared to traditional methods. Fewer still use technology with *catalytic rationale* hoping to reform teaching practices or to make desired changes in student learning.

Carol's final product, a Technology How-To Notebook, archived her new technology skills and interesting ideas from our mentor experience. She has entered process steps in order to help her remember what she has accomplished. Next, she noted an application of each new skill to her Reading/Language Arts teaching and learning. Entries are dated in the order that she learned them during our mentoring sessions. They are for her, 'real life' experiences that fit her schemata of learning in an optimal learning match."

Conclusions

In reality many teacher preparation programs do not have sufficient faculty support in order to use technology in teacher education preparation. Encouraging teacher education faculty to use technology in teaching and learning is possible using effective mentoring as an optimal match to increase technological competencies. One-to one mentorships can provide cost-effective, personally-rewarding experiences for faculty with motivation and freedom to progress at their own pace. A mentorship team can explore and investigate responses to individual technological needs, address challenges of complex and open-ended problems, and rely on inquiry and invention.

As Harrington (1991) suggests, there is a difference between preparing teachers to use technology and using technology to prepare teachers. If we only prepare teachers to use technology, we limit the conception of the role of technology in education. University-level education faculty must be empowered to take more responsibility for both acquiring technological competencies in order to improve the capabilities of their preservice students.

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