

TECHNOLOGY INTEGRATION THROUGH STAFF DEVELOPMENT
by
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A Thesis Submitted in Partial
Fulfillment of the Requirements for
Master of Science-Curriculum and Instruction

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THE UNIVERSITY OF WISCONSIN-WHITEWATER
December 30, 2007

The University of Wisconsin-Whitewater

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Abstract of Thesis

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Staff Development

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How does staff development in education insure that all learners meet the intended learning outcomes? At the time of this study most staff development for teachers was designed to get as many learners as possible familiar with a particular skill or concept in a one-shot workshop. There was no system to meet the needs of learners who did not understand the concept the first time taught. This study was to find out how teachers would respond to a more sustained and continuous form of instruction, emphasizing their individual learning needs after a technology staff development workshop.

Data were collected through interviews conducted before and after a staff development workshop that provided two teachers with individualized continuous technology training. Observation notes were used during this follow-up training to corroborate my interpretation of the interview data.

Both teachers benefited from sessions that met their technology needs. The more a session was tailored to meet their technological needs, the more the teachers integrated technology into their respective curricula. Each session was designed to reinforce and build on skills learned during the previous training session. Because of this continuity the teachers were feeling more comfortable using a computer and they achieved a deeper understanding of the skills taught.

Data collected through pre- and post-technology training and mentoring interviews produced three themes. They were the comfort level of the participants, the benefit of continuous training and the integration of technology into the curriculum with continuous training. Integration of technology happened as the participants felt comfortable enough to share their areas of weakness and as they became aware that there

was an instructor flexible enough to meet their needs. There were long gaps in between training sessions that had a negative impact on the progression of the participants.

With mentoring, the teachers successfully integrated technology into their curricula through software evaluation. One of the teachers previewed and bought reading software to meet the needs of below level learners and above level learners. The other teacher started to take her students to the computer lab to supplement grade-level curricula with technology. She began by having the students do Internet research on two major topics in Life science. They also learned how to incorporate technology into their curricula through training in the use of software such as Microsoft Office and Internet research.

Results of this study suggested that staff developers would be more successful if they created technology learning committees that would increase the comfort level of the participants by addressing their needs, and conducted supplemental technology mentoring sessions like one-to-one small break-out lessons or partner guidance sessions for technology integration.

Chapter 1

Introduction

Most staff development in education is designed to meet the needs of a general audience of learners. It is a cookie-cutter approach that focuses on getting as many learners as possible familiar with a particular skill or concept. Most staff development occurs in one-time only training with no follow-up to ensure that the participants learned the intended material (Sparks and Hirsch 1999). The comfort level of the participants is not a consideration either (Cohen & Gallbraith, 1995). Learners are then accountable for the material and in most cases of staff development, required to display synthesis of the information. Generally, it does not take into account the levels of the different participants, nor is it a sustained development plan that builds on previous skills. A certain result is that some participants do not learn as much, nor do they acquire the intended learning skill. This results in less of a sense of ownership of the material, which causes less incorporation of the intended skill into the curricula.

Two particular areas of concern with current, inadequate forms of staff development are the comfort levels of the participants and the time frame in which staff development occurs and accountability of meeting the different learning levels of the participants. Generally, staff development takes place after school or on a weekend. These training sessions happen in one-shot approaches where a great deal of information on a skill or concept is covered. There is no follow up to the training provided, and at times teachers need to use the skill in their classroom. What system is there to meet the needs of learners who do not understand the concept the first time taught? How does staff development insure that all the learners meet the intended learning

outcomes? There are gaps in staff development being continuous, meeting the needs of all the learners and building on skills taught in previous learning sessions.

Staff development in technology follows the same kind of inconsistent path. The goal of staff development in technology is to meet the needs of diverse populations of students in a global information age. How are teachers using technology as a way to supplement curricula supposed to apply a technological skill that was presented to them only once? What if they didn't grasp the skill the first time? They are then held accountable for applying the skill into their curricula. Research identifies the conditions of effective technology implementation in schools. They are based on models and templates that promote change like Grappling's Technology and Learning Spectrum (Bernajean Porter Consulting, n.d.) that concentrate on the learner going through stages of technology use. A successful staff developer gets the teachers to one of the three levels of applying a skill into their curricula, and ultimately wants to get all the teachers to the top level. It is a way to avoid the cookie-cutter approach and acknowledges the variation among individuals who participate in staff development.

This qualitative study sought to provide knowledge that may provide some informative direction for staff developers who want to promote effective technology implementation based on models of successful staff development facilitation. It sought to examine the impact of continuous staff development on two participants in technology during a ten-week period. My role was a participant who helped facilitate learning and as an observer. This was subsequent to a full staff development session at St. Michael's Catholic School in Samman, Wisconsin¹. The school serves children in kindergarten through eighth grade. Both participants received pre- and

post-technology training and mentoring interviews that were coded for emerging themes. These themes were increased technology integration in the classroom through continuous training based on an established time frame, the comfort level of the participants, and technology integration into the curricula.

After an all-staff inservice the researcher chose two participants, one at the first grade level and one at the eighth grade level. Each teacher took an initial interview, that helped determine what their needs and anxieties were, what technology skills they wished to learn and how technology might be integrated into their respective curricula.

The following questions guided this study:

1. Will sustained and continual teacher training of ten weeks in technology result in increased integration of technology into the curriculum?
2. How does continuous technology staff development encourage integration of technology into the curriculum?

This study, therefore, is important because of instructor-student communication and learner accommodation. These are two of the many ingredients needed for technology acquisition. Diverse learners at all different levels of technology fluency need successful staff development. Certain situations may not have any staff development or differentiated staff development that has a flexible enough curriculum of skills to meet all learners' needs.

This research examined a parochial school's technology staff development. It yielded results that were consistent with current successful technology integration strategies. It also yielded issues of technology anxiety and inconsistency in training. No other research has looked as closely at the process from the perspective of a small school of this type. Issues of inadequate

hardware and support are much more evident here than in other schools and districts. An examination of the effect of staff development on two teachers in this kind of school provided some useful advice for technology staff developers on establishing the comfort level of the two participants and how it relates to integration of technology into the curricula.

Chapter 2

Review of Related Literature

Staff development has been called many different names such as professional development, training, mentoring and inservicing. It is a broad term that has come to encompass many different aspects that all refer to the same thing. All of these names express ideas about learning and development; these names just use slightly different methods to achieve the same purpose, which is the professional and personal growth of the participants. This study used the following definition of staff development: staff development is a formal or informal way to help teachers learn new skills, develop insight into their teaching style and content knowledge, investigate new understandings of content and resources, and collaborate with other professionals. For the purpose of this literature review these names are summed up into the phrase *staff development*. It is my intent to use staff development and professional development interchangeably for the purpose of this report.

The research on effective staff development falls into two areas, staff development and mentoring. This literature review shows criteria for effective staff development. Part of the research is based on adult learning theory while some is from surveys of teachers on quality professional development, some from effective mentoring programs, some from professional development programs and studies that occur consistently over a set period of time.

Traditional forms of staff development have focused on educating many learners rather than meeting learner needs on an individual basis. These forced opportunities, sometimes offered in one-shot sessions, do not help the learners achieve the individual goals each brings to a professional development session. Aligning district needs and teacher needs would be most beneficial in integrating technology into the curriculum. If professional development is to meet the needs of the participants, why are the learners' goals not shared in developing the outcomes for the sessions?

Theory of Technology Implementation for Schools

Research on technology implementation is built on a shared school vision that prepares students and staff to efficiently function in a technology-based global society. One productive model of this is the North Central Regional Educational Laboratory (NCREL) enGauge framework, which outlines the steps and skills necessary to efficiently and effectively use technology to achieve specific goals. It highlights 6 skills necessary for successful technology integration. They are:

- Demonstrate a sound conceptual understanding of the nature of technology systems and view themselves as proficient users of these systems.
- Understand and model positive, ethical use of technology in both social and personal contexts.
- Use a variety of technology tools in effective ways to increase creative productivity.
- Use communication tools to reach out to the world beyond the classroom and communicate ideas in powerful ways.

- Use technology effectively to access, evaluate, process and synthesize information from a variety of sources.
- Use technology to identify and solve complex problems in real-world contexts (NCREL 21st Century Skills for Technology Literacy).

Grappling's technology and learning spectrum assesses technology integration through three stages. They are technology literacy uses, adapting uses and transforming uses. These provide a clear description of technology integration phases and support indicators that generate knowledge on essential skills that is supported and measured for all teachers. Each of the three phases has a focus and a measure of the learner and staff. It is a good data-driven way to attain knowledge for good staff development practices that will facilitate positive results (Grappling's Technology and Learning Spectrum, 1995).

Adult Learning Theory and Professional Development

Research on professional development related to adult learning theory takes into account the unique experiences each adult brings to learning. The research has investigated how adults became life-long learners as well as learning being individual and unique to each learner. Based on a survey of research findings on adult learning that can be applied to the design of effective professional development programs, Speck (1996) developed criteria for effective staff development. These criteria serve as a good frame of reference for programs that teach adult learners and they account for the individual needs of the learners.

1. Adults need real-world applications. The training will have more meaning to the participants if they feel as if they can use what they have learned in the workplace.

2. Adults want to be treated as competent professionals. Participants need some control over the specifics of the what, how, why, when and where details of their learning.
3. Adult learning involves egos. Professional development opportunities should be structured to allow support from peers and to reduce the fear of judgment while participants are learning to apply new skills.
4. Adults need constructive feedback on their efforts to learn and apply new skills.
5. Adults benefit from professional development activities that allow them to participate in small-group activities that provide opportunities for application, analysis, synthesis and evaluation.
6. Adult learners are unique individuals with a wide range of skills and experiences. Individual needs and differences must be accommodated in the professional development planning and implementation.
7. The transfer of learning must be facilitated. "Coaching and other kinds of follow-up support are needed to help adult learners transfer learning into daily practice so that it is sustained" (Speck, 1996, p. 35).

Galbo (1998) described 20 key elements of effective staff development also based on adult learning models. Because adults are unique, Galbo notes, they have personal experiences that shape their learning. The 20 elements touch upon those needs and how ongoing professional development should focus on learner ownership and life-long learning. For example, the individual growth and improvement of the adults should be facilitated by systematic support, participation and instruction. Professional development goals that are shaped by people involved in the school, like teachers, are flexible enough to meet their needs and will more directly affect

curriculum. One of Speck's concepts was learning needing to be applied within the workplace of the individual. Different from Speck are two of Galbo's Key elements that are of relevance to this review of related literature. The first one is professional development is an ongoing process not a "one-shot approach. The second, all educators should be life-long learners (Galbo, 1998).

In 1999 Blasé surveyed 809 U.S. educators to identify their opinions about effective staff development. Part of the survey takes into account the personal experience of the learner, but does not account for adult learning that specifically focus on what the learner wants to specifically achieve. The study illuminated the following areas of concern with instructional leadership in the 809 educators' responses (Blasé, p. 5):

1. The study of teaching and learning
2. Collaboration
3. Coaching
4. Action research
5. Resources
6. Adult Development

New technology is being invented every day, as are new ways to gain and access information. According to one school district administration, namely Oswego, staff development plans should recognize the changing face of technology and keep the learning continuous.

"These changes, and more yet to come, require teachers to regularly update their familiarity with the technologies of information and communication in order to adequately prepare students for their professional and personal lives" (Oswego School District, 1997). This plan elaborates the

idea that as technologies continue to change, there needs to be a way to ensure opportunities for systematic, continuous staff development for effective use in the classroom.

Another source that supports on-going staff development is the CEO Forum in Education. According to the CEO Forum (1999), schools and districts should provide faculty with on-going professional development that supports integration of technology into their curricula (CEO Forum in Education, 1999). Supporting curriculum with this staff development would increase integration of technology, if it were able to meet the needs of a staff at the district level and on a one-on-one level.

Another plan, similar to Oswego's in that it emphasizes the continuous and ongoing nature of effective staff development is the North Central Regional Educational Laboratory's (NCREL) Technology Connections for School Improvement Planners' Handbook (1999). This handbook offers a comprehensive plan on developing a technology vision policy and infrastructure. In it, the authors describe a multi-strategy approach to professional development rather than a one-model-fits-all kind of thinking:

Hands-on training, long-term study groups, online courses, peer coaching, and modeling each has its place in strategically meeting teachers' particular learning needs. The one strategy that is not effective is sending teachers to one-shot or off-site inservice workshops (McNabb, Valdez, Nowakowski, & Hawkes, 1999, p. 53)

In addition to identifying criteria for success with staff development, some researchers have identified reasons for failure. Sparks and Hirsch (1999) describe failure in professional development opportunities for teachers as being partly due to "one-shot" workshops with inconsistent courses not linked to school or district goals, limited in-service opportunities, and

isolated course work not related to the classroom. Teachers can gain college level credits or district clock hours without using the content and skills acquired to change their teaching (Sparks & Hirsch, 1999). The National Plan that Sparks and Hirsch highlighted is the need for staff development to be “sustained, rigorous, and cumulative” (2000, p. 4).

A similar article published in July of 1995 by the U.S. Department of Education Professional Development Team highlighted criteria for effective staff development. Three of them are relevant to this study because it focuses on technology integration into the classroom. One promotes continuous inquiry and improvement that is embedded in the daily life of schools, the second demands that substantial time being devoted by participants, and the third requires that a program be driven by a coherent long-term plan (National Awards Program for Model Professional Development, 1995).

One common thread in the attempts to identify criteria for success is to align objectives with district or school curricula (NCREL, 1999 & National Awards Program for Model Professional Development, 1995). The plan must have well defined objectives that participants understand their relevance. As noted by the CEO Forum, “The best chance to achieve results is to develop a long-range plan with pre-defined, widely endorsed goals and objectives, including the necessary resources” (CEO Forum, 1999, p. 9). A long range plan with goals established is beneficial for two reasons. One is the objectives being grounded in curricula which helps the learners find relevance to the staff development plan and the other is the well defined objectives. These objectives laid out in a timely fashion helps learners build on skills they had learned previously.

Existing Technology Staff Development Program

Like Oswego, Milwaukee Public Schools has staff development opportunities for all Milwaukee Public Schools staff (2001). However these opportunities are offered in one shot sessions. Because technology coordinators are responsible for being the network and systems specialist, tech troubleshooter and teach all the students at the school computers, there are mandatory inservices for them. Two major ones are offered once a year, over a two-day span of eight hours each with an hour and a half break each day. Each of the classes has a maximum enrollment of 15 and participants have to be enrolled by the end of August. If one misses the enrollment deadline, one has to wait an entire year to take it again. With around 300 schools in the district, there are a great number of technology coordinators who need training and very limited opportunities to get training. In addition, to receive release time from one's school can also be difficult.

One of the classes, Macintosh Troubleshooting, is designed to give hands-on practical experience in troubleshooting Macintosh workstation and printer problems. Here is a breakdown of the class:

Participants will learn about: connecting workstations to Ethernet networks, connecting printers to networks, installing Internet and 3rd party software applications, setting up control panels, installing RAM chips and Ethernet cards, using tools to fix/prevent hard drive problems, installing a clean system folder, connecting external devices (scanner, camera, zip drives, etc.), when to send in a repair requisition to Facilities and Maintenance (Staff Development Opportunites, 2001).

The other class, Apple Network Services, covers the fundamentals of Apple Networking. Participants, in groups of two or three use three computers: an Appleshare IP server, administration/model workstation and student/teacher workstation. This is designed to simulate a technological environment at a school.

Different from the one shot approach in Milwaukee Public Schools is Winston and Creamer's (2000) who elaborate on the need for regularly scheduled staff development. Both Winston and Creamer and Sparks and Hirsch's (1999) studies show and sustain that professional development needs to be ongoing. In Winston and Creamer's words:

Each supervisor and those who are supervised should have regularly scheduled one-on-one sessions for the sole purpose of examining progress in meeting goals, discussing emerging issues or priorities, exchanging views about current activities, identifying potential "hot spots", and revising agreed-on goals.

(Winston and Creamer, 2000, p32).

The Kentucky Department of Education developed an extensive program evaluation in 1999 designed to improve Kentucky's educational reform efforts. This program, which incorporates Blasé's characteristics of effective staff development called for each school to submit an annual professional development plan based on six criteria:

- (a) a clear statement of school or district mission, (b) evidence of representation of all persons affected by the professional development plan, (c) evidence of application of needs assessment analysis, (d) professional development objectives focused on the school or district mission and derived from the needs assessment, (e) a professional development program and implementation strategies designed to support school or

district goals and objectives, and (f) a plan that incorporates a process for evaluating professional development experiences and improving professional development initiatives (Daniel & Craig, cited in Borko, Elliot & Uchiyama, 1999).

Like Blasé, this evaluation offered districts the opportunity to perform needs assessment analysis with objectives that were determined from that assessment. The learners personal experience and needs were assessed during the analysis and goals then created from there.

The four schools that participated in Kentucky evaluation developed extensive professional programs specifically aimed at meeting the needs of teachers and students. More importantly, “all four schools exhibited a strong commitment to professional development and a belief in the importance of ongoing support for teacher learning” (p16).

Another policy statement or set of recommendations prepared by researchers at the North Central Regional Educational Laboratory (NCREL), similar to Kentucky’s, was to develop a preliminary framework for assessing professional development. The framework used five questions as a guide for helping to change state policy on professional development and assessing the connection between professional development and student outcomes. The most relevant to this study is “Do state policies on professional development recognize the complexity of improving student outcomes?” (St. John, Ward, & Laine, 1999, p 11-12) All of the questions are relevant in some fashion, but this one recognizes the diverse learning styles and personal experiences of students, similar to Galbo’s (1998) criteria for effective adult learning.

According to Hammond & McLaughlin in 1995, successful reform efforts depend greatly on teachers learning new skills and new knowledge. One of the six characteristics of successful professional development is “sustained, ongoing, intensive, and supported by modeling,

coaching, and the collective solving of specific problems of practice” (p 598). This is important to note because as teachers gain more skills there needs to be a sustained time-plan for the teachers to get follow-up and help.

Cadiero-Kaplan (1999) developed a four-phase technology staff development project to help administration at Ceasar Chavez Elementary School in San Diego. Its purpose was to develop a building model of staff development that would help the integration of technology into the curriculum. A building model means that it is at the level of an individual school, which could be used as a template at other schools. The project was aimed at developing a basic computer expertise among the teachers on school software and multimedia equipment. The four phases of Cadiero-Kaplan’s (1999) project were as follows:

Phase 1: School wide In-Service Training Sessions

Phase 2: Weekly e-mail correspondence

Phase 3: Technology Training Trees

Phase 4: On-site Workshop Series

Cadiero-Kaplan concluded that this was a good program for many reasons. One was that the teachers were trained on software and equipment available at the school that they could use in their classrooms. Another reason was that the project sought to develop a common computer knowledge base for all the teachers as opposed to having teachers at different computer knowledge levels. The training trees were a good support system and facilitated staff development occurring on a continual basis. The participants were able to get help on questions through a support system of weekly email correspondence and on-site technology trainers.

The Mentoring Relationship

Mentorship, like staff development, promotes the professional and personal growth of the participants. It is one way of instruction and support. It can be a one-to-one relationship or one person serving as mentor to a smaller group of learners. Participants set and attain short and long term goals and facilitate continual professional learning and growing opportunities. Mentoring develops a learning atmosphere of nurturing and guided relationship between the mentor and mentee. It takes place over a sustained period of time where the people involved meet regularly. Though staff development can happen on an individual level, mentoring occurs more frequently on an individual basis rather than a group setting. "Mentoring is a one-to-one interactive process of guided developmental learning based on the premise that the participants will have reasonably frequent contact and sufficient interactive time together" (Cohen & Gallbraith, 1995).

The mentor/mentee relationship can be a powerful tool for growth and experience and aid the in the professional development of both participants. McGee (2000) investigated the effects of preservice teachers in a technology course in which they mentored other educators about technology. The participant preservice teachers were required to keep an ongoing email relationship with the course instructor in which they reflected on each mentoring. The study examined patterns among the mentoring experiences of the preservice teachers. Most of the mentees in McGee's study proposed an interest in a specific software application or a skill goal that they wanted to work on with the mentors which helped the mentor set a goal to be prepared for the sessions (McGee, 2000, p 3). This allowed people to work with the mentors and opportunities to build on some prior knowledge or skill of the mentee. The mentee had enough prior knowledge to select a particular type of software that could help build on their previous

learning experiences. Because the tasks each mentor/mentee shared were open-ended, the mentees were able to learn what they wanted to learn.

In a similar study, McNally and Martin (1999) examined how mentors helped novice teachers start to develop their own visions of teaching through a focus of goal setting. It also sought to gain a deeper understanding of the methods experienced mentors used to challenge and support novice teachers. The mentors cited many ways to give support to novice teachers. Some of them were “making time, being approachable and listening; and addressing their individual needs” (McNally & Martin, 1998). The findings suggest that trust and rapport were necessary components for fostering a positive mentoring relationship. This trust and rapport was achieved through continual support from the mentors. “Support is a key factor in building trust and rapport and is therefore an important building block for the sharing and risk taking that is a significant element of the challenge process” (1998)

Peluchette and Jeanquart (2000) measured the effectiveness of mentors on University professors in three stages: assistant professor, associate professor and professor. The data supports that mentors have a positive impact on the careers of the professors both personally and professionally than those with no mentors at all. Assistant professors in the early stages of their careers had the highest career success with mentors with regard to research and scholarly productivity. Associate professors in the middle career stage with multiple mentor sources, were more productive than professors with no mentors at all.

A point of interest in this study is the value of mentoring at the University level with professors. This mentoring relationship includes mentors from sources within the profession and outside the educational workplace. An aspect relevant to this study is the need for formal

mentoring programs. Peluchette and Jeanquart (2000) elaborate on the need for formal mentoring programs:

Organizations in the United States must recognize the importance of the profession as a source of mentoring and provide the necessary resources to aid in the development of such relationships, particularly for professionals in the early stage of their career.

Dedication to ongoing learning fosters the development of the mentee in personal and professional growth. The mentor offers assistance, experience and knowledge to aid in the professional development of the mentee. The mentee then is on a sort of journey of self-development. This commitment to and engagement of mentoring partners seems to be a primary key element in establishing, maintaining, and fostering successful mentoring relationships.

A study in 1997 by Jones and David discusses theoretical approaches to mentoring. *Good mentor* is a term developed by teachers involved in mentoring in England. Effective mentors incorporated practical help for their mentees such as providing guidance, feedback and modeling (Jones & David, 1997). “Mentors who provided regular time, immediate feedback and a sense of availability were seen as most effective.”

An earlier study by Haggerty (1995) looked at mentors in school and tutors in a university. Haggerty analyzed patterns in discussions between mentors and student teachers thinking about their own practice. The data about the discussions show that the mentors were less successful in sharing their methods for decision-making and more focused at describing their own teaching. The data also shows that mentors drew upon their own teaching experiences in discussions with student teachers to the point of dominating the conversation. The data suggests that mentors should focus on the development of the mentee rather than reflecting on their

teaching experiences. Haggerty (1997) suggests that the chosen mentors had not stuck to the criteria of good teaching practice when dealing with student teachers agreed upon at the beginning of the study. There was a real lapse of communication between the university and the mentors and affiliated schools between what the mentors actually did and what they were supposed to try to accomplish.

A relevant point in this study is that the mentor teachers began to dominate discussions with their student teachers based on their past teaching experiences. Staff development organizers and facilitators suffer from this condition as well. They often are so focused on their own agenda that they either do not listen to the participants needs or try to be the person who fixes everything for them. They need to be enablers.

The relationship of the mentor and mentee offers a unique opportunity for a partnership to be formed with teachers on infusing their curriculum objectives with technology. This kind of partnership can build on the teachers' prior knowledge and help teachers gain technology skills that can be used personally and professionally.

There is a considerable amount of research on effective adult learning, effective staff development and professional development design. There is a gap, however, in knowledge specific to technology staff development on meeting the individual needs of the teachers. The studies cited above suggest that if those could be met on an individual level, with the teachers also having ownership in what they learn, the result would be higher levels of technology being integrated into teachers' curriculum. More specifically, let the teachers share their ideas and have the training focus around their needs.

Methodology and Context of Research

The aim was to find out what would happen when one-on-one mentoring was used with technology training sessions to help two teachers supplement their curriculum with technology. The intention was to increase technology integration into the curriculum and increase their technology practice and integration. The specific content of what the participants would learn depended on each of the individuals participating. There were three guiding questions used, but many personal problems emerged with the two participants that affected their learning. The question I sought to answer was:

- 1) Will sustained and continuous technology training and mentoring with two teachers increase comfort level with technology and increase technology into their curricula based on their needs?

Staff development practices at this school consisted of one or two sessions a year that would last anywhere from one to two hours. There was not any district professional development of any kind. For this study however the professional development was aimed at being continuous and based on the needs of the participants.

The study started with an all school professional development session during the fall of 2000. The first training session I conducted for the teachers was designed to meet their technology needs based on skills they deemed necessary for their curriculum. It was a requirement for all of the teachers to attend. From the pool of participants it then was narrowed to two teachers who wanted to continue participating in the study. Data was collected from both teachers through pre- and post-technology training and mentoring interviews and field notes. The pre- and post-technology training and mentoring interview data was coded to generate categories for themes

and trends. These categories were then analyzed to generate a theory of what happens during individualized mentoring and the first staff development training. The selection process is explained later on.

Place

Saint Michael's school is a small Catholic school in Samman, Wisconsin. There are approximately 110 students in the school ranging from grades K-8. Prior to its demolition in 2005, the school was an old brown brick building. Grades K, 1, 2 and 4 are on the first floor and grades 5-8 are on the second floor. The main office was on the floor with grades 1-4. Also adjacent to the main office was a room which hosts staff mailboxes and office supplies. The third-grade classroom was in the basement along with the library, which doubles as the cafeteria and art room. The art room was off in another corner of the cafeteria. This room was also used as a storage facility for playground equipment such as balls, jump ropes and bouncy ball things that one sits on and bounces around.

No food is cooked at the school. Lunches are brought in from the public school every day. The library is a sectioned corner of the cafeteria where there are a few shelves with books. The library is not sectioned off by any kind of partition or shelving. The teacher's desk in the library has two plastic covered computers. One of them is a Macintosh LC520 and the other is a Mac Performa 6200CD. Each individual teacher is responsible for checking books in and out and taking classes to the library. During the weeks that I conducted my research, I never saw the library area used. I was there two or three hours each time I was there.

The classrooms are fairly spacious considering that the average student population in each classroom is 10-12. All the rooms are carpeted. Each classroom received a computer during

the summer of 2000 that just became Internet operable during the second week of January of that year. Each classroom has a different computer model in it based on what each teacher wanted.

The only software on the computer was Netscape Navigator and Microsoft Works.

The computer lab has many different computers and monitors. All of the computers except two have 8 or 16 megabytes of random access memory. The following list is an inventory of the school computer lab. The level of Pentium in the computers were very old and processed extremely slow.

<i>Computer Characteristics</i>	<i>Monitors</i>
• 10 Presario Prolinea 4/66 computers	10 IBM professional system 2 monitors
• 2 Presario 150S computers	2 MAG monitors
• 3 Desktop Pro XE 560 computers	1 NEC monitor
• 1 KC computer	2 Samtron monitors
• 1 KC 97 computer	1 AOC monitor
• 1 Dell Optiflex computer	1 Packard Bell monitor
• 1 Packard Bell Legend Compter 10cd	3 DTK monitors
• 1 Compu Add Express 466 DX2 computer	1 NEC multisync monitor
• 2DTK computers with Microsoft Office 2000	1 NEC SVGA monitor and 1 NEC multisync 2V monitor

Classroom computers vary from room to room, but the eighth-grade classroom had a Compaq Presario MV 500 with a Deskjet 540 Printer. The fourth-grade classroom computer was a KC 97 computer with a CTX monitor and no printer.

Methods and Procedures

Time Span The data were collected during a six-month period. The work began by my facilitating an all-staff inservice for two hours on a Wednesday afternoon for staff to increase their use of the Internet in their curriculum in October 2000. During the first staff development session on incorporating the Internet into teaching, I explained my case study. Then from there I was to choose two teachers to be subjects.

Access to site. Originally I had hoped to conduct my research at the school at which I had previously taught. In early August I met with the principal there and explained my proposal and what I hoped my research was going to be about. I had conducted a staff development session there in November of 1999, to fill a requirement for a class I was taking. I felt there was a need for the school personnel to have some training on how to incorporate the Internet into teaching. It proved to be a very successful training session, and I received emails throughout the year from excited teachers using the ideas they had learned in the session. I did the same lesson for Saint Michael's. So I thought this might be a good situation in which to conduct my thesis investigation.

After discussing the proposal with me, the principal suggested that I contact the principal at Saint Michael's to see if I could do something there. That very day I contacted the principal by phone and explained my thesis project and that I needed a school in which to conduct research. He was very interested about my idea and agreed to meet with me on the Friday following the

first week of school. When we met, he read over my proposal and felt that his school could benefit from my research.

I met with him in early September to set up a time to facilitate the staff development session, for the staff, geared at incorporating the Internet into their curriculum. We agreed that the early dismissal day on October 3 would be a genuine opportunity for the staff to get some staff development in technology. Participation in the technology training was a designated staff development time. During this meeting he shared some of his frustrations. He felt that the computer lab was not being used to anywhere near its capacity. He would have liked to see more technology integration at his school, but because of the ongoing computer lab situation the teachers didn't use it. With so little memory on the computers and lack of consistent Internet hookup, the range of computer-based activities for students was quite limited. There had been problems with the Internet dial-up at the school. During August there were over 8,000 dial-up calls to the Internet provider costing over \$2000. At that time the school was able to log onto the Internet, but any time a computer in the lab would change sites, the server would start the dial up process all over again. Until the day of the session, the school was not able to get the entire lab on the Internet at the same time. This was the first time the entire staff and the computers in the lab would be on the Internet at the same time. The computers in the individual classrooms were not hooked up to the Internet either.

Selection of Participants

Two teacher volunteers were needed for this case study. The generation of volunteers was hopefully going to come from the first Internet Staff Development session. The principal offered his advice on which teachers he felt would be the most interested. He felt that some teachers

were reluctant to change and did not want to learn any new skills in technology. Others he thought, would not have the time to participate. He did suggest the two teachers chosen for the study, because they previously had expressed high interest in learning about computers. The final decision on which teachers to use remained solely at my discretion. The eighth-grade teacher and the first-grade teacher decided to participate in the study. No other teachers volunteered to participate.

In following the principal's recommendation I applied the following criteria for selecting participants:

1. Had time (supposedly) to work.
2. Deemed by principal to be willing to change and ready to learn.
3. Attended the first session
4. Represented different grade levels.

I wanted to choose teachers from the primary level and the intermediate level because I wanted to see what a primary and middle school teacher would do differently with technology. How does a primary teacher's integration of technology into their curriculum differ from a middle school teacher? My hunch was that the eighth grade teacher would use technology to supplement topics with web research and word processing whereas the first grade teacher would use technology as a resource to supplement classroom lessons on topics being studied. The basis for my hunch came from analyzing the initial interview from both participants.

Introduction of Project at Staff Development Session with Entire Staff

The first thing to do at the session was introduce the project entitled Technology Integration through Staff Development to the school's teachers. The teachers were informed that the

research being conducted would look at the effects of technology integration in part, through the entire staff, and more specifically two teachers. It would take place over approximately a twelve-week period during when I would work directly with two teachers. There would be on site formal and informal interviews that would be coded to open up inquiry and analyze the interview sessions focusing more intensively on single categories.

I let them know that there would be no risk to the staff, including the two teachers participating in the case study. The two teachers would be learning how to incorporate technology into their curriculum based on their needs and what they wanted to learn. I would be analyzing how continuous one on one mentoring and technology training on an individual basis would affect this incorporation.

I elaborated that staff development based on the research I had read was often done in one-shot inservices in which teachers had barely learned the material. I informed them that I felt professional development needs to be ongoing and continual if it is going to be incorporated into the curriculum. Technology staff development was a good example of this.

I explained to the staff that the time commitment was going to be approximately 12 weeks from beginning to finish. I let them know that I would need to see their unit plans and that I was not evaluating their plans nor was I evaluating their objectives or lessons. This disclaimer included in the participant contract that all teachers had to sign before starting. I emphasized that I was a resource and guidance person to help them integrate technology into their curriculum and learn how to use the computer more effectively. I would be a reference and technology mentor who could help them achieve their goals. I could be the person who works on a program where they may have trouble. I could also be the person who helps in the computer lab or researches

questions they may have on a program or subject. I was a resource person who was conducting staff development, I noted in my comments.

Internet Staff Development with entire staff

After the introduction of the project, the teachers took the Computer Ability Profile (Thurlow, 1999). The profile was a self-assessment that assessed the teachers' current ability as users of computers in seven areas with possible scores of one to five, with one indicating a non-computer user, two being limited experience with a computer, three being to use the computer for tasks like word processing, four being to load software and use programs and five indicating advanced and frequent user. The seven areas were basic computer skills, managing computer files, using word processing files, use of other software, use of multimedia cd-rom and educational software, use of the Internet and curriculum integration of computer technology. I asked briefly what some of the teachers' scores were. In the group one reported being a non-user and one reported being an expert. This profile allowed the participants to determine their own level of proficiency. Most of the scores ranged from 1 to 5 on most items, but most of the scores mostly averaged in the middle scoring, which means the teachers had some knowledge and application skills. One teacher rated himself 5 because he developed fantasy football web sites. Another teacher rated herself as 1 because she did not use computers and was afraid of them. She said so upon entering the computer lab. She was confused by all the information that came up when some web sites were accessed, such as banner advertisements.

The objective for the all staff lesson was to have the teachers feel more comfortable using the Internet to support curricula and to demonstrate knowledge of navigating the Internet. After the introduction to the research project, I led a discussion about an Internet package entitled *Using*

the Internet: Your Gateway to the World of Information (1998). This packet explains the following terms succinctly: *Internet, Web Browsers, Search Engines, Web Sites, Hypertext Links, URLs, username, domain.name, edu, com, gov, mil, net, org, Meta-Search Engines and Boolean Logic*. Each one of these terms was displayed with a definition under it with examples. This supported our discussion about the differences between sites. The participants discussed the differences between *whitehouse.com*, a pornographic site versus *whitehouse.gov*, the official site of the United States President and why students needed to know the difference.

Obtaining reliable information from a web site was also explained in the packet. Two of the questions in the packet were related to reliability of information: “what is the source of the information” and “why is the information online.” There were online resources in the packet such as Badgerlink, CQ Researcher, *libraries.edu* and *coolschools.edu*. So this also helped our discussion of knowing the difference between a government site and a commercial site, by allowing the teachers to experience educational web sites. The discussion came about after a teacher commented on going to *whitehouse.com*, instead of *whitehouse.gov*, two sites using almost the same name but drastically different. Then I handed out a packet entitled *Visual Quickstart Guide to Search Engines* (Glossbrenner, 1999). The discussion focused on search engines being essentially huge databases of information that can be retrieved using Boolean logic and key word searches. Teachers were using computers to look at different sites.

The staff-development session used the six search engines identified in the packet. They were AltaVista, Excite, HotBot, Infoseek, Lycos and Yahoo. First we went to *excite.com*, a directory service. We typed in the word *pets* and yielded some six million web sites using the word *pets*. Using Boolean Logic we narrowed our search by typing the phrase *not dogs* after *pets*. This

narrowed the search to some two million. Using Boolean Logic again the search narrowed further by typing in the phrase *no cats* after *pets* and *no dogs*. Then lastly we typed the word *pythons* after the other words and the search narrowed to around eighty sites.

The next step for the teachers was to practice fine-tuning an Internet search on a subject as if they were preparing to demonstrate or search the subject with a class. I wanted them to get some practice using Boolean Logic to limit Internet searches on different search engines. Based on a hunch, I felt that if the teachers could practice using a search engine to research a topic their students might search, they might have felt more at ease incorporating that search engine into their teaching. This hunch was developed when a teacher in a class I was in showed us how to limit Internet searches and then research a topic students might research. Adult learning taught me that adults need real world application of in The training will have more meaning to the participants if they feel as if they can use what they have learned in the workplace Speck (1996).

However, due to the slow Internet connection, advanced Internet searching was not possible due to time constraints. A goal was to have the teachers walk through a search independently using the skills I had done with them. Then they could practice and try it with their class and because they had practiced, they would know exactly where the search would lead them. This worked for about ten minutes and then the teachers started doing their own searches. As the teachers were working, they began sharing how to navigate to certain sites. The teachers spoke, in an all-group discussion, about the different search engines they were on and why they liked or disliked them.

The teachers received 4 Internet site resource packets on math, science, physical education and reading. There were about 100 sites for each subject. I went to yahoo.com and gathered site

addresses and put them into a Microsoft Word document. I did not evaluate each site for content because I thought the individual teachers would find it more beneficial to do their own evaluation of the websites. After an hour and a half the teachers talked off topic, so I deduced that through their off topic conversation was due to their attention span being exceeded. It was also the end of our allotted time for training.

Choosing of Participants

Upon return the following Monday I walked around the school seeing whether people had questions on the workshop or anything related to technology. Almost everyone was happy with what they learned. My impression was that they did not really want to do or learn any more. One sign of this was that a number of them had left right after school. As I walked past the rooms it appeared that the teachers were busy working in her classroom things and really didn't want to spend any time with me. From the hallway I could hear one teacher discussing her feelings with the principal about not wanting to really participate in the study. She and two other teachers had previously volunteered to participate. The literature review on adult learning and staff development led me to believe that either her learning needs were not met, or that she didn't find the information applicable to her situation.

Three teachers actually volunteered, but according to my initial design that the Institutional Review Board had approved, I had to use the data from two teachers. The three volunteers' grade levels were first, sixth and eighth. I felt that the first grade teacher and the eighth grade teacher would facilitate a better breadth of information related to my research proposal questions. That is, I would be able to gain a better sense of what kind of curriculum integration with technology happens in a primary setting and a junior high setting. One of the

participants, named T2, vocalized her feelings about not wanting to give any extra time to this study, other than what she could give at school. So there was a lack of time issue, which will be elaborated on later. The other participant was eager to begin. Looking back, I felt the grade span of the participants was of relevance to this study.

Initially I tried to contact the two teachers via email, but neither received my message. T1 responded to my phone call right away so she and I set up a time to get together for her first interview. It took numerous phone calls and messages before T2 finally got in contact with me.

The mentoring of the two teachers began with an interview designed to get them to speak freely about the technology situation at their school, in their lives and classrooms. I wanted to get some sense of what systems were in place already and what some of their apprehensions about technology were. It was necessary for me to get a feeling for the inter-working of the school related to technology and some of their feelings related to technology. Both were interested in supplementing curricula through a deeper understanding of Microsoft Word. I tailored each session after the first one to address what each teacher wanted to learn.

Data Collection

Data were collected in a series of formal training sessions, interviews and observations. Each of the training times with the teachers lasted one hour. The initial and final interviews took a little longer than an hour. An hour was the time allotment decided on by the participants, though sometimes sessions exceeded that.

Table 1-Training was 9 Total Hours for T1

Table 2-Training was 11 Total For T2

October 3, 2000 entire staff development session	October 3, 2000 entire staff
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	development session
October 8 T1 decides to participate and signs participation agreement	October 8 T2 decides to participate and signs participation agreement
November 9, 2000 initial interview with T1	November 9, 2000 left numerous messages before and after this date to schedule interview
November 16, 2000 training session	November 16, 2000 initial interview cancelled due to T2 being ill.
November 21, 2000 cancelled by T1	Between November 16 and December 1 left around 12 phone messages for T2 to schedule time for initial interview.
November 30, 2000 training session	December 4, 2001 initial interview
December 7, 2000 training session	December 12, 2000 training session
January 4, 2001 met with both people to determine schedule for next few weeks. It was determined that training with both teachers would take place on Fridays.	January 4, 2001 met with both people to determine schedule for next few weeks. It was determined that training with both teachers would take place on Fridays.
January 11, 2001 cancelled by T1 due to back problems	January 11, 2001 training session
January 18, 2001 cancelled by T1 due to back problems	January 18, training session
January 25, 2001 cancelled by T1 due to back problems and did not hear from her at all.	January 25, 2001 training session
February, 2001 no contact with T1 despite numerous phone calls and messages.	February 2, 2001 students in lab with T2 for first time.
March 5, 2001 T1 wants to continue training	February 9, 2001 cancelled due to ice and snow storm
March 13, 2001 training session cancelled at T1's request	February 16, 2001 students in the lab
March 14, 2001 training session with review of capturing images and saving.	February 26, 2001 final interview
March 16, 2001 cancelled final interview at T1's	

request	
March 20, 2001 T1 no show for final interview. Many phone calls were left with T1 to reschedule time.	
March 24, 2001 T1 responds to call	
March 26, 2001 Two phone calls left with T1 to complete final interview	
March 27, 2001 Phone call left with T1, no response	
March 27, 2001 Phone call left with T1, no response	
April 6, 2001 Final interview with T1	

The entire data collection could have been expedited more efficiently and quickly. There was an enormous gap of almost two months in T1's training. So consequently T1 spent time relearning skills she had forgotten. There was also quite a bit of difficulty getting T2 to start her initial training. So her training started off much later after the staff development session conducted in October.

The data analysis methodology was interviewing each teacher with pre- and post-interviews so I could gain a better understanding of how their learning had progressed during our weeks of meeting or not meeting. The data was word processed with a number after each line of interview data. The lines were in numerical order so I could discover themes and trends. The more times I visited the interviews and read them, the deeper my understanding of the themes presented in this chapter. This coding to analyze and interpret the data gave me the opportunity to generate themes and ideas. The data from the pre- and post-technology training and mentoring interviews revealed a number of themes that became evident as the interviews were coded. Many

of these themes overlap with one another and they all tie together in one form or another. These themes will be elaborated on individually throughout this chapter. All my observations involve a growth in technology use and technology integration by the two participating teachers.

Chapter 4

Findings

Three main themes emerged during the duration of this study. One theme related comfort level with flexibility in training to meet the teachers' needs. The more comfortable they felt with their own technology progress, the better the adapting and transforming use of technology. The participants needed to feel comfortable enough to share what they wanted to learn and believe that the instructor was flexible to facilitate their needs. The second theme was the benefit of continuous training. The third theme was the integration of technology into the curriculum facilitated by continuous training. The integration of technology just happened as the training progressed. Gaps in the training did have a negative impact on the overall advancement of the participants. The training proved to be most effective when it happened consistently, focusing on skills the teachers could see themselves using in the classroom.

Both teachers' main curriculum was the textbooks and teacher's manuals they used in their classes. The scope and sequence of the teacher's manual offered a direction that the teachers can follow, but out of necessity, neither of them followed this direction. In one case, one of the teachers did not even have a teacher's manual for a subject. There was no written curriculum to follow, so it was up to each teacher to interpret the objectives of the different subjects and what they wanted to teach within the content of the subject textbooks. The objectives the teachers aimed for were their own and was not set by the school or state. So the

teacher's manual became the pseudo written curriculum. Both teachers supplemented their curriculum with worksheets, books, videos, Open Court Phonics software, flash card games, drawings, science labs, quiz bowls and maps.

The teachers at the school shared ideas with each other, so there was some internal communication for sharing ideas, but that was it. The computer teacher was an educational assistant and was willing to help, but she only worked two days a week and spent a great deal of time trouble-shooting lab problems. Also having recently been diagnosed with breast cancer, she was on sick leave until at least the following fall. This network of sharing did not lead to increased integration of technology into grade level curriculums.

Comfort level of Participants and Flexibility in Training to meet Needs

Both teachers were eager and willing to learn how to supplement their curriculum with technology. Both also benefited from training sessions flexible enough to meet their technology needs, although there was always an agenda for each training session that I thought would be beneficial for their learning that included several skills. If the teachers came wanting to work on a particular skill, that skill became the most important. The more the training focused on the needs they perceived to be important, the more the teacher integrated that skill into their curriculum. Each teacher, at times, would come with an idea or skill they wanted to develop, and the session would focus around that skill and integrating it into their lesson plans. This method of training proved to be quite useful for meeting the teachers' needs and increasing their comfort level.

Both teachers referred to this kind of training in the initial interview. T1 wanted training that was more grade level specific. T2 needed to feel more comfortable when she would bring

her class to the computer lab and get them working on the Internet. So both teachers identified their own needs and what they might benefit the most from. I did not start the training with the assumption of them identifying their own needs, but it actually emerged from the data. T1 described her own need like this:

It's kind of hard because what I need, in technology, is completely different than what the seventh grade literature teacher needs. So I would imagine there could be some general staff development about technology that we could all use, but other than that it has to be kind of catered to K-3, 4 and 5, and then 7, 6 through 8, just like everything else.

T2 explained her own need in this way:

This year if I could feel more comfortable with the amount of time that it would take me to get to the computer room, not have to find a key to get in there and get on the Internet to do their little projects.

There was no logistical problem with T2 using the computer lab. T2 just did not feel comfortable taking her students there. She just wanted to be sure it was worth the effort she was putting in.

T1 and T2's comments during the initial interview led me to believe their training should focus on establishing their comfort level first. Meeting their technology integration needs became secondary. So I deduced that establishing their comfort was the first thing to focus on. Other needs like T2 being able to get in the lab in a timely fashion and T1's technology training specific to grade levels would be addressed as the comfort level increased. This helped set the stage for future successes.

During the first meeting with both participants I actively listened to their perceived anxiety problems and offered reassurance that I would be attentive and supportive to their needs

in any way I could. This proved to be one of the most important aspects of this whole study. Without the participants feeling comfortable, much of the positive progress we did make would not have happened. So like the area in Speck's research (1996) that focused on the accommodation of individual needs and differences in professional development planning and implementation, their individual needs were given first priority. The accommodation of the two teachers' unique needs avoided the problem and was a direct response to Sparks and Hirsch's concern (1999) of professional development being done in "one-shot" workshops with inconsistent courses not linked to school or district goals, limited in-service opportunities, and isolated course work not related to the classroom

T1 came into the first session wanting to find information and pictures on penguins. She wanted to use the pictures and information on web sites for worksheets. This fits with the research showing that teachers first use technology for their own productivity needs before using it with students. This way she could offer more enriching questions and pictures on concepts she was teaching. This was not the agenda for the session, but the training shifted focus to meet her needs. T1 started research on Yahoo using key word searches to narrow the overwhelming amount of information on penguins. From there she was able to look at some web sites on Penguins and find the information she needed.

Once finding appropriate pictures, T1 was shown how to save an image to the desktop and a floppy disk. Saving an image proved to be an ongoing source of training for T1 because she really thought that pictures on her worksheets helped motivate student interest and stimulated their thinking. So her technology training was also meeting her personal needs. Before training started, T1 copied the part of the web page she was at and physically cut out the picture she

needed and pasted it into a worksheet. This skill was taught and reviewed numerous times during her training sessions due to her missing two months for being ill. There were no written instructions provided for her training.

T1 used Microsoft Word and started by inserting one penguin image into a word processing document. She experimented with changing the size of the pictures using the handlebars. After being successful at inserting the first image, T1 started to type text and created a worksheet on penguins with questions on penguin's habitat, diet and feathers. The worksheet was then used in her classroom that afternoon.

At other training sessions, T1 used search engines to look for pictures of Abraham Lincoln and whales. She used some of the keyword search techniques she was shown during training like AND or NOT to limit her field of information. She tried different presidential keywords such as *presidential pictures*, *presidents*, *pictures of presidents* and a few others before finding what she was looking for. T1 did the same kind of keyword search for information on whales. All of the information and pictures she found on both presidents and whales was used to reinforce concepts she was teaching. It was put into a worksheet format for her students. She did not use specific image databases from Google or Searchasaurus.

T1 found it beneficial that the training sessions were open to her ideas. She knew there was an agenda for each class, but she felt comfortable enough to come in and share ideas that she wanted to work on. T1 shared her feelings about the training sessions being flexible enough to meet her needs during the final interview. She described it in this manner: "Like that time I came in and I wanted to work on penguins and you showed me how. And we did that instead of doing what you wanted to do." She described how much that one training session helped her and then

each session after she brought ideas she wanted to cover. I believe T1 would continue training by networking with teachers stronger in technology or through taking a technology class aimed at meeting the needs of teachers.

T2 came to a training session wanting to learn PowerPoint because one of her students did an assignment presentation for computer class. That session focused on training T2 in the use of Power Point. She learned how to create slides with pictures and text, arrange slides, rehearse slide timings and display a slide show presentation. So the students were using the program for note taking and outlining. She also learned how to capture images off the Internet and paste them into a slide and paste Microsoft clip art pictures into a slide. T2 did her first Power Point slide show on American Presidents and then created another one on the Space Shuttle.

Now, in conjunction with the computer teacher, T2 started having the students do Power Point presentations on concepts she had been teaching in Life Science. She had the students type in important information onto slides and arrange them into an outline format using the outline feature. This helped the students remember key concepts she was teaching because they were able to see the information in a slide show format and an outline format. Then the students used the printed versions of their outlines to study for tests.

Using her ability to find and save images from the Internet, T2 found images of atoms on the Internet and developed a three-page brochure highlighting the school's science fair. The brochure went home to all the families in the school. Her students also started developing brochures to describe different features of each body part they were studying. Next year she planned on having the students make a travel brochure on a country of their choosing.

When the teachers learned a new skill they were given as long as they needed during the training sessions to practice. They practiced each skill many times during each session. This drill and practice time gave the teachers a chance to get comfortable with the skill they were learning and it allowed them to commit it to memory. This approach seemed quite meaningful for the teachers and seemed to increase their comfort level. The teachers needed the time to grasp the skill, so by the end of the session they understood it.

T2 explained it in her final interview as wasted time relearning something already learned:

When you don't practice it or use it and then a month or two later you think it might be a good thing to do, it takes up too much of your time to figure out how to do it.

As the teachers progressed through the training sessions they became more willing to share their feelings about what they wanted to learn. My sensitivity to this as a trainer helped the teachers develop skills they wanted. Then, they would use technology more in the classroom. Marsha Speck (1996) wrote about learning involving egos, and wrote that learning involved egos, and that was true in this case. As they felt better about their computer skills, the more comfortable they became and the more they started to use it for curriculum needs.

Technology Integration into the Curriculum

One of the guiding questions for this research was whether or not sustained and continual teacher training in technology would result in increased integration of technology into the curriculum. When the study started there was a lack of technology use at the school, let alone integration into the curriculum. Both teachers expressed a strong desire during the initial interview to integrate more technology into their curriculum. Three main ways both teachers

wanted to integrate technology was by using drill-and-practice, subject-specific-software and Internet research.

Both teachers wanted to see computers used for projects to supplement curricula. T1 wanted to supplement each new phonics skill she taught with some kind of phonics software designed to progress in difficulty as the students' phonics knowledge progressed. She wanted her students to use the phonics software as a resource to supplement what she was already doing in the classroom. T1 also wanted to supplement her social studies unit plans on presidents and science unit plans on animals, with resources she could use to gain more subject information.

T2 described wanting to supplement units on weather, American History and life science. Her students studied Tsunamis, and T2 felt that her students would have a deeper understanding of the material if they could see a Tsunami on the computer or could analyze and track different kinds of storms through various weather web sites. T2 also described having the students look at various body parts such as the heart and lungs and bodily functions on software or web sites. However, it was overwhelming to her to bring her class to the computer lab, turn on the computers and get the class logged on to the Internet. So both teachers had ideas of what they wanted to do, but just did not know how to go about accomplishing those ideas with technology. T1 thought about using technology, just not when planning her lessons.

T1 commented during the initial interview that technology just did not exist in her mind when she was preparing her unit plans. However, she saw technology while she did other things and saw that it was useful. She still claims that she chose not to think about it when planning instruction. "I have to be honest with you, technology probably does not cross my mind." Even though she still said she never wanted to think about it, she still had a strong desire to integrate

technology. The software program she did use was *Math Blasters*, which presented math drill and practice exercises for her students to do. T1 also wanted to use technology in reading. The phonics series she used, *Open Court*, was 30 years old. Many of the reading cards in her set were faded, torn or gone. T1 did use a phonics software program that the school received for free, but she felt it did not meet the needs of her students because it did not progress to higher phonics levels as her students did. So basically the computer was used as a way to free up time for her to spend with other students in reading groups, while the more advanced ones played on the computer. "But really, it's just to free up some time."

One of T1's goals for the training sessions when they started was to find phonics software. She explained that she didn't have the time to research phonics software, but it was something she felt was a need for her students. She wanted something progressive, that would supplement students' learning as they developed. During one of the training sessions T1 was given a software evaluation sheet. She previewed five phonics software programs in the Wisconsin Instructional Technology Resource Center at the University of Wisconsin Whitewater and used the rating sheet to indicate the benefits and limitations of each program. After looking at five phonics software programs she decided on one for her school to buy that would be a good supplement in her classroom or the other materials she used. "That is the only one, that was the one I really liked. It was progressive; it didn't stay on one thing too long." The software was going to be implemented into T1's curriculum starting in the fall of the next school year.

During the initial interview T2 wanted to supplement her lessons with some website learning. After a number of training sessions, she decided to take her class to the computer lab to do Internet research for her American history class. She had a back-up plan, in case the students

were not able to log on. The Internet had been down in the morning because of a problem at the high school, which this school is connected to, so T2 appeared nervous at the start of the class. My goal was to be there as an observer and as support if needed.

The computers were turned on before her class arrived at the lab. There were only eight students in the class so only part of the lab was being used. T2's class had just finished a unit on Inventors and inventions. Two of the inventions they studied were the railroad and the steamboat. Their objectives were to find two websites on the steamboat, research information on the inventor of the first successful steamboat, the year the steamboat was invented and its name. Her students were also to create a poster announcing the invention of the steamboat and create an infomercial explaining its significance in American history.

Another part of the assignment was to come up with another web site and answer questions about a worksheet they were given. The students went to *Dogpile.com*, *Altavista.com*, *Askjeeves* or *Infoplease.com* to search for information on steamboats. From there the students started to narrow their searches looking for the information they needed. Upon finding the needed information infomercials were created in Microsoft Works and clip art was used to enhance their writing with visual images.

The second time I observed T2 she was supplementing her life science curriculum with the students researching *Hemoglobin*, *Leukocytes*, *Thromboplastin*, *Hemophilia* and *RH Factor* on the Internet. The students had completed a three-part test on the circulatory system. One section was written about the vocabulary stated above, another section was oral on the path of the blood through the heart and the last section was to identify organs and the path of blood in a fetal pig. The students were given a worksheet to guide them in looking for information, but

otherwise they conducted their own searches. Many of the students shared new bits of information they had learned about each of the science terms with T2 and an all class discussion developed on *Leukocytes* with the students vocally sharing things they learned from the open searching of different web sites.

T2 took her classes to the computer lab at least once a week after being observed in the computer lab the second time. After a training session that focused on how to use the overhead projector from a computer, she used the projector to guide students through Internet searches as the students followed along on their individual computers. “And then recently I’ve incorporated some computer web site learning on the terms or terminology as an extension of the lesson or reports on history,” she noted.

A student of T2 brought in a PowerPoint presentation on a concept they were studying in class. T2 was experiencing some anxiety about not ever having worked with the program. So one of her training sessions focused on using Power Point. This session facilitated a real-world experience on a skill she could use almost immediately in her classroom. At the very least she was able to understand how PowerPoint works and would be able to look at the slideshow for its content rather than being intimidated by a skill she didn’t know.

T2 started to supplement her lessons with guided searches to specific web sites that helped her students learning. She had begun to use website learning as a way to expand on some of the concepts she had been covering in her classes. T2 elaborated on a direction she saw developing for incorporating technology into her unit plans. “I’m starting to have a vision of where I can use the computers in the computer room for more projects where we can all work at the same time to find information.” By the end of the study, T2 looked towards using the Internet

more with her sixth and seventh grade classes as well to better meet the individual needs of her students. “I would like to get the seventh graders to do more and start the sixth graders to use the Internet.”

At the start of the study, neither of the teachers knew how to turn on the computers in the lab, nor how to save or move files, nor how to capture an image off the Internet. Nor were they confident in bringing their classes to the lab or willing to try to integrate technology into their curriculum. The previous quotations show that both of the teachers have developed a base knowledge of saving and moving files, capturing images off the Internet, and T2 taking her class to the computer lab to do research. They were more interested in integrating technology as they became more comfortable with computers. Another theme was continuous training with flexibility, meeting the needs of the teachers. Training proved to be more effective when it happened consistently focusing on skills the teachers could see themselves using in the classroom. Other themes that emerged as both teachers began to use technology more was an increased comfort level around a computer and starting to develop areas where they wanted to supplement their curriculum with technology.

The awareness of technology grew for each teacher. This awareness increased their value and perception of technology over time. All of these examples show that the teachers integrated technology when the technology was specifically designed to fill their needs, not as a preset agenda, but rather an influence on their specific teaching styles.

Continuous Training

The training format focused on reinforcing and building on the skills learned in the previous training session. Each session started with reviewing the skill that had been covered

during the last training session. This review helped the teachers remember what they had been working on, and the continuous training seemed to increase their confidence when using the computer. This was evident in the teachers' integration of technology into their curriculums.

The reinforcing of and building upon previous skills did not always take place in sessions, and some of the training sessions were spent reviewing previously learned skills. T1 had missed almost three months starting just before Christmas and lasting into February with debilitating back problems. I did not hear from her for over two months despite numerous phone calls and messages. Her back pain had been so severe that she was bedridden for weeks at a time, so it was not really an option for her to think about her technology training. So her training upon return was spent relearning the skills she had forgotten. Upon returning on March 8th, she had to relearn capturing an image off the Internet and saving it to the desktop or a floppy disk. She also had to relearn doing keyword searches on the Internet. This break in training proved to be detrimental to her development because she forgot everything she had learned. So the last few training sessions were helping her relearn the skills from before the break in training. T1 did not want her training to end up like this, so another focus was to make her feel comfortable working with a computer again. She felt uncomfortable coming back, I believe, because of guilt for missing sessions and because she thought I might be angry with her. So we reviewed concepts she had learned and worked from there. I was stressed at the situation, but never was I angry with her nor give that impression.

One difference between T1 and T2's training was that T2's training was more continuous. Her training did not have a long break in the middle like T1's and therefore T2 was better able to remember the skills she had previously learned. A number of T2's training sessions

were cancelled due to inclement weather or illness, but they were usually rescheduled the following week. Since each session started with a review of the previous skill, she was able to move on to new skills fairly quickly and was able to carry out previous skills with little review because there was not a long gap in training.

Another difference between T1's training and T2's is that T2 tried more of the skills she had learned at home such as working on PowerPoint and looking for pictures to copy on the Internet. She spent time at home capturing images of her son from the Marquette University soccer web page and posting them on her desktop. So only a small portion of each training session was spent on reviewing the previous skill. T2 referred to this kind of skill building during her final interview when she says: "Oh, sure, because the more times you hear something the more you remember it. Now if you constantly go over something a little bit, um, it's obviously going to stick with you and then you'll try it."

T1 did not have the Internet at home and T2 did. So T2 used technology for her own personal development as well as professional. This is consistent with Speck's (1996) criteria on adult learning theory. T2 used technology in a relevant situation for her own personal gain, similar to the real world application of technology that Speck wrote about.

T1 wanted more software to supplement her classroom lessons and was able to purchase phonics software she evaluated at the Wisconsin Educational Resource Center. She also spent a great deal of time looking for images on the Internet and pasting them into a word processing document. This skill had been covered during her first three training sessions. Her delay in training from December to March had forced the remaining training sessions to always review this particular skill. The time she returned on March 8th, we reviewed the same skill and she was

able to evaluate and chose a phonics software program for her school to purchase. It was apparent that she felt most comfortable when I was there to guide her. Saving the image to either a floppy disc or the desktop appeared to be her biggest challenge.

Conclusion

The coded data revealed that technology integration was beneficial and useful because the participants' comfort level was established first. With the comfort level established came the sharing of ideas on what skills they wanted to learn, and then participants learning technology skills and finally incorporating them into their classroom curricula. The integration of technology came as an affect from the participants' comfort level.

Limitations

The biggest limitation in my research was the delay in learning. A good portion of T1's training was done in one-shot style sessions where she did not gain as many of the technological skills as she could have. This was due to the gap in training from December to March. T2 completed the all staff inservice on October 8 and didn't start training until December 4. This gap in training at first limited T2's progress, but once the training started it progressed fairly consistently with only snowy Wisconsin weather being a factor.

My findings were that the teachers did better when they had a high comfort level and when I provided training that was on-going and adapted to their needs. The study would have shown greater technology integration as a result of the training if the training had started sooner and been more steady for both teachers.

The learning in this study took two different paths. One of the paths consisted of the teachers getting genuine learning opportunities to incorporate technology into their curriculum.

They both learned how to copy and paste pictures and to research topics on the Internet. Part of this is due in great part to there only being two participants, but also due to the training sessions being focused on what they wanted to learn during each session.

The other path was that the training did not reach a timely conclusion due to conflicts in their schedule and physical health. Because of the long gaps between learning sessions, much of the information taught in one session was relearned again in the next session. It took from October 8 to December 4 for T2 to even respond to phone calls and emails to set up an initial interview. This gap occurred shortly after the first all staff training session.

My initial intention was to build on the skills learned at the first inservice. T2 had her initial interview on December 4th and her training started on December 12. Throughout January T2 had training sessions and on February 2 took her students to the computer lab for the first time. She had her class in the computer two more times after that during February. I was there to help the students if needed, but due to her small class size, my help wasn't really needed.

Another part of my presence there was for moral support for T2.

T1 had three training sessions between November 16 and December 7. After our scheduling of training sessions on January 4 T1 disappeared until March not returning numerous phone calls at home and school, and not responding to numerous emails. It became a bit discouraging and stressful not hearing from her. She was bedridden with a herniated disc and couldn't really move. We had a training session on March 8 where we reviewed the same skill of copy and paste that we had done during her previous sessions. Her last training session was on March 14. On April 6 she had her final interview, but in between those two dates were meetings either cancelled or she didn't show up.

Both teachers were able to come in and get specific training on skills they wanted, and the facilitator of the training sessions was flexible enough to meet their needs. The outcome could have been very different had there been twenty participants or training done on a continuous timetable.

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Chapter 5

Implications for Technology Coordinators

Administration in charge of facilitating staff development needs to take in many areas of consideration when scheduling technology inservices for teachers. The following paragraphs will detail what schools or districts can do to improve how teachers use technology if they try the form of staff development and mentoring relationship conducted in this study.

Staff developers working with teachers such as T1 and T2 should make increasing the comfort level of the participants a priority. Because of actions I took to increase T1 and T2's comfort level, there seemed to be more technology skills acquired and more integration into the curricula. I remained aware of their needs and what steps I could take so T1 and T2 were comfortable with the training they received. Speck's research shows that adult learners are unique individuals with a wide range of skills and experiences. The individual needs and differences of the participants must be accommodated for. The accommodation of individual needs and differences in professional development planning and implementation should establish the comfort level of the participants.

One way of achieving their comfort level was through practicing active listening. T1 and T2 had technology anxiety problems that they felt affected their competency as teachers who work with computers. Many teachers come to staff development sessions with this type of anxiety. Both teachers seemed almost frightened at learning new technology skills. So I offered reassurance to support their technological needs in any way I could and help them feel more relaxed and open about learning new skills. Without the participants feeling comfortable, much of the positive progress made would not have happened. They referred to this comfort level in their pre- and post- interviews.

T1 and T2 came to different technology mentoring sessions with specific skills they displayed an interest in learning, so training focused on areas they wanted to work on. This increased the teachers' motivation to gain more technology skills and increased that particular skill level. Both teachers developed a base knowledge of saving and moving files, capturing images off the Internet, and T2 was doing research in the computer lab with her students. They were more interested in integrating technology as they became more comfortable with computers. So I suspect that their technology skills would continue to increase if they felt comfortable enough during staff development sessions.

Sparks and Hirsch's description of professional development being done in "one-shot" workshops with limited inservice opportunity also happened during this study. T1's training was interrupted due to her back problems. Her delay in training due to medical problem resembles the one-shot inservices that many districts and schools conduct. Instead of moving ahead and gaining new technology skills, she had to revisit the same skill almost every session. Staff developers

need to understand that teachers may not get the opportunity to review a necessary skill that was learned once. Why is it that many school or district technology inservices are offered only once?

T1 would benefit from supplemental technology mentoring sessions. There may be situations that cause teachers to miss technology staff development. How are their needs accounted for? T1's situation is typical of teachers in any school or district who may miss an inservice due to health problems or family priorities.

A learning tree system where the bigger branches nourish the smaller branches and leaves is the idea. It would be a system where participants utilize other members of a school or district for help on a particular technology skill. This is a good direction for staff development to take. If technology training is presented in an all group fashion, it should be flexible enough to meet the needs of all the learners. It is beneficial to have assistants that help facilitate learners to acquire the desired technological skill. A good idea would be to have assistants from the same school helping with teachers' learning. Each assistant would be in charge of a certain number of participants and could help the learners feel comfortable knowing that there is someone to help them other than the facilitator. This meets more of the learners' needs than with just one person facilitating the entire staff development session.

There are ways to meet the needs of the participants after the initial training sessions. Training can be supported in one-to-one small break-out lessons or partner guidance sessions to address specific technological needs. Typically technology development sessions cover a great amount of material in a short amount of time, so supplemental learning sessions are of great importance for further technology integration into the curricula.

A small group break out learning session must be led by someone with a strong understanding of that particular skill who is also sensitive to the needs of the people they are working with. This opportunity gives learners who may not understand the skill a chance to revisit the skill and become successful at it. This is similar to the same kind of review with T1. As T1 revisited the same skills she became better at it and her learning continued to progress and get stronger. This kind of session can also benefit people who missed the technology staff development for that day and provide them with the opportunity to learn the skill. This way is designed to meet the varying needs of the teachers.

Technology learning communities utilizing a system like this will help teachers gain the skills and confidence they need for successful work in a school district. This kind of learning tree also can generate a positive mentoring relationship between two teachers who can share technology integration ideas. Schools or district development planners should consider this kind of team building so teachers feel supported at the teacher level and that administration is sensitive to their learning needs as educators.

Learners need real world application of the skills they are being taught for successful technology integration. This study started with an all staff inservice and then focused on two individuals. The initial session with the staff focused on concentrating Internet navigation on a particular subject. From there T1 and T2 used this skill to meet their own personal and professional needs. As their Internet navigating skills became stronger so did their sense of technology competency and new skills started coming into focus like saving pictures from the Internet for curricular activities, Powerpoint lessons and classes going to the computer lab to conduct research. This study was mostly facilitated around a technology mentoring relationship.

I worked with one teacher at a time but never worked with them together. Each teacher received hour-long sessions focused on skills they wanted to learn. When professional development is done only once, the chances are less that the participants will retain the skills taught in the session. A learning tree system in place will continue the learning process and help teachers acquire the needed skill.

Staff development should focus on keeping learning sustained and continually review skills and build new knowledge based on previously learned skills. Galbo's research on professional development highlights on-going learning so the learner takes more ownership of their development. The individual growth and improvement of the participants should be facilitated by systematic support, participation and instruction. Having on-going professional development in technology will foster a greater integration of technology into curricula. T2's training progressed continually and her proficiency and confidence grew. We reviewed skills previously taught briefly, then the learning focused on technology skills she wanted to learn. From there she was taking her students to the computer lab for research, creating brochures for the school science fair and was making presentations using Powerpoint. Her progress is due to the continuous training she received.

Professional development in technology for teachers needs to start as a real world experience that the participants can utilize in their everyday lives. This builds self-confidence in the learner. In my research I found that instructing T1 on copying images of penguins from the Internet and pasting them into a word document was a skill she used to reinforce curricula. Until then she had printed pictures and pasted them onto worksheets. This skill was revisited numerous

times during the course of my study and it is relevant because she was able to use it in a situation that met her teaching needs and the needs of her students.

A student of T2 brought in a Power Point presentation on a concept they were studying in class. T2 was experiencing some anxiety about not ever working with the program. So one of her training sessions focused on using Power Point. This session facilitated a real world experience on a skill she could use almost immediately in her classroom. At the very least she was able to understand how Power Point works and would be able to look at the slideshow for it's content rather than being intimidated by a skill she didn't know.

Technology professional development should focus on goals that are shaped by administration should consider the people involved in the school and focus on keeping the learning flexible enough to meet their needs. This will more directly affect technology integration into the curricula. The one-shot inservices do not work by themselves, they need to be followed up by a systematic plan to supplement learning. Based on the research I have done, I do believe this path for technology staff development to be a valid way of integrating technology.

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Pre and Post Interview Questions for T1 and T2

1. Describe the purpose of your unit plans and what you hope to achieve during your unit.
2. What is currently being used as support to your unit plan objectives?
3. What support material is currently most useful to you in achieving your unit objectives?
4. Is technology seen as an instrument for you to achieve your unit or curricular objectives or is it something separate?
5. Is technology seen as separate, if so when and how often does it occur?
6. Where do you see technology being incorporated into your unit plans?
7. How will the incorporation of technology into your plans help support curriculum?
8. How will you integrate the Internet into your plans to help support curriculum?
9. Where is the benefit of the Internet in curricular objectives and unit objectives?
10. Is there staff development in technology in your school?
11. How long was the duration of each session?
12. Do you feel continuous staff development in technology helps increase you incorporation of technology into the curriculum?
13. Have you begun to look at how to integrate technology into each unit plan or curricular objective?
14. How will the development of your unit plans and curriculum objectives change with continuous staff development?
15. Currently, do you see thinking patterns for yourself in terms of how to support your curriculum with technology?

16. Does your teaching style change when you look at incorporating technology into your lessons or does it stay the same, your actual style of teaching?
17. What changes have occurred in your use of technology during the ten week intensive professional development partnership we have had?
18. What learning insights and understandings did you feel you learned during this partnership or would be able to demonstrate during this partnership?