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Understanding the Impact of Follow-up E-Mail Support on Teacher Adoption of Technology: a Study of Teachers in Self-selected Web-based Training

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UNDERSTANDING THE IMPACT OF FOLLOW-UP E-MAIL SUPPORT ON TEACHER ADOPTION OF TECHNOLOGY: A STUDY OF TEACHERS IN SELF-SELECTED WEB-BASED TRAINING

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ABSTRACT

UNDERSTANDING THE IMPACT OF FOLLOW-UP E-MAIL SUPPORT ON TEACHER ADOPTION OF TECHNOLOGY: A STUDY OF TEACHERS IN SELF-SELECTED WEB-BASED TRAINING

The purpose of this dissertation study was to gain an understanding of the impact of post course follow-up e-mail on teachers' level of technology adoption and use of the Internet for professional inquiry. Subjects were teachers in the Capital District area of New York State who self-selected to participate in a BOCES Model Schools technology course, during the summer of 2001, that included a web or Internet component. The research questions include the impact of the experimental treatment on level of technology adoption, teachers weekly use of the Internet at home and at school, differences in the pre-post adoption of the two study groups, and whether age, gender, or years of teaching experience is related to teachers level of technology adoption.

The methodology for this study was entirely web-based. All data collection and communication with subjects was conducted via the Internet. The primary instruments for data collection instruments were the Teachers and Technology: A SnapShot Survey (Norris and Sollaway, 1997) that includes the Stages of Technology Adoption (Christensen, 1997). The research also used a post experimental online questionnaire to collect data regarding the follow-up e-mail treatment. The experimental design tested a treatment that consisted of twelve e-mail that included educational websites, online articles, listerv opportunities, and information that supported the use of the Internet for professional inquiry.

The results indicated that the experimental e-mail follow-up was successful in producing a statistically significant increase in the experimental subjects' level of technology adoption. The results support the concept of sustained e-mail support

following technology training as a means of increasing teachers' level of technology adoption. Suggestions for further study and implications for future practice are addressed in the dissertation.

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CHAPTER 1

INTRODUCTION

Background

Schools in the United States are quickly becoming technologically equipped. In his State of the Union address on January 23,1996, President Clinton spoke about the federal government's commitment to provide educational opportunities via the Internet. "In our schools, every classroom in America must be connected to the information superhighway with computers and good software and well-trained teachers (Clinton, 1996, p. 3)". Computer technology in schools was intended to prepare learners for the Information Age.

In technological circles, theorists believe that the use of the Internet by teachers may facilitate new educational practices (Tapscott, 1998). According to Ravitz (1999), the uses include the creation of rich environments for learning, breaking down classroom walls, and the creation of a shared knowledge across time and distance.

At the National Conference on Educational Technology in Washington, D.C., July 12, 1999, former U.S. Secretary of Education Richard Riley stated, "We are far enough along in the technological revolution and its application to learning that it is time for systematic review and analysis of what works best (Riley, 1999, p. 6)". Riley's statement expresses the concept that has lead to this research study, namely, an investigation of the teachers'

use of the Internet for professional inquiry and the impact of a series of follow-up e-mails on teachers' level of technology adoption.

The CEO Forum reported in June 2000 that 95% of public schools have Internet access and 72% of public classrooms are connected to the Internet. The CEO Forum information confirms that public classrooms have infrastructure, hardware and Internet capability (CEO Forum, 2000). However, there is a need to examine teachers' use of existing technology for their professional learning. In addition, research should consider how schools are using the potential of the Internet to develop teachers' technological competence in order for teachers to gain the skills necessary for seamless use of technology.

Purpose of the Study

Since it is reported that 95% of public schools throughout the country have computers and Internet access, it would be useful to evaluate types of use and the general perceptions of teachers regarding their use of the Internet. Teachers have varying interest, support, instruction, and available resources to keep up to date with educational philosophy, technological advancements, instructional issues/topics, and the vast amount of information that is available on the Internet (Coley, Calder & Engel, 2000). There is a need to investigate an approach to support teachers becoming or remaining professional learners using technology.

Once technology infrastructure is in place, most schools provide hands-on initial training that allows teachers to access software applications that are available to the teachers on school computers, but the training is not ongoing. David Gordon, editor of "The Digital Classroom: How Technology is Changing the Way We Teach and Learn", a

Harvard Education Letter, says teachers need access to regular workshops, online workshops, and discussion groups about technology (Gordon 2001). Scheffler and Logan (1999) examined what teachers should know and be able to do with computer technology in schools. He asserts that training and computer experience increase teacher computer use and that technology training and professional development for teachers must be an ongoing process. Cunningham claims that school computers are most often used as glorified workbooks. He states that workbooks require no teacher expertise. "Even teachers and administrators who are barely computer literate are attracted to the promise of prepackaged, networked computer-based learning systems" (Cunningham, p. 41, 2001). Similarly, Owen (2000) believes that in many schools, the computer is used as a cut and paste tool and the Internet is viewed as a visual encyclopedia.

McKenzie (1998b) asserts schools are beginning to change from the deficit model where training is offered to improve teachers' knowledge in a particular area to a model that expects "andragogy," where adults take responsibility for their learning. Professional associations, education departments at the state and federal levels, school districts, educational product companies, curricular organizations, not-for profit groups, and educational foundations all have informational web sites that teachers could use for professional growth and for expanding their knowledge in a multitude of related areas. This educational information is available at any time, from any location, with the click of a mouse.

In view of the fact that current NCES data indicates that 99% of public school teachers have at least one computer with Internet access in their classrooms and, therefore, have access to the abundance of information on the Web, it is important to

evaluate whether and how teachers are using this technology (U.S. Dept. of Education, NCES, 2000).

Adult learning theory suggests teachers learn and absorb in different ways, just like their students. The one size fits all approach that most schools and training programs use may be a barrier to successful Internet use. Time is a critical issue in any professional development plan. The use of time is a resource that will always factor into teachers' involvement and interest in professional study. The freedom to explore and learn on one's own time is supported in the literature on adult learning. According to McKenzie (1998a), theorist Malcolm Knowles went even further and suggested that adults are beginning to insist on learning to take place at a time, place, and pace convenient to them. In his book Andragogy in Action (1984), Knowles affirmed his confidence that most educational services would be delivered electronically by the end of the twentieth century

Statement of the Problem

The dual purpose of this research is to investigate the impact of Model Schools course follow-up e-mail support on teachers' level of technology adoption and their use of the Internet for professional inquiry. The research proposes to determine if teachers' use of the Internet as a professional learning tool is related to a concise model of use and perceptions of technology adoption called the Stages of Technology Adoption (Christensen, 1997). In addition, the research proposes to determine whether teachers who are provided regular post Internet/World Wide Web technology training course e-mail support messages increase their level of technology adoption more than teachers who participate in similar technology training but do not receive follow-up e-mail support.

Research Questions

This research was undertaken in collaboration with BOCES Model Schools program in the Capital Region BOCES of New York State and proposes to answer the following questions:

1. To what extent do teachers who participate in a self-selected Model Schools technology course use the Internet as a resource for professional inquiry at home or at school? Sub question: How much time do these teachers spend using the Internet each week?
2. Is a teacher's self-reported Stage of Technology Adoption a factor in whether the teacher is more likely to use the Internet as a resource for professional inquiry?
3. How will teachers' Stage of Technology Adoption change after a six-week period during which they receive bi-weekly Web links, online course offerings, listservs, software tips, and online articles? Sub-question: How will teachers in the experimental group use the follow-up e-mail treatment to enhance their level of technology adoption?
4. After the six-week follow-up test period, what differences exist in the Stages of technology adoption for the experimental and control groups?
5. How are age, gender, or years of teaching experience related to teachers' self-reported Stage of Technology Adoption?

Research Hypotheses

1. There is no relationship between Teachers' self-assessed Stage of Technology Adoption and their use of the Internet/World Wide Web as a resource for professional

inquiry, after they complete a Model Schools professional development course that includes an Internet/Web component or focus.

2. There will be no significant differences in teachers' self-assessed Stage of Technology Adoption between an experimental group that receives post Model Schools technology course bi-weekly e-mail that includes Internet tips, related Web links, online course opportunities, software tips, listservs, and articles and that of a control group that does not receive the follow-up e-mail.

Definition of Terms

Asynchronous communication – learning events in which people are not online at the same time and cannot communicate without time delay. Examples are self-paced courses taken via Internet or CD-ROM, Web presentations, videotaped classes, streamed audio/video presentations, Q& A mentoring, online discussion groups, and e-mail (Kaplan-Leiserson, 2001).

Asynchronous training: Training where interaction between teachers and students takes place intermittently, not simultaneously, such as through links to HTML content or e-mail, news, or discussion groups. (Kaplan-Leiserson 2001)

BOCES – Board of Cooperative Educational Services, a regional public education service organization. Established in 1948 by the state legislature, BOCES provides educational services to the school districts of New York State through cooperative effort. The mission of BOCES is to sustain and enhance the capacity of component school districts to carry out their roles as the chief instrument in the schooling of the children, youth and adults in their community.

Bookmark - A function that allows people to save a reference to a site or page that they have already visited. At a later point in time, you can use a bookmark to return to that site or page.

Continuous Learning - The act of learning to learn. If the learner can view life and work as a "learning program", then the learner will continue to learn from almost everything in life. Therefore, the learner continues to expand his or her capacity for living, including working (McNamara, 1999).

E-mail – (Electronic Mail) Messages sent from one computer user to another (Kaplan-Leiserson 2001).

E-mail Address – also known as "Internet address" "network address" "Web address", or "addy" is a series of letters, numbers, and/or symbols by which you identify yourself and by which the Internet identifies you (your computer). Through the use of addresses, people can send e-mail, look at Web sites, and send or receive files and documents. An e-mail address takes the form of username@hostname.com, where the username is a name you have chosen and the hostname is that of your ISP or e-mail provider. The symbol in the middle is the "at" symbol (@). An e-mail address is verbalized as "username at hostname dot com" (Netlingo, 2000).

E-mail Support Mail – bi-weekly e-mail message that research participants will receive on their school and/or home computer. The messages will contain supportive post-course tips, links to related websites, articles, list-serv opportunities, online course opportunities, and general support for skills learned at their Model Schools technology course.

Internet – also known as "the Net". The name given to a collective electronic network of computers and computer networks which are inter-connected. It is estimated that the

Internet has more than 200 million users worldwide, and that number is rapidly growing (Netlingo, 2000).

Link – text and/or images on a Web page that a user can click on to "connect to" or reference to another document (Netlingo, (2000).

Listserv – A powerful program for combining and automating mailing lists and discussion groups on a computer network over the Internet. A form of one-to-many e-mail communication. Subscribing to listserv groups adds your name to a mailing list. (Kaplan-Leiserson, 2001).

Log in/Log on - The process of establishing a connection over a network or modem with a remote computer so that a user's computer may retrieve or exchange information (Kaplan-Leiserson, 2001).

Mailing List – a means of sending the same message to everyone on a specific list whom is interested in receiving this information (Netlingo, 2000).

Model Schools Program – A technology training program that has provided New York State capital district area teachers/districts with opportunities for professional development courses that focus on all aspects of computers, software applications, Internet, and Web resources. The Model Schools program has been offering technology training since the late 1980's (www.capregboces.org, 2002)

Online – The state in which a computer is connected to another computer or server via a network. A computer communicating with another computer (Kaplan-Leiserson, 2001).

Self-Directed Learning - the process by which people take control of their own learning, in particular how they set their own goals, locate appropriate resources, decide on which learning methods to use, and evaluate their progress (Tuinjman, 1995).

Synchronous communication: Communication that allows participants to interact simultaneously in real time through methods such as live chats, electronic whiteboards, or videoconferences (Kaplan-Leiserson, 2001).

Telementoring – a mentoring relationship or program in which the primary form of contact between mentor and mentee is made through the use of telecommunication media such as e-mail, listservers, etc. Wighton, 1993).

World Wide Web (WWW) - the web makes the Internet easy to use. A system of Internet servers that support specially formatted documents. The documents are formatted in a language called HTML (HyperText Markup Language) that supports link to other documents, as well as graphics, audio, and video files. Not all Internet servers are part of the Web. The technical definition of the World Wide Web is a global hypertext system that you navigate by clicking hyperlinks, which display another document that also contains hyperlinks (Netlingo, 2000).

Assumptions

It is assumed that:

1. The research participants are teachers in the Capital District area of New York State.
2. BOCES, NERIC and Model Schools administration support this research and will cooperate with the researcher by providing data and technical assistance for this research.
3. The participants have daily access to a computer with Internet access.
4. The participants have acquired knowledge for school computer Internet log-on procedures.

5. All subjects are willingly participating in this research project.
6. All participants willingly enroll in a Model Schools technology course of their choice and are not influenced by this dissertation research.

Scope and Delimitations

1. This study is limited to participating school districts in the Capital Region BOCES Model Schools Program in upstate New York.
2. Teachers' level of educational attainment will not be a variable of this research.
3. The subjects' Model Schools course selection is not being considered as a variable in this study. The subjects will select course/s without input from this researcher. Therefore, the number of participants in any given course will not be determined until registration through Model Schools has been completed.
4. Teaching assignment of the participants will not be a variable due to the inability of the researcher to control the course selection of the research subjects.
5. Non-technology based professional development courses and workshops that teachers complete during the research period will not be a variable of this research.

Significance

Given the amount of money that school districts, state and federal governments, and local taxpayers spend on computers, networks, and Internet access, it is essential to evaluate types of teacher technology use and teacher perceptions of the Internet/WWW. In 1999, USA Today reported that just 20% of teachers surveyed by the U.S. Education Department felt capable of using technology (Healy, 1999). In an earlier survey conducted in 1997, the Maryland Department of Education documented that only 53% of

their teachers stated that they could use the Internet or E-mail independently (Committee on Technology in Education, 1998). Another author who supports these survey results is McKenzie (1998 b) who describes schools with brand new computer networks that suffer from the "Screen Savers' Disease". McKenzie describes this expression as schools and classrooms where new monitors "glow in swirling colors while students still grasp pencils, notebooks, paper, and dry lectures" (p.1), in other words, the computer is turned on but the screen saver is showing because the computer has not been used. He asserts that this is the equivalent of educational red ink, a waste of money and powerful tools, and he contends the primary explanations for this phenomenon are poor design of technology staff development, too little support for adult learning and lack of a clear purpose for the use of technology.

The number of state standards continues to increase and demands for school accountability intensifies. Media and taxpayer groups continue to criticize educators and schools for failing to raise achievement levels of students and failing to meet the needs of all students. Stories of idle computers in schools abound. Newspaper articles, editorials, television stories, and articles in professional journals report that computers in schools are not being used to the fullest extent possible (Clowes, 1999; Furger, 1999; Becker, 1999). There may be a measure of exaggeration and truth in these statements regarding computer use. In some instances, there are idle computers, and in others, the public perception about computer use is distorted.

The success of technology implementation by individual teachers is open to examination. Districts, schools and administrators will benefit from knowing if introducing teachers to pertinent articles, Web sites, software tips, or online course opportunities is a constructive approach for encouraging teachers' self-directed

professional inquiry, for advancing district goals, and for providing a consistent support for computer use. Research has not indicated a high level of post-class follow-up and support for teachers who participate in technology training (McKenzie, 1998b; Cole-Gomolski, 1999; Stewart, 1999). The use of e-mail surveys, bulletin board feedback sites, and follow-up professional development support needs to be investigated.

This research will contribute to a broader understanding of how teachers are using the Internet and how supportive follow-up e-mail, after they complete a technology course, impacts on teachers' level of technology adoption. It will provide information to guide districts' professional development efforts, especially in the area of technology training. If teachers are self-directed, is the ease of obtaining information through the Internet an appropriate way to increase professional inquiry? This research will assist school administrators involved in technology planning and, on a broader scale, organizations that support school technology plans through grant funding. An analysis of teachers' use of the Internet for professional learning could be extended to other settings or organizations involved in supporting technology-based learning for their employees. NCES statistics indicate that less experienced and younger teachers use the Internet more than older, more experienced, teachers (U.S. Dept. of Education, NCES, 2000). Research examining this point would be useful to anyone involved in planning and implementing professional development through the use of technology.

Although the primary focus of this research is not on teachers' classroom use of the Internet, the research could benefit schools and district administrators in their search for ways to improve or change teachers' instructional practices. Accountability for student achievement is a reality confronted by every school district. If teachers' use of the Internet to increase their awareness and knowledge proves to be a factor in their overall

Internet use, one would hope students would indirectly benefit from their teachers' increased knowledge. Scheffler and Logan's study on computer technology in schools (1999), reported teachers need to learn more about how to use and manage computers in order to enhance their instruction. They believe that change can only come about with increasing teacher competence in the use of computer technology. In a recent article in the Journal of Teacher Education, Alfie Kohn (2000) discusses the fact that in certain parts of the country, administrators and teachers are being dismissed when they are unable to improve student achievement on standardized tests. Increased accountability may motivate teachers to seek information that could improve their instructional practice, change their beliefs, and generally increase their professional knowledge. This research proposes to add to the body of knowledge in the field of Internet/Web professional development, and specifically to test a model that is designed to increase teachers' use of the Internet for their own professional learning.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of literature is divided into several sections and it includes a discussion of teacher inquiry through the use of technology, models of professional development, teachers as adult learners, motivating adults to learn, models of staff development, the connection between business and education, online opportunities for professional learning, and the concept of learning and change. Since the research questions encompass age, experience, and gender, findings pertaining to these variables is linked to the major discussion categories.

School district supported professional development typically consists of a menu of training options that are designed to share ideas, techniques, or materials with teachers. Summer training sessions are oriented toward improving practice but usually do not provide teachers with necessary follow-up. In examining the history of staff development, Dillon-Peterson reports that in-service workshops and one-shot training sessions began to counter deficiencies in instructional competencies because many teachers began their teaching careers without completing 4-year degrees (Dillon-Peterson, 1991). In contrast, the Joint Venture Organization (2002) outlines "Six Guiding Principles of Teacher Professional Development". The Joint Venture guidelines include thoughts that professional development is teacher-centered, is focused on students, addresses issues of equity, is coherent and aligned, takes place within a learning

community, and the existence of systems and structures to support professional development.

Ferdi Serim (1999) believes that teachers' jobs are more complex today than they were twenty years ago. He refers to himself as a "professional learner".

> My responsibility is to keep alive the fires of inquiry for the rest of my life, for my students, my colleagues, and me... We can't rely on others to build the fire for us. Each of us is in charge of our own professional growth from here on out. Of the many pathways to quality professional development, which will you choose? Which best matches your needs? As educators, we face a dazzling array of options. Whichever you choose, here's to keeping the spark alive, building from the first flashes of curiosity to an inferno of inquiry (Serim, 1999, p. 9)!

This opinion is echoed by Sullivan (2000), who writes that learning will be a major opportunity in the twenty-first century and that the time of andragogy or adult-based learning is upon us. Sullivan proposes that employees need uniquely specific learning to fit ongoing programs to fit the changes in workplace. He reports that once only large corporations had access to resources to provide the training, but now resources are available to everyone in their own living room, through books, correspondence courses, the Internet, cybercolleges, and DVD portable packages. "People will be able to tie into global workshop discussions, master teaching packages, virtual reality training, training videos, and a myriad of new, relatively inexpensive, globally available learning options on every imaginable subject (Sullivan, 2000, p.12)."

Similarly, Bailey asserts that although there is sizable information regarding general characteristics of effective staff development, there has been minimal study that is specific to technology staff development programs. "Few, if any, technology staff development program models have been field-tested by researchers (Bailey, 1996, p.6)." He also maintains that an abundance of research related to computer learning has been undertaken but that little information exists about emerging technologies (multimedia, electronic collaborative learning, and electronic cooperative learning). Bailey's concluding thoughts is worth considering because they relate to the need for a study of the Internet as a tool for teachers' professional inquiry.

> We need to remember the words of John F Kennedy... "When written in Chinese, the word "crises" is composed of two characters – the one represents danger and the other represents opportunity. The essential question is will you spend the majority of your time helping others look for opportunities of technology or the dangers of technology?" The survival of our youth, public education, and our nation depends on your response (Bailey, 1996, p. 6)".

Stein, Schwan-Smith, and Silver (1999) describe the changes that staff developers/presenters should make in their presentations and how the field of staff development must change if traditional workshop presentations are to remain a viable option for teachers and schools in the twenty-first century. By acknowledging there is not a well-defined educational group that takes responsibility for the study of learning and development of teacher educators, the authors question whether this is the reason for the absence of long-term studies of professional development. This recent article made no mention of technology as a resource for teachers or staff developers.

Teacher Inquiry through Technology

It is essential to examine literature regarding teachers' use of technology for professional inquiry. Becker surveyed teachers about three professional uses of the Internet. The teacher Internet uses his study revealed include: finding information and other resources on the Internet, E-mailing with teachers at other schools, posting information, suggestions, opinions, or student work on the Web (Becker 1999).

In explaining the model of four stages that teachers go through in developing expertise with the Internet and the World Wide Web, Sherry, Bilig, Tavalin, & Gibson (2000) maintain that research regarding teachers adoption of technology and telecommunications and ways teachers use technology to enrich teaching and learning is still ongoing. Cunningham (2001) believes that teachers have the necessary intelligence and disposition to succeed in a technologically enriched classroom but that too many teachers prefer delivering prepackaged curricula, using traditional tools, and assessing student progress in traditional ways. Cunningham argues economic forces, rather than educational ones, will probably determine how computers will change society and our schools. Moreover, Bracey reports the World Wide Web is a global information system designed for easily sharing, transferring, publishing, and disseminating information and for supporting collaborations and interactive communications (Bracey, 2000).

In the resent literature, there is much written "about" professional development; however, there is relatively little research on this relevant topic. McMillan-Culp, Hawkins, and Honey (1999) discuss teacher learning with technology and using technology to support lifelong learning. They list model programs in these and other areas of technology research. They also address promising directions for future research

and development work. These writers believe researchers are changing their focus in order to address the obvious lack of proof that the technology investment is paying off.

In discussing the use of the World Wide Web by educators, Bracey (2000) writes, "Educators around the world are exploring the uses of the World Wide Web as an instructional medium and tool. They and their students are using curriculum webs created by government agencies, international organizations, non-profit organizations, companies, and other educators covering a diversity of curriculum (p.2)". Nellen (2000) states, "You can't be a couch potato on the Internet (p.3)". Nellen believes that the failure of other forms of media in the classroom has been a failure to understand how to use it. He reports technology puts the user in control and the concept of constructivism is seen at its best because computers require active interaction. Likewise, Becker (1999) studied conditions of professional use in a national survey of teachers and found teachers with higher constructivist views valued and used the Internet more than teachers with a more traditional pedagogical philosophy.

DiMauro and Jacobs (1995) found that professional validation, encouragement, collegial conversations and professional activities are some of the hallmarks of a professional's typical work life and noted these experiences are frequently missing components of teacher's professional experiences. These authors analyzed participants in the LabNet project, a telecommunications-based project that was funded by the National Science Foundation. Bresnick-Kendler (1998) contends that professional development offerings are available in every conceivable format including: books, CD-ROMS, videos, district-wide courses, and even online degree programs. This author lists, explains, and reviews many of these resources and notes that although they reflect current needs and educational topics of interest to teachers, many of these resources have a registration fee

or associated cost. The cost of courses, whether in a traditional or an alternative setting, may be one reason teachers have disregarded these approaches for their continuing professional development. In the article, "Educators' Guide to Professional Development Resources," the author discusses a number of training organizations, online courses, hands-on workshops, and materials to support internal professional development for teachers who want to increase knowledge.

The amount of educational information available via the Internet continues to increase. The Association of Research Libraries report between 1996-1997 the number of electronic journals increased from 200 to 1,465. Online journals promote interaction between the reader and the author. They also report an increase in online discussion groups regarding journal articles that include authors' e-mail addresses and they note an ease in the ability to contact journal authors through the use of e-mail (Association of Research Libraries, 1998). Vrasidas (2000) cites the advances in telecommunications and microcomputers that are changing the way the members of the educational community share ideas and access information. This author believes the Internet has evolved into a very powerful tool for scholarly communication.

The literature maintains one creative concept supportive of teacher professional development is telementoring. Research by Wighton (1993) discusses the concept of telementoring, reporting on a number of explorations that have been conducted into the potential use of telementoring within an educational telecommunications network. Organizations and businesses such as the National Science Foundation, U.S. Education Department, Technology Literacy Challenge Grant, and the Hewlett Packard Company are involved with the telementoring movement.

The literature regarding inquiry through the use of technology supports the need to evaluate the degree to which teachers use the Internet for professional inquiry. The literature substantiates the availability of resources for educational inquiry and study and cites opportunities for teachers to use the Internet as a professional resource.

Teachers as Adult Learners

The issue of teachers as adult learners is important to explore and there is substantial research on this topic. In his "Resource Guide on Adult Learning Theory," Crafton (2000), reports the existence of a substantial body of knowledge and research on adult learning. He cites the work of several writers who have contributed to the extensive body of work in adult learning. The review of literature includes references to the work described in Crafton's resource guide.

In the literature, several authors examine essential aspects of teacher-as-learner. Teacher as learner involves four aspects: the technical, reflective practice, research, and the collaboration. A decade ago, Fullan, Bennet, and Rolheiser-Bennett (1990) established the notion that balance, among these aspects, affects specific and general learning. "It is difficult to focus on the four quadrants simultaneously and it is rare for these traditions to receive intensive attention in the same setting (p.15)". McKenzie (1991) also believes that greater time and resources should be devoted to teacher learning and more attention given to the needs of teachers as adult learners. His thinking parallels other writers who affirm and agree that one-shot staff development activities do not support a change of beliefs or practice. He reports profound shifts of attitude and behavior are acquired though immersion and believes the Web is a perfect vehicle for

immersion and the follow-up that scholars believe is important in planning truly effective technology staff development.

Glickman (1990) asserts an individual's decision-making, information processing, and understanding can improve with age. He believes that in viewing a teacher's growth or lack of growth, we should consider both the characteristics of the individual, the influences of the work environment, and the teaching profession. Glickman suggests teachers lose their enthusiasm for the profession and he challenges administrators to treat teachers as adult learners, enabling them to develop their individual potential.

In contrast to Glickman's positive view of individual growth with age, Ayers (1980) believes tenure after three years of teaching contributes to the decline in teacher effectiveness because tenure affords teachers a stable position. Ayers also questions whether teachers accept the norms of the school after the first three years and if there is a decrease in teachers' high ideals and expectations after that period. Both of these authors challenge teachers' learning and the rapid advancement of the Internet as a vehicle for inquiry and learning and support the need for an investigation of teachers' use of the Internet.

Butler (1992) reviewed literature on adult learning and describes eleven common descriptors of adult learners. Her literature review supports the notion that adults may underestimate their own ability to learn or may need additional time to adjust to new learning conditions and that adults exhibit a variety of learning styles. Butler reports adult learners' stages of development, "whether personal (cognitive, moral, ego, conceptual), chronological (early adulthood, mid-life, etc.) or professional (new or experienced teacher, etc.), profoundly affect their learning (p. 5)". Butler also believes age does not reduce a person's ability to learn but may reduce the speed at which learning

takes place and supports the idea that adults are motivated to learn by changes in their situations and learn best when new learning apply in practical ways and/or are relevant to the changes in their situations. Furthermore, Butler reports the literature supports the fact that adult learners must be treated as adults and respected as self-directed persons as adults learn best in non-threatening environments of trust and mutual respect. The common descriptors Butler reports support the need to investigate teachers' use of the Internet and the use of e-mail as a vehicle for supporting their level of technology adoption.

Support for life-long learning is also articulated by Stephen Brookfield in the International Encyclopedia of Education, found in (Tuinjaman, ed., 1995). Brookfield asserts that an examination of learning across the lifespan the variables of culture, ethnicity, personality and political ethos assumes far greater significance than the variable of chronological age. Brookfield presents four major areas of research on adult learning: self-directed learning, critical reflection, experiential learning, and learning to learn. He believes when these areas of research are combined, they constitute a theory of adult learning, and this theory provides information regarding the manner in which many adult educators practice their craft.

This examination of the literature supports the use of the Internet and World Wide Web as a viable method of increasing adult learning. Further research is needed to determine if the Web could prove to be an effective tool, supporting teachers as adult learners and facilitating the principles of adult learning theory.

Models of Professional Development

Models of teacher professional development were developed before the growth of technology and they are evolving as information technology increases. The paradigm of professional development is changing as the evolution of the information age unfolds and as public schools increase available technology. Stein, Schwan-Smith, and Silver (1999) identify and describe challenges that schools are likely to encounter as they design and implement new programs to help teachers learn new paradigms of teaching and learning amidst current educational reforms. These authors describe a new professional development paradigm that encompasses features including: embedded teachers assistance, development of teacher communities of professional practice, collaboration with experts outside the teaching community. In addition, they cite the lack of long-term studies of professional development and report one reason for this lack of research is the fact that no well-defined educational group supports the study of the learning and development of teacher educators.

Sparks and Loucks-Horsley (1990) present five staff development models be used for teachers that is individually guided; where individuals identify, plan, and pursue activities they believe will support their own learning. They maintain self-directed development empowers teachers to address their own problems and by doing do create a sense of professionalism. Their models are:

> Observation Assessment: Teachers are observed directly and given objective data and comments about their classroom performance.
>
> Training: Teachers engage in individual or group instruction in which they acquire knowledge or skills.
>
> Involvement in a Development or Improvement Process: New

> skills or knowledge may be required and can be attained through reading, discussion, training... Involvement in the improvement process can result in teachers' acquiring new skills, attitudes, and behaviors.
>
> Inquiry: Teachers identify and collect data in an area of interest, analyze and interpret the data, and apply their findings to their own practice. This model is based on the belief that the mark of a professional teacher is the ability to take "reflective action (Sparks & Loucks-Horlsey, 1990, p. 242)".

The inquiry model proposed by Sparks and Loucks-Horsey supports current and continuing research on teacher professionalism, action research, collegiality, and teacher reflective practice.

Similarly, Sherry, Billg, Tavalin, and Gibson (2000) believe the framework of other researchers needs extension in order to describe the systemic process in which technological, individual, organizational, and pedagogical factors interact through the life span if a program. The "Integrated Technology Adoption and Diffusion Model" (p.43) is based on their research, which found that teachers go through four distinct stages as they develop expertise with the Internet and Web. The stages in their model are: Teacher as Learner, Teacher as Adopter, Teacher as Co-Learner, and Teacher as Reaffirmer or Rejecter. In an evaluation of a technology project in Vermont, they found the use of technology can evolve to expand educators' use of collaborative professional development planning with technology professionals, as well as building the skills, knowledge and in-depth understanding of the content and pedagogy required for effective teaching and learning.

The "Four-Stage Model for Technology Adoption" described by Russell, offers a concise description of teachers' use and perceptions of technology adoption. This model describes each stage of adoption, how teachers interface with technology at each stage, and finally, what districts' should do to facilitate movement to a higher stage of adoption (Russell, 1995). Davis (1986) introduced the Technology Acceptance Model (TAM) to account for the psychological factors that affect computer acceptance. The model was originally developed to understand the causal link between external variables and user acceptance of PC-based applications.

Another adoption model is the Concerns-based Adoption Model (CBAM), a model of the change process that focuses on how individuals react to and implement innovations. The tool related to the Concerns-based Adoption Model is the Stages of Concern (SoC). This tool, developed by Hord, Rutherford, Hulig-Austin, and Hal (1987) through the Southwest Educational Development Laboratory, is used to measure how people feel about the innovation they are expected to implement. Where the Stages of Concern tool measures how people feel about the innovations they are asked to make, another CBAM tool, Levels of Use (LoU), assesses how people are actually using the innovations. The LoU measures behaviors. Eight LoUs, which are fairly congruent with the SoCs, have been identified; between each two levels is a decision point at which the individual has made the decision to shift behaviors. This model (Table 1) has been used to measure teachers' technology adoption behaviors.

Table 1

LuO Levels of Technology Use

Level of Use	Behavioral Indicators
VI. Renewal	The user is seeking more effective alternatives to the established use of the innovation.
V. Integration	The user is making deliberate efforts to coordinate with others in using the innovation.
IV B. Refinement	The user is making changes to increase outcomes.
IVA. Routine	The user is making few or no changes and has an established pattern of use.
III. Mechanical	The user is making changes to better organize the use of the innovation.
II. Preparation	The user has definite plans to begin using the innovation.
0I. Orientation	The user is taking the initiative to learn more about the innovation.
0. Non-use	The user has no interest, is taking no action.

Produced with permission from *Taking Charge of Change*, Shirley M. Hord, William L. Rutherford, Leslie Huling-Austin, and Gene E. Hall. Alexandria, VA: Association for Supervision and Curriculum Development and Southwest Educational Development Laboratory, 1987.

Another survey model that is referenced in the literature is the Stages of Adoption of Technology, developed by Christensen and based on the work of Russell (1995). Christensen's stages are: Awareness, Learning the Process, Understanding and Application of the Process, Familiarity and Confidence, Adaptation to other Contexts, and Creative Application to New Contexts (Christensen, 1997). The New Zealand Ministry of Economic Development surveyed 289 teachers using the Stages of Technology Adoption and reports 40% of the elementary and 41% of the secondary

teachers indicated Stage 4, familiarity and confidence (Knezek & Christensen, 1999). This self-assessment instrument is included in the Teachers and Technology: A SnapShot Survey (Norris & Solloway, 1997).

Follow-up support, as a model for technology training, is not widely discussed in recent literature. However, a model of follow-up assistance is described in Janet Smith Strickland's unpublished dissertation. Strickland describes a training follow-up procedure that was designed to improve teachers' use of the Internet through an experimental model that provided an opportunity for teachers to post comments and questions to a Listserv, following technology training. The author believes that a small sample size may have contributed to the lack of statistical significance for the research questions even though the participants in the experimental Listserv perceived the model as helpful (Strickland, 2000).

Likewise, Brown and Sheppard (1997) make a case that professional development programs need to provide follow-up, support, and pressure in order to achieve organizational objectives.

> "As individuals experience the learning curve which is inherent in doing something new, they want to revert back to the tried and true practices of the past. An excellent example of this can be found through observation of people attempting to keep pace with the rapid changes in computer software. Just when they have begun to master one version of a word processing program, another more advanced program is released. Many resist moving to the newer, improved version because they know that the learning curve will be painful and, in fact

> while they are learning, they will be less efficient. Many who do not perceive themselves as software pioneers need some pressure to move from one program to the next. They only move to the next program either when someone else can convince them that it is indeed an improvement or if they find that their program is no longer compatible with programs used by others and is beginning to cause them difficulty (p. 8).

Barriers to Computer Use

In a review of literature regarding teachers' use of the Internet, an examination of barriers to the use of computers may offer insight toward methods or models to eliminate these barriers. Several researchers found that time and ineffective training methods are foremost barriers to computer use. The Office of Technology Assessment states that teachers are "prisoners of time" and that their school day is devoted almost entirely on actual instruction. This research indicates teachers have little time available during the school day for planning, preparation, or learning new things (U.S. Department of Education, p. 31, 1994). In a recent article, Peck, Cuban and Kirkpatrick (2002) relate barriers to the question of why technology has had little effect on instructional experience of students. Their research shows four factors directly affect the choice of whether or not teachers use technology in their teaching. The first is the structure of traditional schools that departmentalize and isolate teachers into separate classrooms. The authors believe this prevents the spread of ideas from teacher to teacher. The next barrier they discuss is time. They state that teachers are already burdened by various time-consuming tasks and "taking a course on the Web, evaluating educational software, or searching for relevant

websites, teachers find that technology use requires a sizeable time investment p.479". In addition, these authors discuss defects in the technologies and competing educational priorities as barriers to technology use. Their research found that teachers reported frequent crashes and technological malfunctions doomed their lessons and caused them to revert to backup plans. Also, they believe technology is still a secondary goal in American education. "Policy makers approve million-dollar technology grants at the same time as they enthusiastically endorse standardized tests, which seldom encourage or reward computer use in the classroom (p. 479)".

Likewise, Renyi reports on a National Foundation for the Improvement of Education research study that maintains barriers to teachers' professionalism persist. The research identifies barriers including: resistant, top-down, and inflexible bureaucracies, paternalism toward a feminized workforce, and the sheer inert weight of habit. They discuss the view that although teachers' organizations have a clear stake in meeting the learning needs of their members, none has yet acted to change what and how teachers learn on the job (Renyi, 1996).

A paper presented at the Asia Pacific Regional Internet Conference on Operational Technologies considers attitudes to change as a barrier to the integration of information technology into learning and then explores issues relating to the professional development. Watson contends that professional development efforts have focused on "re-tooling" and need to change to the concept of "re-forming", if they are to break down barriers to technology integration (Watson, 1999, p. 9).

Additionally, Oleson (2000) explores teachers' innovativeness, perceived relevance, and self-competence as predictors of technology value and use. The dissertation examines a school district in its first year of a technology implementation plan and

describes barriers to the use of computers. Oleson suggests that teachers' ability to find value in the use of computers is a prerequisite to their ability to effectively use computers for educational purposes. Antrim's (2001) technology professional development plan speaks of similar barriers for teachers' use of the Internet.

Motivating Adults to Learn

Motivation of adult learners is central to the development of Internet use by teachers. A literature review by Wlodkowski (1985) lists specific factors that have an impact on adult motivation:

> Attitude: the learner's combination of concepts, information, and emotions about the learning that results in a predisposition to respond favorably.
>
> Need: the current condition of the learner, experienced as an internal force moving the learner toward the goal.
>
> Stimulation: any change in perception or experience of the external environment that prompts the learner's action.
>
> Affect: the learner's emotional experience.
>
> Competence: the learner's sense of effectively interacting with the environment.
>
> Reinforcement: the learning event maintains or increases the probability that the learner will achieve the appropriate response (Wlodkowski, 1985, p. 133).

Similarly, these factors are considered by Blase and Blase (1999) who confirm the importance of reflective professional growth for teachers. They challenge administrators to build a culture of lifelong learning through inquiry and collaboration. They concur with other writers that schools should apply principles of adult development to staff development programs. In another article by Blase and Blase (1998), the authors

describe their findings are consistent with research on teacher career development. Their research reveals that teachers have a strong need for growth including engaging in continuous collaboration, reflection, and critical thinking. They also suggest the exploration of autosupervision may prove useful. They describe autosupervision as teachers' supervision of their own instructional practices, including self-analysis, reflectivity, monitoring their own progress toward goals, and implementing changes based on reflection. Although the authors do not suggest that this model is adequate or appropriate for all teachers, they believe it should be investigated. .

In their writing, Blase and Blase include the following suggestions for educational learners and instructional leaders. They state that their findings support leaders who "adhere to the principles of adult learning; respond to and foster teachers' professional stage development; recognize and support different phases within teachers' life cycles; help teachers to understand, navigate, and learn from life transition events; enhance teacher motivation." (Blase & Blase, 1998, p. 7)

Santa (2000), writing in Reading Today, supports teacher participation in professional groups. She is a former president of the International Reading Association and expresses a strong opinion concerning the need for teachers to reflect upon their own practice. "Teacher scholars evaluate and learn about their own practice by continually puzzling about the progress of their students, by asking hard questions, and by being up-to-date on the latest research and thinking in their field (p. 31)". Santa argues that on one is born an expert teacher or scholar and that the journey to such expertise is long and never-ending. The International Reading Association supports professional efforts by providing forums for the interchange of information, by publishing and sponsoring research in reading, by helping to mentor new teachers, and by providing lifelong learning opportunities. "As I

learned more about how to be a better teacher, I began to realize that being a professional required more than obtaining a degree and a job. Being a professional required a commitment to continued learning and exploration (p. 32)".

Learning and Change

The process of learning and change is found in recent literature. An examination of this literature offers additional information on supporting teachers' professional inquiry through the use of the Internet. Butler (1992) believes change is a process and not an event. She writes the introduction to and training in new ways of doing things does not assure that people will immediately begin to do them. Butler believes change is a process that must unfold over time. For many teachers, the use of computer technology, the Internet, e-mail, and the World Wide Web means change, a change in beliefs, in actions, in thinking, and in comfort level. Similarly, Evans (1996) writes and quotes extensively on the subject of school change. He says, "Change immediately threatens people's sense of competence, frustrating their wish to feel effective and valuable (Evans, 1996, p. 32)". He believes that resistance to change accounts for many implementation problems in school reform. Additionally, Judd (1999) examines the changes in pre-service teachers coping in a technology learning environment, Judd reports that technology facilitates teachers' problem solving ability and argues that the change to a more constructivist classroom environment is enhanced by teachers' use of Internet.

Zinner (1998) offers a perspective regarding how school administrators might view life-long learning that can be applied to all school personnel. He says that asking what adults learned in school today "is a vital and persistent a question for grown-ups in schools as it has been for our students" (p. 4). He warns that the risks of depriving

educators the opportunity of learning are greater than imagined. "Our task is to lead others toward learning, but we can't lead where we won't go (p. 4)".

In discussing school and teacher change, Caine and Caine (1997) offer a historical and futuristic view of school change and changes they believe will improve teacher effectiveness. In, Education of the Edge of Possibility, the authors introduce the paradigm of change from the perspective of several new developments. They believe the fundamental ideas and purposes of traditional approaches to education continue to inhibit the appropriate type of change and adaptation that are necessary in our schools. They describe a new paradigm that requires an understanding of brain research and teaching to actualize the potential of the teacher.

Online Opportunities for Professional Learning

Possibilities for professional learning have been enhanced through the availability synchronous and asynchronous communication. It is important to investigate this literature because technology has provided new opportunities for professional learning. Two technological learning opportunities are synchronous communication, which occurs when people interact with each other at the same time, but at different locations and, asynchronous communication is designed so that people interact at different times and locations. Stewart (1999) researched asynchronous professional development for teachers. She compares the knowledge and attitudes of teachers who participated in traditional professional development classes with those who participated through online asynchronous communication. Stewart found no differences in knowledge or attitude of either group and she concluded that asynchronous learning networks provided a valuable opportunity for teachers' professional development. Mayadas reports that several

institutions are researching to determine the appeal and effectiveness of Asynchronous Learning Networks (ALN). Colleges and Universities appear to have an interest in promoting this nontraditional learning model (Mayadas, 1997).

Honey (1998) believes that as teachers' access to technology increases, technology will facilitate teacher collaboration. Writing for the Academy for Educational Development, she says that online professional development experiences can overcome the obstacles that have stood in the way of teachers establishing collegial practices with each other. She explores the notion of the Internet as a "safe" place where teachers can express concerns and discuss content and pedagogical issues with other teachers. It could also provide teachers with access to experts in specific fields and support as teachers implement instructional strategies in the classroom. The use of the computer as a professional development tool eliminates the barriers of time, schedule, and location. With these barriers eliminated, she contends that teachers may become motivated to search and explore professional information and communicate with others in a collaborative, safe, anonymous medium of the Internet. Honey believes that Internet discussions encourage reflective and thoughtful responses that can be posted at any convenient time and location. Also, Honey affirms the anonymity and asynchronous feature of the Internet is appealing because it frees the teacher to discuss issues that he or she may not be able to discuss with colleagues, administrators, or mentors. At this time, most teachers have access to a computer and online service at home and in school therefore, the time, schedule and location barriers for use are somewhat minimized (U.S. Dept. of Education, NCES, 2000).

In discussing online opportunities for teacher professional development, it is important to note an important tool some teachers use today is the personal digital assistant (PDA).

An examination of the literature regarding educational use of PDA's indicates the availability and portable nature of this devise has the potential to further reduce barriers to technology use and to promote Internet use by educators. Frauenfelder (1999) posits that in the future, teachers and students will synchronize information to and from their PDA's, from classrooms and from remote locations. He believes the possibilities that palm held computers afford will be studied extensively in the coming decade. Forrester Research (FORR) predicts that by 2002, handheld computers will start outselling personal computers (PC's) and the forecast is that 21 million handheld computers will be sold by the year 2003. They believe the educational community is already using this technology; therefore, it should facilitate professional learning much the same as the personal computer.

In discussing opportunities for online training, the *T.H.E. Journal* reports that school districts have not done a good job of demonstrating a compelling reason for teachers to use technology. Jackson (1999) writes that most educators believe they will use technology sooner or later and that they are waiting for later to happen. Jackson suggests Web-delivered staff development as an alternative current methods of training. He contents that Web-based delivery would minimize problems scheduling staff development and would meet the need of teachers who are at different stages on the technology adoption curve. Online training is also supported by Owen (1999), who indicates educators are just beginning to understand how information technologies, such as the World Wide Web, can complement the educational experience and school districts are beginning to offer online delivery of courses

The U.S.Department of Education National Center for Education Statistics report, "Teachers' Tools for the 21st Century: A Report on Teachers' Use of Technology"

(2000a) found that teachers used the Internet at home more for personal communication such as communicating with colleagues and parents rather than administrative tasks such as record keeping. NCES research found teachers with nine or less years of experience were more likely to engage in all of the activities, including creating instructional material, gathering information, accessing research, accessing model lesson plans, communicating with colleagues and parents, and administrative record keeping than teachers with more years of teaching experience. The report lists barriers to teachers' use of technology and among the most significant perceived barrier is inadequate training opportunities.

Table 2

Percent of Public School Teachers Who have Computers at School or at Home Reporting Using Computers or the Internet a Little or A lot at School and At home for Various Activities, By School and Teacher Characteristics: 1999

Activity	School Use	Home Use
Create Instructional material	78%	85%
Gather Information	59%	67%
Administrative Record Keeping	51%	44%
Access Research	37%	46%
Access Model Lesson Plans	34%	42%
Communicate with Colleagues	50%	48%
Communicate with Parents	25%	19%

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Furthermore, research by the U.S. Education Department, National Center for Educational Statistics (NCES) provides a wealth of data that are available on the Web. The NCES is the primary federal entity for collecting and analyzing data that are related to education in the United States and other countries (U.S. Dept. of Education, NCES, 2002). In addition to NCES data, a variety of online survey instruments has been developed to gather data regarding teachers' use of technology. Universities, research

organizations, and individuals have access to survey instruments and the ability to survey teachers on the Internet. For example, the Learning with Technology Profile Tool is a profile tool that compares current instructional practices with a set of indicators for engaged learning and high-performance technology. The North Central Regional Technology in Education Consortium and North Central Regional Educational Laboratory developed this survey. Another survey instrument is the School Technology and Readiness Chart (STaR Chart), which is used to assess the progress of schools and districts in integrating technology into the curriculum. This instrument was developed by the CEO Forum. The Technology Integration Phases is a self assessment of a teacher's confidence level in the integration of technology into the classroom. This instrument was developed by Box (1998). The Teachers and Technology: A SnapShot Survey, provides a snapshot of how prevalent technology is in education today and what educators believe about the technology. The authors use the survey to track the growth of technology use in the classroom. The Snapshot survey was developed by Norris and Solloway (1998), through the Texas Center for Educational Technology at the University of North Texas and the Center for Highly-Interactive Computing in Education at the University of Michigan (Texas Center for Educational Technology, 2002).

The Teachers and Technology: A SnapShot Survey is available to schools, districts, and individuals at no cost. The short survey is administered online via standard browsers and the developers provide data to the district, school, or individual who is conducting the survey. Survey takers receive individualized feedback, via e-mail, that contains a comparison of the survey taker's responses with their group's responses.

In 2000, over 3100 Nebraska teachers and administrators took the survey that provided Nebraska decision makers with a concise picture of teachers' attitudes, beliefs

and needs with respect to technology use in the classroom (Grandgenett, Mortenson, Norris, Soloway & Topp, 2000). Box (1999) used the SnapShot Survey in a Texas high school with 97 respondents. The teachers in this study indicated sufficient motivation to use technology but did not believe they had the tools or skills to integrate technology into the curriculum.

Business Connection

In a review of literature regarding teachers use of the Internet, it is necessary to research how the staff training takes place and whether there is, or should be, any connection training for teachers. According to Cole-Gromolski (1999), businesses are moving away from traditional trainer-led classes to Web courses. Businesses use the Web especially when large numbers of users need to be trained quickly. Some companies have cut their training budget by up to 75% by replacing traditional courses with online courses. Sullivan (2000) indicates that global learning will explode in the coming decade and learning will be a major opportunity for employees. In discussing types of current training methods available to everyone, Sullivan mentions technology-based training including the Internet, cybercolleges, DVE portable packages, global workshop discussions, and virtual reality training. Sullivan envisions a time when personnel will want to learn as a means of personal growth, rather than employees whose paradigm is that they must continuously learn in order to remain marketable. In addition, Serim (1999) reports, businesses are developing virtual academies for training staff. AT&T's "Learning Network's Virtual Academy" provides teachers with a way to find courses on the Web to meet their professional development needs in a convenient way, anytime, anywhere. The business world has adopted asynchronous learning networks as

a viable method of training employees. Businesses are using synchronous and asynchronous learning networks in an attempt to improve employee professional development. Likewise, Jackson (1999) indicates educators around the world are learning from their counterparts in business and the Internet is changing our world forever with its ability to provide almost any information that a teacher would need. He cites data from the U.S. Bureau of Labor Statistics that predict, in the future, 70% of our jobs will be knowledge jobs and that by 2010, 90% of those jobs will go unfilled. Jackson uses those statistics to justify the need for quality teacher professional development.

In reviewing the literature, it is important to note the contemporary phenomenon of educational institutions learning and integrating models from the corporate world. Models such as Total Quality Management, Seven Habits of Highly Successful People, Management by Objective, and Site-Based Management are examples of business paradigms that have successfully been incorporated into educational institutions (Sergiovanni, 1996; Evans, 1996). Although writers disagree about the appropriateness of the business to education connection, schools may opt to look at outside sources for answers to technology issues.

Gender, Age, and Years of Teaching Experience as Variables in Internet Use

The literature on these variables is not consistent. Although Marcinkiewicz (1993) found that gender did not predict level of technology use by teachers, research by Kay (1992) determined men had more positive attitudes toward computers than females. Chirieac, Burns & Case, (2000) report on a study of college students. "In 1997 females were more optimistic than males on some issues; they were more likely to agree that the

Internet will bring about a better way of life for the average man and that the Internet speeds up scientific progress. However, on other issues, females were more pessimistic than males; they were more likely to agree that the Internet is kind of strange and frightening (p. 6)". Recent NECS statistics (2000) continue to report increased computer/Internet use among younger, less experienced teachers.

Summary

The review of current literature indicates that developing a research study to investigate teachers' use of technology would enhance current knowledge in the fields of technology education and teacher professional development. The literature supports the fact that there is a limited amount of research on the use of the Internet as a resource for teachers' inquiry-based learning.

There is a need to research strategies that will enhance teachers' self-directed, inquiry based learning. The literature supports lifelong learning in education, andragogy, and the fact that many teachers are not yet comfortable with available technology, in spite of training that has been provided by school districts.

Our government, taxpayers, education departments, and parents are clamoring for proof that expensive technology is benefiting their child. The Web-Based Education Commission, established by Congress in 1997, recommends making professional development in technology a high priority. It cites several initiatives by Congress, states, universities, professional organizations, and the business community that support intensive technology training for teachers (U.S. Department of Education, 2002).

Everyone looks to teachers as the link between success and failure of computer use in our schools. Technology training does an adequate job of giving teachers skills on the

use of computers; however, we shift too quickly from providing teachers with techno-skills to mandating the use of technology with students and designing a curriculum that incorporates technology as a learning activity. The missing link is a method of encouraging and assisting teachers to use the Internet for their own professional inquiry. This researcher contends that school district technology plans skip an important step in the attempt to integrate technology into the curriculum. Little research is available on this type of assistance to teachers. Although the implementation of professional development programs is usually described at an organizational level, the variables for this study are viewed as teacher-level variables. It is common for individuals to have a different perception of their ability than do the organizations that employ them.

Teachers who take charge of their own learning need basic knowledge regarding how to seek information, analyze the obtained information, and make decisions about how best to use the information to enhance their teaching. Bracey (2000), reports that the National Foundation for the Improvement of Education (NFIE) and the National Education Association's Research Department conducted an extensive study of teacher professional growth, and found that teachers' interest in professional development is dedicated to improving student learning. 73% of the teachers in the survey indicated that when they study, they do so to improve student achievement. Only 34% indicated that they studied to increase their own knowledge.

This literature indicates there is support for teacher professional development becoming a way of being or an ethos, not simply a program or an activity. The current literature argues that learning should be sustained throughout teachers' working lives. This research proposes to design and investigate a potential for achieving this goal. The need for this study is supported by the recommendations of past research on methods to

increase teachers' adoption of technology, specifically their use of the Web for professional inquiry. The goal of this research is to determine how teachers are using the Internet for professional inquiry, whether teachers' level of technology adoption can be increased through follow-up e-mail support.

This research may have implications for administrators who are responsible for being instructional leaders within their schools, especially in the areas of professional development programs, support for teachers professional growth, and increasing the use of the technology infrastructure in their schools. It is important for schools to know how they should challenge and support teachers' pursuit of professional knowledge. This research proposes to examine whether the use of on-line opportunities for learning is a supportive, nurturing method of increasing teachers' quest for knowledge in the Information Age. Any model that is designed to support teachers' use of technology should include an assessment of teachers' level of technology adoption. An evaluation of teachers' level of adoption would assist school districts in their efforts to support teachers through the transition process of successive stages of technology implementation. This research seeks to determine if teachers can be motivated to use the World Wide Web and the vast amount of material on the Internet as a resource and a support for their professional learning, and if teachers who participate in technology professional development courses, will benefit in any way from receiving post-course support e-mail.

CHAPTER III

METHODOLOGY

The objective of this research was to investigate teachers perceptions and use of the Internet and World Wide Web as a resource for professional inquiry. The research had a two-fold purpose; an examination of whether teachers' use of the Internet and Web is related to their perceived stage of technology adoption and, whether participation in a professional development course on the use of the Internet or the Web along with follow-up e-mail support is an appropriate technique for increasing teachers technology adoption. The objective of the research was to determine if teachers' interest in using the Internet and their perceptions about the Internet increased when teachers received twelve follow-up e-mail that contained relevant Web links, software information, online course ideas, professional articles, and general support for the skills they learned in their Model Schools technology course. This chapter describes the data collection methods that were used, the Web-based methodology, as well as a presentation of the statistical analysis for the collected data.

Introduction

Quantitative methods were used to gather data for this research. Demographic information sheets, pre and post survey data from the Teachers and Technology: A SnapShot Survey (Appendix C), and a post experimental treatment questionnaire were

used to determine the effectiveness of the follow-up e-mail treatment to increase teachers' level of technology adoption and use of the Internet for professional inquiry.

The research was conducted in collaboration with the Capital Region BOCES, Northeast Regional Information Center, Model Schools Program. The research location was chosen based on familiarity with the Model Schools program and the participating school districts. The mission of the Model Schools program is to provide technology training to local school district staff members in the Capital District area of New York State. Currently, 16 school districts participate in the Model Schools program and the teachers in those school districts have unlimited free access to Model Schools technology courses.

Model Schools courses took place primarily during the traditional workday, as school is not in session during the months of July and August. The courses range from one-day two-hour courses to a five-day course for two hours each day. There were also a limited number of full day, 9:00 AM to – 3:00 PM courses. The Summer 2001 course catalogue contained sixty-two courses of technology training. Twenty-eight of those courses had an Internet/WWW focus or component. Of the 28 courses, 14 courses had sufficient enrollment to be given, as planned. The other 14 courses were not offered due to insufficient numbers of enrollees. The Model Schools 2001 summer course catalogue is included in Appendix A.

Teachers from all of the 16 Model Schools districts were invited to participate in this research. The researcher obtained permission to collaborate with BOCES Model Schools Program on this research study. A letter of explanation/request to conduct research and a letter of support from BOCES are included in Appendix A.

A letter of explanation was sent to the superintendents of the sixteen school district members of the Model Schools Program. This letter explained the research project, the teacher permission forms, the nature of the survey data that would be collected from the participants, and the follow-up e-mail support for the experimental group. The school district superintendents were offered the results of this research. The researcher's home telephone number and e-mail address is included in the letter to the school superintendents. The letter indicated that the researcher was available and willing to answer questions or concerns and that the Seton Hall University Institutional Review Board for Human Subjects Research approved this research. A copy of the superintendent letter is included in Appendix A.

Before the start of the Model Schools summer 2001 professional development program, the Model Schools course instructors were given an explanation letter from the researcher. This letter explained the procedure for passing out and collecting the participant materials, the script for the instructor to follow at the beginning of his/her course, and information regarding the purpose of the research. The letter indicated that BOCES Model Schools program and the researcher were collaborating on this project. A copy of this letter is included in Appendix A.

Description of Sample

Teachers from fifteen school districts that attended a web-based Model Schools course were invited to participate in this research. The teachers who were invited to participate in the research were from the following school districts: Bethlehem, Burnt Hills-Ballston Lake, Cobleskill-Richmondville, Cohoes, CRISA (Capital Region Independent School Association), Duanesburg, Guilderland, Manands, Middleburgh, Niskayuna, Roman

Catholic Diocese of Albany, Schalmont, Schoharie, Scotia-Glenville, and Voorheesville. The sixteenth school district is the Schenectady City Schools District. (Note: teachers from the researcher's school district were exempted from participating in the study to preserve an unbiased sample population.)

43 teachers (n = 43) agreed to participate in the research when they attended their BOCES Model Schools course in the summer of 2001. These teachers completed the demographic information sheet. This figure is approximately forty percent (40%) of the teachers who participated in one of 14 summer 2001 Model Schools web-based professional development courses. The researcher had no control over which teachers enrolled for courses. Each of the 43 teachers completed an initial demographic information sheet that included gender, age, years of full or part-time teaching experience. In addition, each subject indicated a level of technology awareness on the Stage of Technology Adoption scale. In the literature, the scale is referred to as both stage of adoption and stage of awareness. This scale relates to a person's use of computer technology within an educational setting. There are six levels from which each subject had to choose. The Stages of Technology Adoption was developed by Dr. Rhonda Christensen, University of North Texas, and is included in Chapter I (Christensen, 1997). Due to the fact that research communication took place solely through e-mail, the subjects were also asked to state all available e-mail addresses, at home, and/or at school.

The forty-three participating teachers self-selected their Model Schools technology course and were representative of the fifteen Model Schools participant districts within the Capital Region BOCES of New York State. Subjects' school districts were Bethlehem Central, Schalmont Central, Cobleskill-Richmondville Central, Niskayuna Central, Burnt Hills-Ballston Lake Central, Middleburgh Central, Capital Region

Independent School Association, and the Roman Catholic Diocese of Albany. All of the subjects indicated that they had Internet and electronic mail (e-mail) access in their schools and/or their home.

Table 3

Initial Subject Gender, Age, Years of Teaching Experience, and Initial Level of Technology Awareness

Gender	Age	Years Experience	Initial Level of Technology Adoption
F	49	5	5
F	47	15	4
M	36	16	6
F	36	13	5
F	46	2	6
F	59	34	6
F	48	27	4
F	44	6	6
F	47	20	5
F	57	35	6
F	55	26	6
F	55	20	5
M	46	23	6
F	47	20	4
F	44	15	4
F	40	4	5
F	50	15	2
F	51	25	5
F	54	9	2
F	53	30	5
F	52	15	4
F	30	6	5
F	60	36	4
F	43	20	4
F	48	4	5
M	32	10	5
F	46	23	2
F	44	7	6
M	40	18	6
F	52	14	4
F		35	6
F	48	20	4

Table 3 (cont.'d)

Gender	Age	Years Experience	Initial Level of Technology Adoption
F	42	12	4
F	40	18	5
M	44	21	4
F	30	7	4
F	38	17	6
F	45	13	5
F	54	20	5
F	35	11	4
F	40	15	5
F	39	14	4
F	30	7	4

The research formally began when Model Schools course participants arrived at the site for their technology course. At that time, they were given a copy of the research participation letter and permission form. The course instructor introduced the research via a scripted introduction that was read to the class by the instructor. This brief explanation was followed by a three-minute period when the participants could read the solicitation letter and research information. The letter explained the research and the requirements for participation, stated that participation was strictly voluntary, that participants would be able discontinue participation at any time, that all responses would be confidential, that responses would not be shared with school district personnel, and that data collected would be used for the purpose of educational research. The teacher letter asked that the subjects complete the information on the demographic information sheet, if they were interested in participating, and return the signed informed consent and demographic information sheet in a self-sealing envelope that was a part of the information packet. Participants were told to keep the research information sheet, regardless of their interest in participation. All course participants were asked to return the sealed envelopes to their

Model Schools course instructor. At the end of the class, the course instructor forwarded the envelopes on to the Model Schools coordinator. The coordinator then forwarded the envelopes on to the researcher. In this way, participants' anonymity was preserved. A copy of the solicitation letter, informed consent, demographic information sheet, and the Model School course instructor script is included in Appendix A.

The follow-up e-mail support commenced after each teacher completed a BOCES Model Schools Program technology course on the use of the Internet and/or the World Wide Web or a course that included instruction on an aspect of Internet/Web learning. When a teacher responded positively to the initial explanation letter, he/she was e-mailed the website for the Teachers and Technology: A SnapShot Survey along with a congratulatory e-mail. This 15-minute survey was developed by Norris and Salloway (1997) and provides an overview of how prevalent technology is in education today, what educators believe about technology, and how they use the it. The SnapShot Survey includes a self-assessment of a one's level of adoption/awareness of technology. The experimental group received the follow-up e-mail for a period of eight weeks after completion of their Model Schools web-based course and completion of the pre-SnapShot Survey. The control group received a congratulatory e-mail and a reminder to complete the pre-SnapShot Survey.

The researcher had to depend on the Model Schools course instructors and the Model Schools coordinator to introduce the research and coordinate the return of the required permission forms because the Model Schools courses took place in a variety of locations and at different times of the day. Because the Capital Region BOCES covers a four-county area that encompasses hundreds of miles, it was not possible for this researcher to

personally attend every course and since the participants were not solicited until they arrived at their course, prior participation permission was not possible.

The researcher's contact with all subjects was accomplished solely through Web-based communication. The research used e-mail communication, an online survey instrument, and a Web-based follow-up questionnaire. The informed consent for this research specifically indicated that the only contact the researcher would have with the subjects would be through e-mail. Once the subjects signed the informed consent to participate in the research, the initial e-mail contact was made. The initial e-mail (Appendix C) indicated the web address for the Snap-Shot Survey and the directions for continued participation in this research. It was sent to all participants within two weeks of the completion of their Model Schools course. As soon as this e-mail was sent to the address or addresses provided by the participants on the initial demographic information sheet, the researcher began to receive "undeliverable" error messages. As explained previously, this sheet was completed during the Model Schools course and returned to the researcher via the coordinator for the Model Schools program.. Because of illegible handwriting quality on some information sheets, the researcher had to eliminate subjects C 17, C 42, and C 43. There were no known e-mail addresses for these subjects. The researcher attempted to make e-mail contact but was unsuccessful in all attempts. Other subjects incorrectly wrote their e-mail addresses, especially home e-mail addresses. Because the school districts in the study area subscribed to similar e-mail servers, the researcher was able to contact the subjects, knowing a segment of a school e-mail address, in all but three cases. Additional information regarding the elimination of subjects will be discussed in the interpretation of the data in Chapter V.

As soon as the subjects completed the SnapShot Survey, they were randomly assigned to either the experimental or control group. Of the initial 43 participants, 21 continued their participation in the research. 21 of the initial participant group did not continue their participation in the research or complete the SnapShot Survey. The randomly assigned experimental group consisted of 11 teachers, while the control group consisted of 10 teachers. All participants in the experimental and control groups were female. There were five males who agreed to participate in the research, however, none continued participation by completing the SnapShot Survey.

Table 4

Subjects' Age, Experience, Pre-Survey Level of Technology Awareness, and Post-Survey Level of Technology Awareness

	Group	Mean	Std. Deviation	N
Age	Experimental	45.00	6.66	11
	Control	47.40	7.93	10
	Non-participants	44.19	8.38	21
	Total	45.17	7.79	42
Years of Teaching Experience	Experimental	14.64	5.57	11
	Control	16.80	9.50	10
	Non-participants	18.09	9.94	22
	Total	16.91	8.84	43
Initial Level of Technology Adoption	Experimental	4.36	1.03	11
	Control	4.90	1.29	10
	Non-participants	4.77	1.02	22
	Total	4.70	1.08	43

Only the control group received a congratulatory e-mail that recognized the course completion and indicated that they would be asked to complete the survey again in eight weeks. The experimental group received only the bi-weekly e-mail support messages for

a period of six weeks. The follow-up support messages included but were not limited to: congratulatory comments, links to technology-related articles from educational journals, software tutorial information, web-based lesson plan links, articles on current issues in educational technology, and opportunities for additional training through the Model Schools program. They also included messages of encouragement to use the skills the teachers had learned during the Model Schools course. The follow-up support e-mails were sent to each subject at the web addresses that the participants provided on the initial demographic information sheet. If the subject provided both a home and a school e-mail address, the researcher sent all e-mail correspondence to both e-mail addresses. Copies of the support messages are included in Appendix B. Model Schools courses were scheduled throughout the months of July and August and the timeframe for the six-week research period for the experimental group subjects was based upon the completion date of each subject's course and the completion of the pre-Snap-Shot Survey.

The control group received a follow-up e-mail congratulating them on participating in the Model Schools course, and thanking them for participating in this research. This e-mail was sent within one week of completing the pre-Snap-Shot Survey that recognized their course completion. The e-mail reminded the control group subjects that they would be asked to complete a follow-up Teachers & Technology: A Snap-Shot Survey at the end of the research period. A copy of this e-mail message is included in Appendix B. The control group did not receive the bi-weekly support e-mail that is described for the experimental group.

After the study period was complete, both groups received an e-mail that indicated that and reminded them to complete the SnapShot Survey. In addition, the e-mail for the teachers in the experimental group included a request to complete a questionnaire to

determine if they opened, read, shared, viewed, printed, or used the tips from the support e-mail that they had received. The questionnaire also asked the participants to indicate if they had visited the site, read any articles, shared any information with a colleague, or in any other way used the information that had been sent to them. This questionnaire asked the subjects how they intended to use the web information that they received and, in addition, asked for subjective feedback about the experimental treatment. These qualitative data were analyzed in a manner that decontextualized the commonalities and frequencies of responses. When the experimental treatment was completed, the researcher sent the experimental subjects an e-mail message with Web links to both the SnapShot Survey and to the follow-up questionnaire. The control group message contained the Web link for the SnapShot Survey.

Instrumentation

The Teachers and Technology: A Snap Shot Survey that was used as a survey instrument for this research is available free of charge to schools and districts for educational research purposes. The survey provides a snapshot of how prevalent technology is in education today, and what educators believe about the technology. The Snap-Shot Survey, developed by Cathleen Norris and Elliot Salloway (1998), has been used throughout the country. The Snap-Shot Survey organization is made up of faculty from the education and computer science departments at the University of Michigan, the University of Nebraska/Omaha and the University of North Texas. Funding for the Snapshot project is provided, in part, from a grant from the U.S. Department of Education, monitored by the North Central Regional Education Lab. A letter of request to use this survey instrument is included in Appendix A. The survey for this research

study was accessed by the subjects through a standard browser on the Internet at http://www.snapshotsurvey.org/tebban. The Snap-Shot Survey includes a self-assessment instrument called the Stages of Adoption. The Stages of Adoption is a self-assessment instrument of a teacher's level of adoption of technology, based on earlier work by Russell (1995) and Christensen (1997). Christensen's model includes six possible stages on which educators rate themselves: Awareness, Learning the process, Understanding and application of the process, Familiarity and confidence, Adaptation to other contexts, and Creative application to new contexts (Christensen, 1997).

Research Variables

The dependent variable in the research is the teacher's Level of Technology Adoption. The independent variable is the twelve follow-up support e-mail that the subjects in the experimental group received.

Research Questions/Data Collection Methods/Instrumentation

The purpose for the research is reflected in the research questions. The research questions are listed, along with an explanation of the methodology that was used to examine each question and the statistical analysis that was used for each question.

Question 1: To what extent do teachers who participate in self-selected Model Schools courses use the Internet as a tool for professional inquiry at home or at school?

Sub question: How much time do these teachers spend using the Internet each week?

Data for these questions were derived from answers on the Snapshot Survey and from the experimental group questionnaire that was used with the teachers in this group. This

experimental group questionnaire asked the subjects to indicate if they opened, read, shared, printed, and/or searched for more information as a result of the bi-weekly follow-up e-mail that was e-mailed to them. A process using descriptive statistics including frequency distribution (mean, median, percentiles) and a Paired Samples t-Test were used to analyze these data.

Question 2: Is a teacher's self-reported Stage of Technology Adoption a factor in whether the teacher is more likely to use the Internet as a professional resource? Teachers' levels of adoption, as indicated on the Stages of Adoption, were compared to the teachers' data from the Snapshot Survey. These data were analyzed for significance using a paired sample t-test.

Question 3: How will teachers' Stage of Technology Adoption change after a six-week period during which they receive bi-weekly e-mail that included Web links, online course offerings, listservs, software tips, and online articles? Sub question: How will teachers in the experimental group use the follow-up e-mail treatment to enhance their Level of Adoption?

The post experiment questionnaire provided descriptive data to answer this question. The post-experiment questionnaire data were analyzed through frequency distributions to determine the selection of responses to the questions on the follow-up questionnaire. In addition, a paired t-test for pre and post level of adoption was used to determine any significance to the data analysis. Questionnaire extended responses were analyzed to determine the commonalities, consistency, and frequencies of the responses. This information was used to controvert null hypothesis number 1.

Question 4: After the six-week follow-up test period, what differences exist in the

Stage of Technology Adoption for the control and experimental groups? This question was addressed by using descriptive statistics and an independent sample t-test. After the six-week follow-up period, both the control group and experimental group were asked to complete the post Snap-Shot Survey. These data were analyzed to determine if there was a correlation between groups on their level of technology adoption and to determine if any statistical differences occurred among the research variables. A correlation was used to analyze these data using Pearson Correlation Coefficient for two-tailed data. Data for this question were used to evaluate the second research hypothesis.

Question 5: How age, gender, or years of teaching experience related to teachers' self-reported Stage of Technology Adoption? This question was addressed by using a Pearson correlation, Chi-Square and the Wilcoxon Signed Ranks Test. These tests were used to compare data from the initial demographic information sheet and self-reported Stage of Technology Adoption, based on age, gender, and years of teaching experience in relation to subjects' reported level of technology adoption.

Research Design and Data

This research followed a pretest-posttest experimental design.

$$R - - \begin{cases} O \rightarrow X \rightarrow O \\ O \rightarrow \quad \rightarrow O \end{cases}$$

Data collection took place at the beginning and at the end of the research period. At the end of post course follow-up research period, the total data available for analysis included:

1. Teachers' pre-test self-assessment on the Stages of Technology Adoption that was a part of the demographic information sheet.

2. Self-reported age, gender, and years of teaching experience.
3. An e-mail address or both home and school mail addresses.
4. Survey results from the pre- Snapshot Survey.
5. Survey results from post- Snapshot Survey.
6. Results from the experimental group follow-up questionnaire.

Analysis of Data

The analysis of these data included descriptive statistics for the collected data. It consisted of a frequency distribution for teachers' level of adoption, responses on the pre and post Snapshot Survey, and responses on the post-study questionnaire for the experimental group. The analysis included calculation of the sample mean, median, and interquartile range of scores. These data are visually represented in Chapter IV. It was important to determine the standard deviation and variance for both the control and experimental groups. The comparison among teachers' perceptions before and after receiving the web links and articles was made using a paired sample t –test. The analysis of subjects' age, experience, and level of technology adoption were done with descriptive statistics, Chi-Square and the Wilcoxon Signed Ranks Test. The data were analyzed to determine if the null hypotheses would be retained at the .05 level of significance.

The open-ended responses from the post-experiment questionnaire were interpreted through the reflective analysis of the subjects' experiences through their participation in this research. These data did not consist of in-depth interviews of the subjects, only free responses to three questions on the post-follow-up questionnaire and one question on the Snap-Shot Survey. Participants were asked to provide their own typed answer on the web-based Snap-Shot Survey and web-based questionnaire. There was unlimited space

for them to type their responses. A reflective analysis was done to organize and categorize the open-ended responses in order to provide additional insight regarding the experimental treatment, from the participants' point of view.

In summary, this research sought to test an experimental model of post technology course follow-up e-mail, using a totally Web-based communication and data collection format. All subjects self-selected a Model Schools course and had school access to the Internet. The experimental follow-up e-mail treatment tested the impact of the experimental groups' use of the follow-up email to enhance their use of the Internet and level of technology adoption.

CHAPTER IV

PRESENTATION OF RESULTS

This chapter presents the results of the research using the data analysis methods described in Chapter III. The dual purpose of this research was to investigate the impact of Model Schools course follow-up e-mail support on teachers' level of technology adoption and their use of the Internet for professional inquiry. For accurate understanding of the analysis, each research question is restated before the analysis of presented data. The data were analyzed using the statistical software SPSS 9.0. The statistical procedures consisted of descriptive statistics, Pearson Correlation Coefficient, Paired Sample T-Tests, Independent T-Tests, Chi Square, and the Wilcoxon Signed Ranks Test.

Pre and post-surveys were used to measure the teachers' level of technology adoption and use of the Internet. Teachers who indicated an interest in participating in the research were e-mailed a request to complete the online SnapShot Survey. The SnapShot Survey consisted of a 24-item, Likert-type instrument that was developed to measure Internet use, level of adoption, and availability of Internet-connected computers at work and home. At the conclusion of the experimental e-mail treatment, the experimental subject group was asked to complete an online questionnaire related to the follow-up e-mail support. This questionnaire asked subjects to indicate how often they checked their e-mail and if they read, opened, bookmarked, printed, forwarded, or saved the follow-up e-mail they received from the researcher. The questionnaire provided for open-ended

responses regarding whether the subjects used or planned to use the e-mail material and solicited general feedback regarding the receipt of the follow-up e-mail.

Table 4, p. 54 represents the age, years of experience, and initial self-reported Stage of Technology Adoption for the experimental group, control group, and the initial interest group of forty-three teachers. The mean age of the experimental group was 45 years (N =11), the control group 47.4 (N = 10), and the initial interest group, 44.2 (N = 22). The mean years of teaching experience of the experimental group was 14.64 (N=11), the control group 16.8 (N = 10), and the initial interest group 18.0 (N = 22). On the initial Stage of Technology Adoption, the mean reported scores on a six-point scale for the experimental group was 4.36 (N = 11), the control mean was 4.9, and the initial interest group mean was 4.77 (N = 22). The total mean age was 45.17 (N = 42), years of teaching experience mean was 16.91 (N = 43), and initial level of technology adoption mean was 4.7 (N = 43). Although the experimental group was slightly younger, less experiences, and reported a slightly lower level of technology adoption, than did the control group, the differences were not statistically significant.

In analyzing the research questions, it is essential to note that the study had three groups, for which data was collected and analyzed. The "initial group" (n = 43) consisted of teachers who indicated an interest in participating in the study. This group completed the demographic information sheet, that included self-reporting their Level of Technology Adoption. Analysis of research question number 5 was based on data for this initial group. For questions 1 - 4, the analysis is based on the results of the data for the experimental and control groups (n = 21).

Research Question 1, Sub-Question 1

To what extent do teachers who participate in a self-selected Model Schools technology course use the Internet as a resource for professional inquiry at home or at school? Sub question: How much time do these teachers use the Internet each week?

The analysis for this question was carried out through a comparison of the descriptive statistics. Analysis of the data on the pre-survey indicates a high percentage of "Strongly Agree" and "Agree" responses for both the experimental and control groups for the statement, "If my district offered professional development activities delivered via the Internet, I would use them." 40% (n = 8) responded, "Strongly agree", 55% (n = 11) responded "Agree", and 5% responded "No Opinion" (n = 1). One subject did not respond to this question. The mean score for the sample respondents (n = 20) was 4.35 and the median score was 4.00.

On the post-Snap-Shot Survey, twenty subjects answered this question. 45% responded "Strongly Agree", 40% responded, "Agree", 5% responded "No Opinion", and 10% responded "Disagree". The mean score for the sample respondents (n = 20) was 4.20. A paired sample t-test for the pre and post data indicated a mean difference of .15, and a t-value of .547. Two-tailed significance was .591. This is not statistically significant at the .05 level.

Table 5

Pre-Snap-Shot Mean, Median, and Standard Deviation for SnapShot Survey

Snap-Shot Survey Question Or Statement	Mean	Median	Std. Deviation	N	Missing
If my district offered professional development activities delivered via the Internet, I would use them.	4.20	4.00	.95	20	1

Table 5 Continued

Snap-Shot Survey Question Or Statement	Mean	Median	Std. Deviation	N	Missing
With respect to the Internet, I feel that I…	4.05	4.00	.74	21	0
School Internet Use	3.62	4.00	1.24	21	0
Home Internet Use	3.69	4.00	1.49	16	5

Table 6

Pre-Survey Frequencies and Percent of Responses for "If my district offered professional development activities delivered via the Internet, I would use them."

If my district offered professional development activities delivered via the Internet, I would use them.	Pre Survey Frequency	Pre Survey Percent
Strongly Disagree	0	0
Disagree	0	0
No Opinion	1	5.0
Agree	11	55.0
Strongly Agree	8	40.0
Total	20	100.0

Table 7

Post-Survey Frequencies and Percentages for SnapShot Survey Question: "If my district offered professional development activities delivered via the Internet, I would use them."

		Frequency	Percent	Valid Percent
Valid	2	2	9.5	10.0
	3	1	4.8	5.0
	4	8	38.1	40.0
	5	9	42.9	45.0
	Total	20	95.2	100.0
Missing	System	1	4.8	
Total		21	100.0	

Table 8

Paired Samples Statistics for "If my district offered professional Development activities delivered via the Internet, I would use them."

	Mean	N	Std. Deviation	Std. Error Mean
Pre-Survey PD	4.35	20	.59	.13
Post-Survey PD	4.20	20	.95	.21

Table 9

Pre-Post Correlations for "If my district offered professional development activities delivered via the Internet, I would use them."

		N	Correlation	Sig.
Pair 1	Pre-Survey PD & Post-Survey PD	20	-.226	.338

Table 10

Paired Samples T-Test for "If my district offered professional development activities delivered via the Internet, I would use them."

	Paired Differences			t	df	Sig. (2-tailed)
Pre-Post Interest in Internet Professional Development Activities	Mean	Std. Deviation	Std. Error Mean			
	.15	1.23	.27	.547	19	.591

The pre-survey responses to the question of interest in online professional development indicated that the 95% of the subjects in sample population indicated that if their school district offered professional development activities via the Internet, they would take advantage of the activities. The post-survey responses to the same question indicated that 85% indicated both "Strongly Agree" and "Agree". In the post-survey 10% indicated "Disagree" and again, 5% indicated "No Opinion". No one indicated disagreement with this survey statement on the pre-survey.

Although not directly addressed in research question 1, the researcher chose to include data and analysis of teachers' confidence using the Internet. On the survey question which stated, "Complete this sentence: With respect to using the Internet, I feel I..." 28.6% responded "am much more skilled than the students" and 47.6% responded, "am more skilled than the students." 23.8% responded " have about the same skill level as the students" and no one responded, "am less skilled than the students" or "am much less skilled than the students." The mean score was 4.05 with a standard deviation of .74. Analysis of these data indicates that teachers believe they are at least as skilled as the students they teach are, and the majority, 76.2%, believes they are more skilled than their students are. These data suggests a significant level of confidence in using the Internet within this sample population.

Table 11

Frequency and Percent Data for survey question, "With respect to using the Internet, I feel I ..."

With respect to using the Internet, I feel I...	Frequency	Valid Percent
Am much less skilled than the students.	0	0
Am less skilled than the students.	0	0
Have about the same skill level as the students.	5	23.8
Am more skilled than the students.	10	47.6
Am much more skilled than the students.	6	28.6
Total	21	100.0

Table 12

Mean, Median, Standard Deviation Data for survey question "With respect to using the Internet, If feel…

N	21
Mean	4.05
Median	4.00
Std. Deviation	.74

For the survey item that stated, "Where do you get information about teaching with technology?" (Table 13, p. 72), the subjects had to rate the following sources of information from "no information from" (1) to "most information from" (5). The responses of the subjects indicate that they receive most of their information about teaching with technology from district training, mean score 4.17; resource people within the school such as a technology coordinator, media specialist, or curriculum coordinator, mean score 3.75; own reading and exploration, mean 3.75; trainers or consultants, mean 3.67; colleagues, mean 3.5; Internet websites, mean 3.08; conferences, mean 2.67; teacher magazines, mean 2.50; journals, mean 2.25; your students, 2.08.

These data indicate the subjects in this study rely heavily on district training and school resource people and colleagues for information about teaching with technology, however, they also indicate the subjects use their own reading and exploration as a source of technology information. The mean score for using Internet websites as a source of technology information was ranked sixth in mean scores, median score of three. This indicates that the respondents do not rely heavily on the Internet as a source of technology information at this time nor do they rely on their students, journals or teacher

magazines as these three criteria had the lowest mean and median scores among the ten variables.

Another survey question sought to determine the amount of time teachers use the Internet. The survey asked the respondents to indicate the number of typical (or average) minutes per week that they used the Internet at school and at home. For school Internet use, 4.8% responded they never use the Internet, 14.3% responded "less than 15 minutes", 14.4% responded, "15 - 45 minutes", 23.8% responded "46 - 90 minutes", and 42.9% responded "more than 90 minutes." The mean score for school Internet use was 3.62 with a standard deviation of 1.24, on a scale of 1 – 5.

The responses for the number of weekly minutes of home Internet use were: 18.8% indicated they never use the Internet, 18.8% indicated "less than 15 minutes", 25.0% indicated "15 - 45 minutes", 6.1% indicated "46 - 90 minutes" each week, and 31.3% indicated an Internet of "more than 90 minutes." The mean score for home Internet use was 3.69 with a standard deviation of 1.49, on a scale of 1 - 5. It should be noted that 5 of the 21 subjects did not answer the question regarding home Internet use on the SnapShot Survey. The number of respondents to this question was sixteen, n = 16. These data denote the research subjects indicated that they use the Internet more at school than at home.

For this question, both school and home use had a mean score above three, on a scale of 1 – 5. This indicates that the mean Internet use in minutes per week for the initial sample population was above "15 - 45 minutes per week" for both school and home use.

Table 13

Mean, Median, Percentile Responses to SnapShot Survey question:
"Where do you get information about teaching with technology?"

N=21	Teacher Magazines	Websites	District Training	Own reading and exploration	Your Students	Trainers or Consultants	Conferences	Journals	Colleagues	District Resource people
Mean	2.50	3.08	4.17	3.75	2.08	3.67	2.67	2.25	3.50	3.75
Median	3.00	3.00	4.50	4.00	2.00	4.00	3.00	2.00	4.00	3.50

Table 14

Level of Weekly School Internet Use in Minutes

Responses	Frequency	Percent	Valid Percent
Zero	1	2.3	4.8
Less than 15	3	6.8	14.3
15-45	3	13.6	14.4
46-90	5	9.1	23.8
More than 90	9	15.9	42.9
Total	21	47.7	100.0

Table 15

Level of Weekly Home Internet Use in Minutes

Responses	Frequency	Percent	Valid Percent
Zero	3	6.8	18.8
Less than 15	3	6.8	18.8
15-45	4	9.1	25.0
46-90	1	2.3	6.3
More than 90	5	11.4	31.3
Total	16	36.4	100.0

Research Question 2

Is a teacher's perceived Stage of Technology adoption a factor in whether the teacher is more likely to use the Internet as a professional resource? This question was addressed using a correlation of variables on the Snap-Shot Survey. Using a Pearson Correlation Coefficient for subjects' Stage of Technology Adoption, weekly Internet use at home, and weekly Internet at school, there was no statistical significance between the variables.

The correlation of variables for this question did not prove to be statistically significant. For this sample population, there is no correlation between teachers' Stage of

Technology Adoption and weekly Internet use either at school or at home. There is no significant correlation between teachers who indicated a higher level of technology adoption and a greater weekly use of the Internet either at school or at home. However, substantive, although not significant, correlations were found for teachers' level of adoption and school and home Internet use. A low negative correlation of -.313 was noted for level of adoption and weekly school use and a low positive correlation of .308 was found between level of adoption and weekly home use. These correlations do suggest that teachers with higher levels of adoption may use the Internet less and school and more at home.

Table 16

Correlation Data for Teacher Pre-Stage of Technology Awareness and Weekly Internet Use

		Pre-Level of Awareness	Weekly School Internet Use	Weekly Home Internet Use
Pre-Level of Adoption	N	21	21	16
	Pearson Correlation	1.000	-.313	.308
	Sig. (2-tailed)	.	.167	.246
Weekly School Internet Use	Pearson Correlation	--	--	.029
	Sig. (2-tailed)	--	--	.915
Weekly Home Internet Use	Pearson Correlation	--	--	1.000
	Sig. (2-tailed)			.

Research Question 3

How will teachers Stage of Technology Adoption change after a six-week period during which they receive bi-weekly Web links, online course offerings, list-serves, software tips, and online articles? Sub-question: How will teachers in the experimental group use the follow-up e-mail treatment to enhance their level of technology adoption? These research questions were addressed using frequencies, a paired samples t-test, and descriptive data from the post-treatment questionnaire. The experimental group pre-post mean was -.73 with a standard deviation of .65. The analysis indicated that there was a significant statistical difference between the pre and post test Stage of Adoption ($t = 3.739$, $p < .004$) (Table 17). The results indicate that there was statistically significant increase in the experimental group's Stage of Technology Adoption from pre to post survey responses. The increase in the experimental group's Stage of Technology Adoption was statistically significant at the .004 level. The 11 members of the experimental group received twelve follow-up e-mail that included encouragement to use technology in their daily work, a reference to their Model Schools course, articles on technology, software features, Internet features, cartoons that involved a technology theme, etc. (See Appendix C) After the experimental treatment was complete, the subjects received an e-mail that linked to the follow-up Snap Shot Survey and to the follow-up Questionnaire. The results of the questionnaire are presented in Table 18.

Table 17

Paired Samples Test for Experimental Group Pre-Post Level Of Technology Adoption

Group	Mean	SD	t	df	Sig. (2-tailed)
Experimental Group Pre-Post	-.73	.65	3.730	10	.004

Table 18

Frequency and Percent Data from Post-Experiment Treatment Questionnaire

Question	Frequency	Percent
Do you regularly check your e-mail?	0 - Rarely	0.0%
	0 - Occasionally	0.0%
	3 - Weekly	27.3%
	3- Daily	27.3%
	5- Several Times each day	45.5%
	11 – Total	
Did you read any of the e-mail that you received from this researcher?	0 – No	0%
	0 – Yes, A Few	0%
	0 – Yes, Some	0%
	4 – Yes, Many	36.4%
	7 - Yes, All or Most	63.6%
	11 – Total	
Did you open any of the links that were part of the follow-up e-mail?	0 – No	0%
	0 – Yes, A Few	0%
	4 – Yes, Some	36.4%
	5 – Yes, Many	45.5%
	2 – Yes, All or Most	18.2%
	11 – Total	
Did you print any of the e-mail you received?	3 – No	27.3%
	8 – Yes	72.7%
	11 – Total	
Did you save any of the follow-up e-mail for future reference?	1 – No	9.1%
	1 – Yes, A Few	9.1%
	3 – Yes, Some	27.3%
	2 – Yes, Many	18.2%
	4 – Yes, Most	36.4%
	11 – Total	
If you opened any of the Internet links to educational websites, did you bookmark any of the links that you opened?	5 – No	45.5%
	6 – Yes	54.5%
	11 – Total	
Did you forward any of the follow-up information to anyone else?	7 – No	63.6%
	4 – Yes	36.4%
	11 – Total	

Table 18 Continued

Frequency Data from Post-Experiment Questionnaire

Question	Frequency	Percent
Did you feel that the e-mail you received were: Choose as may as appropriate		
Useful	11	100%
Relevant to my work	10	90.9%
Increased my use of the Internet	5	45.5%
Did not increase my use of the Internet	3	27.3%
Not helpful to me	0	100.0%
Do you believe the follow-up e-mail increased or enhanced your use of the skills your learned in your Model Schools Course?	2 – No	18.2%
	1 - Unsure	9.1%
	8 - Yes	72.7%
	11 - Total	100.0%

In response to the questions on the questionnaire, five subjects indicated that they checked their e-mail several times each day, three checked daily, and three checked weekly. Seven subjects read all or most of the e-mail they received and four said they read many of them. Two subjects indicated that they opened all or most of the links that were included in the e-mail, five opened many of the links, and four opened some of the links. Eight subjects indicated that they printed some of the e-mail and three indicated that they did not print any of the e-mail. Four subjects indicated that they saved all or most of the e-mail for future reference, two saved many, three saved some, one saved a few, and one did not save any of the e-mail for future reference. Six of the subjects indicated that they bookmarked links that they opened and five subjects said they did not bookmark any links to educational sites that they opened. Seven subjects said that they

did not forward any of the material and four did forward some of the e-mail to another person. All eleven subjects found the e-mail helpful and useful. Eight subjects believe the follow-up e-mail increased or enhanced the skills they learned in their Model Schools course. One subject was unsure whether this occurred. Two subjects indicated that the follow-up e-mail did not enhance what they learned in their Model Schools course. Ten of the eleven subjects found the follow-up e-mail to be relevant to their work. Five subjects indicated that the follow-up e-mail increased their use of the Internet and three indicated that receiving the follow-up e-mail did not increase their use of the Internet.

The data from the follow-up questionnaire indicate that within this sample, teachers read the e-mail, printed them, and opened at least some of the links that they received. All of the subjects found the e-mail useful and 90% found them relevant to their work. 45% did not bookmark any of the websites, 63% did not forward the information on to anyone else, 45% indicated that the e-mail increased their use of the Internet, and 27% indicated that the e-mail did not increase their use of the Internet.

In addition to the Likert-type questions on the post-treatment questionnaire, there was one open-ended response follow-up to question number 6. This question asked, "If you opened any of the links to educational sites, did you bookmark any of the links that you opened? If yes, how do you think you will use the bookmarked links?" Five subjects wrote statements in response to this question.

The subjects' open-ended responses were:

Subject A 1 - To access information/ideas I might be able to integrate into the curriculum. To see what other educators are doing and to further educate myself. Subject A 3 – Will use when time permits. I always look for material to use with my students. Subject A6 -

potentially for lesson development. Subject A 8 - They are filed in corresponding subject folders under my teaching links and will be used to enhance my teaching material and sites that the students can visit and use. Subject A 10 – I plan to refer to them in the future when I have time to explore the information more thoroughly. Subject A 11 – They are bookmarked in my school folder. I will use them with some classes.

The responses to this question indicate that the subjects will use the bookmarked web links with students and as a resource for lesson development for students. Students and/or classes were mentioned in five of the responses. Two responses mentioned the issue of time. Lack of time is a recurring theme in the subjects' responses. The other subjects did not enter a response to this question or did not indicate that they bookmarked any of the links.

The last part of the questionnaire sought feedback information from the subjects and stated, "please provide this researcher any additional comments regarding follow-up e-mail that you would care to share." An open response form allowed subjects to type a response of unlimited length. Seven of the eleven members of the experimental group wrote a comment.

Subject A 3 – These e-mail were helpful and well organized. I wish I could continue to receive them. Subject A 4 - I enjoyed the Internet clip are and the sounds because I am trying to improve my skills in Powerpoint. Subject A 1 - I really appreciated receiving the e-mail. My sister is an educator in a small school district and I forwarded several of the e-mail to her because I was impressed with the content on the identified sites. I've always used the Internet for personal business, but I have increased my use for class related activities and presentations. Subject A 5 – I liked the ideas and info about sites.

However, I haven't had time to explore them as much as I would like. I am taking a graduate course in addition to teaching this year so free time is at a premium. I still have the e-mail and plan to look at them more carefully and visit several more of the sites when I have some time. Subject A 8 - I greatly appreciate the e-mail with the sites that were sent to me. As I am sure you have experienced, there are just not enough hours to search as much as we would like to for quality information on the Internet. It was a real treat to have sites sent to me that I may or may not have found on my own even if I could find the time. Thanks again! Subject A 10 – The follow-up research was very helpful, but in the course of the day with other things to do it was not always possible to explore in-depth the new materials. Subject A 11 – I learned some new sites. Thanks for the information. I found them very relevant and I plan to share them with other teachers that are working on integrating technology with their students.

The results of the open-ended responses from the experimental group indicate those that responded found the e-mail useful, helpful, and acquainted teachers with sites that they may not have found searching on their own. The responses expressed appreciation for the follow-up e-mail. The lack of time to explore the sites and links was mentioned as a concern by three subjects. One teacher indicated an interest in continuing to receive the e-mail. No negative feedback regarding the experimental follow-up e-mail was received.

The SnapShot Survey had an open-ended question that the respondents could answer by typing a response. The question was, "What specific topic would you like to have a professional development training session address?" Fourteen of the twenty-one subjects responded to this question. Their responses were:

Subject A 3 - students using the Internet. Subject A6 - faster ways to sift through the sites that are not appropriate for what we want to use them for, creating web quests, more home page instruction, use of technology, eg. Inspiration to develop study guides, data base development for tracking grades, any way to use technology to reduce paperwork and increase time with students. Subjects A 4 and A 11 - Microsoft Office, PowerPoint 2. Subject A 1 - independent study with knowledgeable help there. Subject A 10 - building curriculum units for new standards using the web, social-emotional behavior, primary students and realistic uses of technology in a classroom. Subject A 5 - activities for using technology in social studies for high school students given the fact that I have ONE computer in the classroom, related to school counseling.

Each of these fourteen subjects had an idea of some specific topic that she wanted addressed in professional development training. In analyzing these responses, the researcher assigned a Stage of Technology Adoption to each response. The table below identifies how the responses align to the stages.

Table 19

Subjects' Responses Related to Stage of Awareness of Technology

Snap-Shot Survey Response	Related Level of Technology Awareness
students using the Internet	3 – Understanding and application of the process
faster ways to sift through the sites that are not appropriate for what we want to use them for	6 – Creative application to new contexts
creating web quests,	5 – Adaptation to other contexts
more home page instruction	5 – Adaptation to other contexts

Table 19 Continued

Snap-Shot Survey Response	Related Level of Technology Awareness
use of technology, eg. Inspiration to develop study guides, data base development for tracking grades	3 – Understanding and application of the process
any way to use technology to reduce paperwork and increase time with students	3 – Understanding and application of the process
Microsoft Office	3 – Understanding and application of the process
PowerPoint 2	3 – Understanding and application of the process
independent study with knowledgeable help there	5 – Adaptation to other contexts
building curriculum units for new standards using the web	5 – Adaptation to other contexts
social-emotional behavior	Unsure of meaning of the response
primary students and realistic uses of technology in a classroom	3 – Understanding and application of the process
activities for using technology in social studies for high school students given the fact that I have ONE computer in the classroom	3 – Understanding and application of the process
related to school counseling	Unsure of meaning of the response

In addition to the questionnaire feedback, the researcher received e-mail responses from subjects after they received follow-up e-mail. The comments that were received were all positive responses. During the research, there was no solicitation of comments regarding the follow-up e-mail, the survey, or the questionnaire. Subject A 11 sent four e-mail responses. One e-mail was received after the subject completed the Snap Shot Survey and three after the subject received follow-up e-mail numbers 1, 6, and 10. Subject B 3 responded to the post-test e-mail reminder. B 3 was a member of the control group and her e-mail response consisted of a message that she had taken the follow-up Snap-Shot Survey. Subject B 1 sent an e-mail message after completing the initial Snap-Shot Survey, "I am participating in your research and just completed the Snap-Shot

portion. I am a school librarian and was disappointed not to see Media Specialist as an Assignment selection." Subject A 7 said, "I just wanted to thank you for the information you have sent the last few weeks. It has been very informative and useful for me in my teaching. Thanks again." In analyzing the responses, it is apparent that these subjects were comfortable using their e-mail system, that some wanted to voice a survey concern (Subject A 7), or to indicate a completed stage of research participation. The unsolicited e-mail responses represented both the experimental and control groups.

Research Question 4

After the six-week follow-up test period, what differences exist in the Level of Technology Adoption between the experimental and control groups?

This question was addressed by using an independent sample t-test. On the pre-awareness level, the mean score for level of technology awareness was 4.36 with a standard deviation of 1.03 for the experimental group and 4.90 with a standard deviation of 1.29 for the control group. The post level of awareness mean for the experimental group was 5.09 with a standard deviation of 1.04 and for the control group the post level mean was 5.10 with a standard deviation of 1.10.

Table 20

Mean and Standard Deviation for Pre – Post Stage of Adoption

	Group	Mean	SD	N
Pre- Stage of Awareness	Experimental	4.36	1.03	11
	Control	4.90	1.29	10
	Total	9.26	2.32	21
Post- Stage of Awareness	Experimental	5.09	1.04	11
	Control	5.10	1.10	10
	Total	10.19	2.14	21

The data from the two groups indicates that there was a greater increase in the Stage Of Technology Adoption for the experimental than for the control group. The results of a paired sample t-test for the control and experimental groups revealed the control group pre-post mean was -.20, with a standard deviation of .42, and a Standard Error Mean of .13. A t-value of -.1.500 with degrees of freedom of 9 had a significance of .168. On the paired t-test, the experimental group pre-post scores had a mean of –73, with a standard deviation of .65, and a standard error mean of .19. The t-value of -.3.730 with degrees of freedom 10 was significant at the .004 level. A statistically significant increase was noted between the experimental group pre-post scores on the Stages of Technology Adoption.

Table 21

Control Group Pre-Post t-Test Results

		Paired Differences Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pair 1	Control Pre- Post	-.20	.42	.13	-1.500	9	.168

Table 22

Experimental Pre-Post t-test Results

		Paired Differences Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pair 1	Experimental Pre-Post	-.73	.65	.19	-3.730	10	.004

The results of the paired t-tests indicate that both the control and experimental groups increased their level of adoption after completing a BOCES Model Schools course, however, only the experimental group increase in adoption was found to be statistically significant. The increase in level of adoption is consistent with NCES data, which describes three topics of high importance in their current study of educational technology. They cite limited research on how teachers use existing technology, how prepared teachers are to use existing technology, and how schools and classrooms support teachers' use of the existing technology (U.S. Dept. of Education, NCES, 2000a).

Research Question 5

How are age, gender, or years of teaching experience related to teachers' self-reported Stage of technology adoption? This question was addressed by using a Pearson Correlation Coefficient for two-tailed data, Chi Square, and Wilcoxin Signed Ranks Test. Data for this question was based on the initial participation group that included 43 respondents.

On the Pearson Correlation Coefficient, represented by Table 23, the strongest correlation was between age and years of teaching experience, .606. This moderately positive correlation was statistically significant at the .01 level of significance. For this sample population, the teachers with the highest number of years experience were also the oldest, therefore, this correlation is statistically significant. The low positive correlation between gender and level of technology adoption, .238, age and level of technology adoption, .124, and years of teaching experience and level of technology adoption, .099, were not found to be statistically significant. Other correlations of interest, but that are not part of the research question were, gender and age, -.271, gender

and experience, .029. These correlations were not found to be statistically significant. For this research sample, gender, age, and years of teaching experience did not significantly correlate with teachers' level of technology adoption. The lack of correlation between the variables of age, gender, and years of teaching experience to level of technology adoption makes the research more important, in view of the fact that Becker (1999) reports, teachers under thirty are more likely to use the Internet and perceive it as more valuable than teachers in the 31-50 and over 50 age groups, and an NCES report "Survey on Public School Teachers Use of Computers and the Internet," (U.S. Education Department, 2000b), indicates that teachers with 3 – 9 years experience felt more prepared to use the Internet than did teachers with more years of experience.

Chart 23

Correlation between Age, Years of Teaching Experience and Level of Technology Adoption

	N=43	Gender	Age	Years Of Teaching Experience	Level Of Technology Adoption
Gender	Pearson Correlation	1.000	-.271	.029	.238
	Sig. (2-tailed)	.	.078	.855	.124
Age	Pearson Correlation	--	--	.606	-.005
	Sig. (2-tailed)	--	--	.010	.973
Years of Teaching Experience	Pearson Correlation	--	--	1.000	.099
	Sig. (2-tailed)	--	--	--	.527
Level of Technology Adoption	Pearson Correlation	--	-.005	.099	1.000
	Sig. (2-tailed)	--	.973	.527	--

In an effort to further analyze the data for question 5, a Chi-Square test was done. Chi-Square results were not found to be statistically significant, however, interestingly enough, the three subjects who indicated a "level 2" on the Stage of Technology Adoption had different years of experience and ages. One subject had 1 - 9 years of experience, one had 10 - 15 years of experience, and one had 16 - 25 years of experience. Within this group of three, two were between the ages of 41 - 50 and the other subject was 50+. There were 15 subjects who were a "level 4" on the Stage of Technology Adoption. One subject had 1 - 9 years of teaching experience, eight had 10 – 15 years experience, four had 16 - 25 years, and two had 26 - 40 years experience. Four were between the ages of 30 - 40, eight were 41 - 50, and three were 50+. There were 14 subjects who indicated they were a "level 5" on the Stages of Technology Adoption. Of these, four had 1 - 9 years experience, four had 10 - 15 years, five had 16 - 25, and 1 had 26 - 40 years of teaching experience. Six of the subjects at "level 5" were 30 – 40 years old, four were 41 - 50, and four were 50+. There were 11 subjects who indicated they were "level 6" on the Stages of Technology Adoption. Three of this group had 1 - 9 years of experience, four had 16 - 25, and four had 26 - 40 years of experience. Three were ages 30 - 40, four were 41 - 50, and three were 50+. The literature on age, experience, and level of technology adoption suggests the opposite of what was found in this research. Tables 24 and 26 present Cross-Tabs results that relate to age and years of teaching experience.

None of the variables for this research question was found to have statistical significance. Within the sample population, age, gender and experience was not a factor

in a subjects self-reported level of technology adoption. Tables 24 – 27 represent the Crosstabulation and Chi-Square data for research question 4.

Table 24

Years of Experience and Pre-Level of Technology Adoption Crosstabulation

Years of Teaching Experience		Pre-Level of Technology Adoption				
		2	4	5	6	Total
1-9 years	Count	1	1	4	3	9
	% within Pre-Adoption	33.3%	6.7%	28.6%	27.3	20.9%
	Std. Residual	.5	-1.2	.6	.5	
10-15 years	Count	1	8	4	0	13
	% within Pre-Adoption	33.3%	53.3%	26.6%	0%	30.2%
	Std. Residual	.1	1.6	-.1	-1.8	
16-25 years	Count	1	4	5	4	14
	% within Pre-Adoption	33.3%	26.7%	35.7%	36.4%	32.6%
	Std. Residual	.0	-.4	.2	.2	
26-40 years	Count	0	2	1	4	7
	% within Pre-Adoption	0%	13.3%	7.15	36.4%	16.3%
	Std. Residual	-.7	-.3	-.8	1.7	
Total	Count	3	15	14	11	43
	% within Pre-Adoption	100%	100%	100%	100%	100%

Table 25

Chi-Square Test for Years Teaching Experience and Pre- Level of Technology Adoption

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.540	9	.185
Likelihood Ratio	15.789	9	.071
Linear-by-Linear Association	1.205	1	.272
N of Valid Cases	43		

Table 26

Subject Age and Pre-Level of Technology Adoption Crosstabulation

Age Group			Pre-Level of Adoption				
			2	4	5	6	
			Total				
1	30-40	Count	0	4	6	3	13
		% within Pre- Adoption	.0%	26.7%	42.9%	30.0%	31.0%
		Std. Residual	-1.0	-.3	.8	-.1	
2	41-50	Count	2	8	4	4	18
		% within Pre-Adoption	66.7%	53.35	28.6%	40.0%	42.9%
		Std. Residual	.6	.6	-.8	-.1	
3	50 +	Count	1	3	4	3	11
		% within Pre-Adoption	33.3%	20.0%	28.6%	30/0%	26.2%
		Std. Residual	.2	-.5	.2	.2	
Total		Count	3	15	14	10	42
		% within Pre-Adoption	100.0 %	100.0%	100.0%	100.0%	100.0%

Table 27

Chi-Square for Age and Pre-Level of Technology Adoption

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.492	6	.745
Likelihood Ratio	4.371	6	.627
Linear-by Linear Association	.257	1	.612
N of Valid Cases	42		

Summary

This chapter is organized to answer the research questions that are presented in Chapter I. Chapter IV presents a summary of the data related to the administration of a previously explained online survey and follow-up questionnaire to teachers in the Capital

District region of New York State after they participated in a BOCES Model Schools web-based technology course during the summer of 2001. The data analysis of the experimental treatment and post-course e-mail follow-up also includes the online post-treatment questionnaire for the experimental subjects. Pre-post data from the experimental and control groups is presented. In addition, open-ended survey and questionnaire responses are presented and analyzed for commonalities and connection to subjects' level of technology adoption and their use of the Internet. The research explored an approach that was totally web-based that relied only on e-mail and online survey response for communication between subjects and researcher.

In Chapter V, the researcher will offer an interpretation of the data and conclusions from the data analysis. Interpretation of the presented data will examine the experimental technique as it related to increasing teachers level of technology awareness through the use of Model Schools course follow-up e-mail to support and encourage Internet use. The interpretation of the data will be explained further through the recommendations and research conclusions.

CHAPTER V

SUMMARY, INTERPRETATIONS, LIMITATIONS, AND RECOMMENDATIONS

Introduction

In 1999, U.S. Secretary of Education Richard Riley claimed, "We are far enough along in the technological revolution and its application to learning that it is time for a systematic review and analysis of what works best (Riley, 1999)". Riley's suggestion was inspirational in the design of this research. The purpose of this research study was to analyze how teachers are using the Internet and whether teachers who receive follow-up e-mail after completing a web-based professional development course would increase their level of technology awareness. The researcher sought to design a totally Web-based methodology to test an experimental treatment of follow-up supportive e-mail that provided teachers with websites, web ideas, articles, and information related to teaching and teachers use of the Internet. The results presented in Chapter IV answer the five major research questions. This chapter intends to analyze and discuss those findings, provide a summary of the research purpose, methodology, and review the results of the data analysis. The chapter provides the interpretation of the statistical results based upon information technology and adult learning theory and discusses potential implications of the experimental research. Conclusions from the data analysis are provided along with the limitations of the study. Lastly, the chapter offers recommendations for further research as suggested by the research results.

Research Findings and Discussion of Sample Characteristics

Five research questions were designed to obtain data on teachers who completed a web-based Model Schools technology course during the summer of 2001. The research sought to test an experimental treatment, which consisted of 12, follow-up e-mail correspondence that contained material to support the teachers after completion of a Model Schools web-based course. Furthermore, the research sought to understand teachers' Level of Technology Adoption and the factors that may influence their level of technology adoption.

The descriptive information presented in Chapter IV regarding the sample explained demographic information relative to age, gender, and years of teaching experience in relation to the three study groups: experimental, control, and initial participants. In addition, the chapter connected the demographic information to teachers' initial Stage of Technology Adoption. A total of forty-three (N=43) teachers agreed to participate in the research by completing a demographic information sheet with their current level of technology adoption. This group has been referred to as the initial participation group. Of the forty-three teachers who agreed to participate, twenty-one completed the required SnapShot Surveys. The twenty-one teachers who participated in the research were randomly divided; eleven were assigned to the experimental group and ten to the control group.

Analysis indicated that there was a statistically significant difference between the pre-post measure of technology awareness of the experimental and control groups. The experimental group increase in technology awareness was found to be statistically significant at the .004 level. This group increased their level of technology awareness

more than the control group that did not receive the post-course follow-up e-mail support. There was no statistical significance found between age, experience and subjects' Level of Technology Adoption. In addition, the results indicated that both home and school Internet use had a mean score above "three" on the five-point Likert scale, which indicated that the mean Internet use in minutes per week for the initial sample population was above "15-45 minutes per week". No correlation was found between teachers' stage of technology awareness and their use of the Internet either at home or at school.

The subjects' open-ended responses to the post-experimental questionnaire indicated that the follow-up e-mail the experimental group received were perceived as helpful, useful, appreciated, and that they acquainted teachers with websites they may not have found themselves. Several respondents mentioned time constraints as an issue for their lack of exploration of the follow-up e-mail. All respondents were positive about the e-mail follow-up.

The open-ended response data for this research was collected from four sources: the demographic information sheet with level of technology awareness that the participants completed at their Model Schools course, the pre and post SnapShot Survey, and from the post-experimental questionnaire. The collection of these data served to answer the research questions as outlined in Chapters I and III of this study. Experimental and control group data (n = 21) were used to interpret research questions 1 – 4 and initial participation group (n = 43) data were used for research question 5. This section seeks to provide an interpretation of the analyzed data.

Interpretation of Data

Research question 1 and sub question addressed the extent to which teachers in the sample used the Internet for professional inquiry and how much time they use the Internet each week either at school or at home. The analysis of this question utilized descriptive statistics, specifically frequency distributions. A paired sample t-test for the pre and post data indicated a mean difference of .15 with a t-value of .547. Two-tailed significance was .591 and therefore, is not statistically significant. The SnapShot Survey asked teachers how much they used the Internet at home and at school. The results indicate that teachers use the Internet more at school than at home. Also, the results indicate that 95% of the teachers in the sample population would be interested in professional development activities via the Internet, if there school district offered this option (Table 4). The paired sample t-test for pre and post responses to this question was not statistically significant, although 10% of the subjects did not indicate an interest in Internet-based professional development. These results are significant for both the Model Schools program and for school districts to examine when planning future technology training opportunities. These results reinforce the work of Stewart (1999) who researched asynchronous professional development for teachers concluding that such learning networks provide a valuable opportunity for teachers' professional development. In addition, these results support Owen (2000), whose research describes the fact that educators are just beginning to understand how information technologies, such as the World Wide Web, can complement the educational experience.

One SnapShot Survey question asked subjects to rate their Internet skill in relation to their students. Because question is indirectly related to the research question, these data

were included in the analysis of question 1. Literature cites lack of technical ability in using the Internet as a barrier to technology adoption (Peck, Cuban, and Kirkpatrick, 2002). Therefore, data on Internet confidence is noteworthy and the sample population exhibited a significantly high level of Internet confidence. Seventy-six percent of the subjects reported that they are more skilled than their students are at using the Internet. Although, one might assume that a reason the teachers rated their level of Internet confidence so high was because the students were elementary age, the distribution of reported teaching assignments does not support this observation. Because the findings in this research supports literature on professional development using the Internet, teachers' level of esteem in using the Internet is an area that needs to be explored further.

Another survey item asked teachers to indicate the source of the information they acquired regarding teaching with technology and to rank each of the following in order of importance for teaching with technology: teacher magazines; websites; district training; own reading and exploration; their students; trainers or consultants; conferences; resource people; colleagues; or journals. The analysis indicates that the subjects in this study rely heavily on district training, school resource people, and their colleagues for information about teaching with technology. In interpreting the analysis of data for this question, the researcher notes that the mean score for using Internet websites as a source of technology information was ranked sixth of the ten information sources. On the five-point Likert scale, using Internet websites had a mean score of three. This indicates that the teachers in the sample population do not rely heavily on the Internet as a source of technology information at this time. There were other sources of information that ranked higher in use and importance for the sample subjects.

Research question 2 addressed whether a teacher's perceived Level of Technology Adoption related to the teacher's use of the Internet as a professional resource. The data treatment for this question was a correlation procedure, namely, the Pearson Correlation Coefficient (Table 16). The fact that there was no statistical significance to the correlated variables indicates that, for this population, no significant relationship exists between teachers' level of technology adoption and their weekly Internet use either at home or at school. However, the substantive, but not statistically significant correlations for level of adoption and weekly use of the Internet at school and home are important to discuss. The teachers with a higher level of adoption used the Internet more at school than at home. In contrast with these findings, NCES (2000) data indicates teachers use the Internet more at school than at home. The discrepancy between these findings and those of this study may be the result of the small sample size or may need further investigation. The negative relationship between level of adoption and school Internet use should be examined. This relationship could have implications for school districts as they develop programs to increase teachers' level of technology adoption and use.

Research question 3 and sub-question sought to determine whether and how teachers in the experimental group would use the follow-up e-mail to increase their level of technology adoption. The paired t-test analysis demonstrates a statistically significant increase in the experimental pre-post Stage of Technology Adoption. The paired sample t-test for experimental group pre-post level of adoption demonstrated a high level of significance ($P < .004$). Seven of the eleven experimental subjects reported an increase in their post treatment level of technology adoption. In interpreting the results of the sub-question, the follow-up questionnaire frequency analysis indicated that seven subjects

read "all or most" of the follow-up e-mail and four read "many of them." These responses indicate a "5" or "4" on the 5-point Likert scale for this question and resulted in a relatively high mean score for this question. The responses indicate a willingness on the part of the subjects to actively engage with the e-mail. Within the experimental group, all subjects read, opened, printed, and saved at least "some" of the follow-up e-mail. This indicates a Likert score of at least "3" on a 5-point scale. Eight of the eleven (72%) indicated they printed "some" of the e-mail. The questionnaire category that elicited the fewest number of positive responses was whether the subject forwarded any of the e-mail on to another person. Only four of the eleven subjects (36%) indicated that they had forwarded any of the e-mail to someone else. These results are supported by research by Peck, Cuban, and Kirkpartick (2002) who believe the isolating nature of our schools results in teachers who do not share information, ideas, or materials. The other question that split 45.5% to 54.5% was whether the subjects bookmarked any of the links that they opened. Although the e-mail can remain saved in a subject's inbox, the researcher contends that bookmarking indicates a higher level of Web-use sophistication and organization. Also, bookmarking material indicates that the website or the information had intrinsic value to the subject who has received it and allows the subject to interact with the information at a later time.

The fact that all of the experimental subjects viewed the follow-up e-mail as useful is an indication that this research provided a beneficial extension to the teachers' Model Schools course. Ten of the eleven experimental subjects indicated that the follow-up e-mail was relevant to their work. Five subjects said that the e-mail increased their use of the Internet and eight stated that the e-mail increased or enhanced the skills they learned

in their Model Schools course. This means that the sample population viewed the follow-up e-mail in a favorable context. This information, along with the statistically significant increase in the post level of technology adoption, provides evidence that the experimental treatment had a positive effect on teachers' use of the Internet as a professional resource. Therefore, the null hypothesis number 1 is rejected.

These finding are consistent with McKenzie (1998a) who asserts that freedom to explore and learn on one's own time is supported in the literature on adult learning. McKenzie connects his philosophy of adult and technology learning to that of Malcolm Knowles, who believes that adults are beginning to demand that their learning take place at a time, place, and pace convenient to them. Similarly, Stewart's unpublished dissertation (1999) supports McKenzie's philosophy. The asynchronous learning network affords teachers the freedom to learn on their own time. Follow-up e-mail support provides an asynchronous learning environment for teachers to explore and the statistically significant increase in the experimental groups' Level of Technology Adoption support the fact that this method of extending professional development training may have value as an aid to sustain learning.

Question 4 sought to determine difference in level of adoption between the experimental and control groups. The data analysis for this question indicated an increase in post-survey level of adoption for both the experimental and the control groups. The mean increase for the experimental group was .73 and for the control group .20. The increase for the experimental group was statistically significant at the .004 level and the increase for the control group was not statistically significant. The findings indicate that for this sample, the follow-up e-mail treatment was successful in increasing

teachers' level of technology adoption. This can be interpreted as an indication that follow-up support in the form of e-mail can be a viable method for increasing teachers' use of the Internet and level of adoption. The U.S. Education Department, NCES statistics and research support the fact that teachers' comfort level and use of e-mail has increased (U.S. Dept. of Education, NCES, 2000 b). Strickland (2000) used follow-up Listserv discussion groups after traditional workshops and did not find this method increased teachers' use of the Internet. The literature on specific e-mail follow-up to technology training is limited and does not correlate to the use of e-mail in this research.

Research question 5 considers whether age, gender, or years of teaching experience is related to teachers' Stage of Technology Adoption. The analysis was based upon data from the initial demographic information and self-reported Stage of Adoption from the initial participation group of 43 teachers. The correlation for the variables of age, gender, years of teaching experience, and level of technology adoption did not confirm statistical significance among these variables. The levels of technology adoption of the sample group was interesting, in that high levels of adoption were found among all ages and years of experience. Of the forth-three initial subjects (N = 43), eleven indicated that they were "level 6" on the Stage of Adoption. Although gender was not a variable in the experimental and control groups, gender was analyzed for the initial participation group. This variable is studied in the literature and it is unfortunate that the subjects who participated in the research were all female. Subjects' ages and years of experience were divided among the categories on the Chi-Square test. The results of the data for this question are not consistent with those found in the literature.

Marcinkiewicz (1994) found that gender did not predict level of technology use by teachers and research by Kay (1992) found that in the 1980's, men had more positive attitudes toward computers than females. Gilliland (1990) reported that females held more negative attitudes toward computers than men did. Burke (1986) found that experience did not influence teacher perspective toward computers. This research did not produce significant correlations between the stated variables however, it is interesting to note the now positive correlation between age and technology adoption contrasts U.S. Education Department findings through NCES that are based on a large sample of public school teachers. It is possible that the teachers in this sample are not representative of typical teachers in their respective school districts due to the fact that they all participated in self-selected professional development training during their summer vacation. It should be noted that the youngest teacher in the sample was thirty and the least experienced teacher had taught four years. No participants under the age of thirty agreed to participate in this research. A typical thirty-year-old teacher would have taught for approximately 8 years. There is no explanation for the lack of subjects in the age range from twenty-two to twenty-nine, even in the initial group (U.S. Dept. of Education, NCES, 2000 b).

None of the subjects indicated a Level of Technology Adoption lower than "2" on the six-point scale. The lack of early technology adopters may be explained by the fact that these teachers lack the confidence level to self-select a Model Schools Web-based course. Potential subjects had to register and complete a Model Schools course before they could participate in this research. The sample population consisted of teachers who had a

personal interest in taking a web-based training course therefore, non-users of computers and the Internet were not a factor, but could have contributed to the small sample size.

The results of the quantitative data analysis in this study indicate that the experimental group that received the follow-up e-mail support, after completing a BOCES Model Schools web-based professional development course, statistically increased their level of technology awareness. Responses to the SnapShot Survey and the follow-up questionnaire indicate that the group perceived the follow-up e-mail as helpful, useful, and that the e-mail enhanced what they learned in their Model Schools course

In analyzing the results for this question, several points are of interest. First, 82% of the subjects in this research would use Internet delivered professional development courses, if their school district offered them. The research subjects use the Internet more at school than at home and the mean Internet use was "15 – 45 minutes" per week for this sample population. Second, all subjects believe that they are at least, if not more skilled, in Internet use than their students. This data is not consistent with the subjects' use of the Internet. Third, the statistical analysis indicated there was little correlation between the teacher's perceived Stage of Technology Adoption and the teacher's use of the Internet at school or at home.

The analysis of the open-ended response on the SnapShot Survey and two open-ended responses on the experimental group follow-up questionnaire offers With respect to the research questions, the data supports current literature supporting the fact that teacher Internet use is increasing (U.S. Dept. of Education ,NCES, 2000 b; Honey, 1998; Becker, 1999). The open-ended teacher responses indicate that respondents a need more support and follow-up in order to increase their use of existing technology and the Internet.

When compared to their Internet use at school and/or home, time continues to be a serious barrier to increasing level of technology adoption. The responses indicated that assistance in "sorting through web-sites" was viewed positively by teachers. A lack of time during the school day to search for information plagued one subject. The positive response to the e-mail follow-up as a tool to enhance what they learned at their Model Schools course can be interpreted as a direction that should be explored by organizations involved in teacher professional development.

The subjects that responded to the SnapShot Survey question on "specific topics that you would like to have a professional development training session address" aligned to the Stage of technology adoption at levels 3 through 6. As the researcher interpreted the alignment, most of the responses were at level 3 on the adoption scale. This relates to understanding and application of the process. This seems to indicate that there is still a need for an increase in lower level application before teachers can move towards adaptation to other and new contexts, levels 5 and 6 on the Scale of Technology Adoption.

Implications for Future Practice

The findings of this research have implications for professional development and Internet training practice. Most important is the value of providing teachers follow-up support after they complete a technology training course as a means of increasing technology adoption. This study has demonstrated that providing teachers with e-mail follow-up increases their level of technology adoption. The perceived value of the e-mail follow-up and teachers' increased use of the Internet/Web for their professional learning

has an implication for technology training practices. There was minimal increase in the level of technology adoption for the teachers in the control group that did not receive sustained support following their Model Schools course. It is easy for teachers to forget what they learn in a technology course, and a regular reminder via e-mail, in the case of this research, proved to be useful to the teacher subjects.

Another implication for school districts relates to the subjects' age, years of teaching experience, and level of technology adoption. It was interesting that the sample did not follow prevailing thought regarding younger teachers being quicker to adopt change using technology (U.S. Dept. of Education, NCES, 2000). Although the youngest subject was age 30, the lack of correlation between age and level of technology adoption needs further research. School districts should support and encourage teachers of all ages and experience levels to participate in appropriate technology professional development and operationalize technology use within the system.

There are questions that remain unanswered by the research due to the fact that only six of fifteen Model Schools participant school districts were represented in the research. The questions that the researcher poses, due to the low percentage of participating school districts, include: Why did teachers in the other ten schools not participate in the summer Model Schools training? What differences exist between teachers' Level of Technology Adoption and use of the Internet higher in the participating and non-participating districts? How does the Model Schools program re-evaluate its summer training to increase participation? The answers to these questions may have significant implications for the Model Schools program and the schools districts.

The findings from this research may have policy implications for schools that are required to provide or monitor teachers' required professional development hours. A number of states have enacted professional development policies and renewable licensure for teachers (U.S. Dept. of Education, NCES, 2000). The use of the Internet as a tool for professional development has financial implications because current NCES data indicate that 99% of U.S. schools have Internet capability. Infrastructure issues are no longer a significant barrier to the use of the Internet. The economic impact of teachers' use of the Internet for professional learning may be financially beneficial to school districts.

Of importance for future research is the fact that teachers in this study did not indicate the use of the Internet as a key source of information on teaching with technology. Districts and Model Schools should consider developing their school or district websites as a means of disseminating information on teaching with technology. The Model Schools program should consider offering more connection with the Internet and teaching strategies.

Although the subjects did not indicate that they rely heavily on the Internet as a source of information, their reported confidence level in using the Internet is quite high. The subjects in the study indicate that their skill level is as high or higher than their students. Their reported skill level is not supported by their weekly Internet use or level of technology adoption. The Model Schools and school districts may find it useful to regularly check teachers' confidence level as a way to monitor success of professional development programs and district technology initiatives.

The final implication of the research concerns the fact that teachers in the study overwhelmingly supported their districts' use of the Internet for professional

development. School districts should consider developing more synchronous and asynchronous methods of technology training for teachers. The Internet provides the opportunity for training and supports the current research findings on adult learning. Current literature tends to support the results from of research, although writers point out that empirical research is lacking. (Renyi, 1996; Roblyer, 1996) Based on the results from this research, school districts and organizations need to explore ways to assist teachers with their Internet use.

Limitations

This research was conducted within the context of the BOCES Model Schools program over the course of their summer professional development schedule. Courses took place during the months of July and August, when teachers typically are not working. As a result, factors specific to professional development participation during the school year and the influence that a working day may have on teachers' participation, responses, or use of the Internet were not controlled by the study.

This research did not control for the quality of the Internet/Web based courses through the Model Schools program. In addition, the type, duration, and sophistication of the subjects' self-selected Model Schools course were not controlled for in the research.

The relatively small sample size is another limitation of this research. Due to an experimental design that was Internet-based and the design of the Model Schools program that includes sixteen school districts from a large geographic area, the researcher did not have control over the presentation of the research to the potential subjects; therefore, sample size was a limiting factor in analyzing the outcomes of the research.

Lastly, the inability of the researcher to control how and when teachers checked their e-mail and how timely they were in responding to e-mail reminders to complete the survey is another limitation. Unknown variables such as computer hardware problems and network connection problems are possible issues that were not controlled in the research.

Recommendations for Future Research

Based on the discussion of the limitations of this study, additional research in other settings would be called for in order to substantiate the findings from this study. In particular, future research should explore ways to evaluate Internet professional development for teachers, since ninety-five percent of the subjects indicated an interest in using this option. This research may have implications relative to policy, economics, research, and practice for educators. Organizational change and school improvement are topics that were not addressed by this research; however, they are current topics that relate well to technology use and adoption in our schools.

It is recommended that this study be replicated with a larger sample population to determine if there is a correlation between Stage of Technology Adoption and Internet use and to validate the findings of this study. The variable of gender was not studied in this research as a result of the lack of male participants beyond the initial group. This research did not consider the type of school in which the subjects work, i.e. urban, suburban, or rural. There are other variables that were not considered in this research that should be considered in future research regarding increasing teachers' technology adoption, in addition to the replication of this research. In addition, a sample that

included early adopters, those at levels one and two of the Stages of Technology Adoption, would provided a greater depth of understanding of the follow-up and whether it is an appropriate strategy for increasing teachers' use of the Internet and Level of Technology Adoption.

It is recommended that a qualitative form of this study be conducted in order to provide more data on the benefits of follow-up e-mail for teachers. Interview or case study methodology that probes teachers' perceptions and use of the follow-up e-mail would be informative and beneficial to organizations involved in planning teacher professional development programs. This type of research would allow the subjects greater freedom of expression and the ability to probe subjects' responses should provide valuable information. It has already been noted that the concept of bookmarking websites is a sophisticated skill that means the material that is bookmarked has intrinsic value to the recipient. A study that determined how subjects interact with the bookmarked websites would provide a greater understanding of this particular technical skill.

Another area of potential interest for future research would be to study, in detail, the barriers to technology use and adoption. The lack of time to search the Internet was indicated as a barrier to Internet use, both in this research and in the literature. A study that controls for the "time barrier" issue is suggested. Since this research indicated a low negative correlation between level of adoption and school Internet use, an exploration of the issue of time would provide useful information on this topic.

In addition, a longitudinal research study on the topic of teachers' level of technology adoption and use of the Internet that replicates the Web-based experimental treatment is

suggested. This research would determine the long-term implications of this follow-up method in sustaining and increasing teachers' use of the Internet. The concept of "telementoring" was discussed in Chapter II. A research study that allows the teacher to control the flow of the follow-up may provide insight into the suitability of training follow-up. It was previously noted that subjects responded favorably to a continuation of the follow-up e-mail. A longitudinal study that re-evaluated subjects' Level of Technology Adoption at various periods would provide additional information regarding follow-up support after a technology course.

Conclusion

Professional organizations such as the National Education Association and the National School Boards Association support school districts' efforts to increase teacher professional development in the area of technology and increasing teachers' adoption of existing technology (NEA 2001; NSBA 2002). The Model Schools program, funded through the New York State Board of Cooperative Education Services, has been providing technology related teacher professional development since 1989 and this research is a collaborative effort between this researcher and the Model Schools program that sought to analyze the effectiveness of the follow-up treatment as a potential means to increase teachers' technology adoption.

A technological innovation, the Internet is not something teachers can learn to effectively explore, utilize, or study with training from a course or a book. The Internet requires teachers to actively participate in the process of learning. This research sought to test an experimental treatment that provided teachers with follow-up support that would

encourage them to increase their Internet use as they viewed regular e-mail that were supportive, colorful, included multimedia objects, and provided links to a variety of useful websites. Education technology leader Seymour Papert said, "You can't teach people everything they need to know. The best you can do is position them where they can find what they need to know when they need to know it." (connectedfamily.com, 2002) This research tested a follow-up design that supports the premise of Papert's statement regarding technology.

The availability of computers with Internet access has increased to the point where "access" is no longer a viable concern. Poole and Moran (1998) contend that teacher training is ineffective if there is not continued support. E-mail as a follow-up to self-selected technology training is a concept that needs further investigation. It is but one approach to support teachers in their quest to navigate and integrate the Internet in our 21st century schools.

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APPENDIX A

Letters

Date

To Whom It May Concern:

I am a doctoral student in the Educational Administration and Supervision program at Seton Hall University, South Orange, NJ. The topic of my doctoral research is to investigate teachers' use of the Internet as a resource for self-directed professional inquiry.

I am interested is using the following online survey for my research:

Teachers & Technology: A Snap-Shot Survey

The survey will be administered to public school teachers in upstate New York during the spring and summer of 2001. I estimate that approximately 200 teachers will participate in my research. I will administer the survey before teachers participate in a professional development technology course and again eight weeks after the course has been completed. Following the course completion, an experimental group will receive follow-up e-mail support.

I understand that you request a copy of any publications that results from the use of this instrument with my permission to use the results of my research within your future research studies.

Thank you for considering my request to use the Teachers & Technology: A Snap-Shot Survey. I look forward to your reply to this request and I am most willing to answer any additional questions you may have about my research and the use of your survey.

Yours truly,

Sheila K. Tebbano
tebbanos@schenectady.k12.ny.us

February 2, 2001

Ms. Kim Griener
Capital Region BOCES
Northeastern Regional Information Center
1031 Watervliet-Shaker Road
Albany, NY 12203

Dear Kim:

Thank you for meeting with me to discuss the Model Schools Program and the data collection that you coordinate for this professional development program. As you know, I am a doctoral student at Seton Hall University and I am proposing to do doctoral research in the area of technology use by public school teachers.

I am interested in collaborating with BOCES and the Model Schools program for my dissertation research. My dissertation proposal will need the approval of the Seton Hall University Institutional Review Board because it will involve research with human subjects. As part of that approval process, I will need a letter of support from BOCES.

I would like to meet with you to discuss the dissertation proposal and any additional permission for collaborating with Model Schools that would be necessary for this research project to proceed.

Thank you for you cooperation and for your interest in working with me.

Yours truly,

Sheila K. Tebbano

Superintendent Name
School
Address

Dear Superintendent NAME:

In collaboration with BOCES Model Schools Program, I am conducting a research study investigating whether participation in BOCES Model Schools technology courses and follow-up email support increases teachers' perceived level of technology adoption and use of the Internet for self-directed professional inquiry. As you school district is a participating member of the Model Schools program, I will be asking teachers from your district who register for Model Schools courses to voluntarily participate in this research. Potential subjects for this research study will include teachers who participate in Summer Model Schools Courses offered during July and August 2001. Only registrants for Model Schools courses that have an Internet or World Wide Web component will be potential subjects.

When your teachers arrive for the beginning of their selected course, they will be given a letter of explanation about my research. The letter will explain the research study, the time commitment for survey completion, and the follow-up questionnaire that they will need to complete online. The follow-up questionnaire will seek information regarding the usefulness of the follow-up email support and if/how the teacher used the follow-up material. The online survey will feature questions and drop-down menu choices for no more than twenty-five questions. I anticipate that this questionnaire will take no longer than 10 minutes to complete. The teacher letter of interest will indicate that participation is voluntary, that volunteers can discontinue participation at any time, that all responses will be confidential and will not be shared with other school district personnel, and that the data collected will be used exclusively for the purpose of educational research. The letter will include a voluntary informed consent statement. I will ask participant to give their school and home (if applicable) email addresses, home address, school district, gender, age, and years of teaching experience.

Teachers who choose to participate will be randomly divided into two groups. Participation for both groups will consist of completing an online survey twice, about eight weeks apart. Each administration of the Teachers & Technology: A Snap Shot Survey takes about 15 minutes. In addition, participants will be asked to complete an online questionnaire regarding the follow-up email support they receive for eight weeks after their courses conclude. All data will remain confidential and will be reported without names or other personal identifiers.

Participants in Model Schools courses are asked to complete a course evaluation at the end of their course. This evaluation may be completed in hard copy format or through the Model Schools website. This evaluation and the demographics that the Model Schools program collects will not be used as a research variable. However, the information may be used as descriptive data.

Participants will receive a certificate of appreciation for their time and participation in this research.

I hope you will support your teachers' participation in this research. There are no known risks associated with participation and the Institutional Review Board Involving Human Subjects at Seton Hall University has approved this research. Any superintendent who wishes to receive the results of this research study. Should you have any questions or desire further information please contact me at 370-8250 or by email at (tebbanos@schenectady.k12.ny.us). Thank you in advance for your cooperation and support.

Sincerely,

Sheila K. Tebbano

BOARD OF COOPERATIVE
EDUCATIONAL SERVICES

NORTHEASTERN REGIONAL INFORMATION CENTER

1031 Watervliet-Shaker Road
Albany, NY 12205
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Capital 123
ALBANY
SCHENECTADY
SARATOGA
BOCES

February 2, 2001

Mrs. Sheila Tebbano
Central Park Middle School
Schenectady City School District
421 Elm Street
Schenectady, NY 12304

Dear Sheila:

I enjoyed meeting with you discuss the Model Schools Program and the data collection that BOCES coordinates for our professional development program. I anticipate a very beneficial relationship with you as you pursue your doctoral studies at Seton Hall for research in the area of technology use by public school teachers.

I look forward to the collaboration with our Model Schools Program and your research project. Please consider this our letter of support. Because the research and data gathering will come from human subjects, we must be mindful of security and confidentiality.

Thank you for your interest in this collaborative project. I am confident that the analysis of the data will help us to improve our professional development program.

Sincerely,

Kimberly S. Greiner
Model Schools Program Coordinator

Date:

To: Model Schools Instructors

From: Sheila Tebbano

Re: Research with Model Schools Program

I am a doctoral student at Seton Hall University. I have been an educator in capital district for over twenty-five years. Presently, I am the principal of Central Park Middle School in the Schenectady City School District. I am collaborating with BOCES Model Schools program to gather research for my dissertation.

The coordinator for Model Schools has approved my collaboration with BOCES and I need your assistance to distribute and collect some material for my research. I am requesting that you:

- Explain the research project by reading from a script at the beginning of your technology course
- To pass out an envelope to each attendee
- To collect all of the envelopes (that will be sealed by the attendees) at the end of the first session.
- To return the envelopes to the Model Schools Coordinator

Please note: the researcher is committed to preserving confidentiality of responses, as well as the complete anonymity of participants in this research. Should you have any questions, please feel free to contact me at the number listed in this letter or to contact the Model Schools Coordinator. This project has been reviewed and approved by the Seton Hall University Institutional Review Board for Human Subjects Research. The IRB believes that the research procedures adequately safeguard the subject's privacy, welfare, civil liberties, and rights. The Chairperson of the IRB may be reached through the Office of Grants and Research Services. The telephone number of the office is 973-275-2974.

Thank you for your assistance with this research project.

Yours truly,

Sheila K. Tebbano
782-0511
370-8250
stebbanl@nycap.rr.com

Model Schools Instructor
Script for Distributing Research Material

Please Read

Good Morning/Afternoon Ladies and Gentlemen:

Model Schools is collaborating with a graduate student at Seton Hall University on a research project. I will be distributing an envelope with information about the research project. All participants in Web-based courses are invited to participate in this research although it is not required.

Please take a minute to read the enclosed material and decide if you with to participate. You are under no obligation to participate and your response to the information in the letter will not be shared with me.

If you wish to participate in the study, you will need to complete two forms, to return them to the envelope, remove the sealing strip, seal the envelope, and return your envelope to me before you leave today. If you choose not to participate, please place the forms in the envelope, seal it, and return it to me.

Everyone should keep the explanation letter. If you choose not to participate in the study, you may dispose of the letter after you leave this session.

(*Please wait three minutes and begin your class.*)

Sheila K. Tebbano
6 Tamarack Lane
Niskayuna, NY 12309
782-0511 or 370-8250
stebban1@nycap.rr.com

Summer 2001

Dear Participant in BOCES Model
Schools Technology Course:

I am a doctoral students at Seton Hall University and I am conducting a research study investigating the impact teachers' perceived level of technology adoption after completion of a self-selected Model Schools course. I am also studying whether and how teachers use the Internet and Web for professional learning. I am collaborating with BOCES Model School Program to study teachers' use of the Internet and World Wide Web. I am asking for a small amount of your time to add to the body of knowledge in teachers' use of educational technology. In education, we often have opinions regarding successful programs but data is necessary to offer more than just an opinion.

If you choose to participate in this research, you will be asked to complete an online survey after you complete this course and again, approximately eight weeks after you complete your Model Schools course. The online survey is called the Teachers & Technology: A SnapShot Survey and it will take no more than 10 minutes to complete. The survey asks you to rate your present level of technology adoption and questions about your use of technology. I will ask you to complete it now and again approximately eight weeks after your course ends. The web address for the survey is:

http://snapshotsurvey.org/tebban

In addition to completing the surveys, you may be randomly selected to receive follow-up email from me after you complete your Model Schools course. After the follow-up email period, I will ask you to answer an online questionnaire regarding the follow-up email you received from me. This questionnaire will take no more than five minutes to complete.

Participation in this research is voluntary and you may choose to discontinue participation at any time. Your name and school district name will not be used and any information you provide me will not be shared with your school district or school administrator. The data you supply will be used only for the purposes of educational research and the analysis of data will not identify individual schools or districts.

In order to communicate with you throughout the research period, I will need your email address at school and at home, if applicable. This research will only involve email communication and your timely response to the online surveys. Since you selected participate in an Internet or Web course, I hope you be willing to communicate with me by email. I will not communicate with you for any other reason than for the stated purpose of this research. At the end of the research, participants will receive a certificate of appreciation.

This research has been reviewed and approved by the Seton Hall University Institutional Review Board for Human Subjects Research. The IRB believes that the research procedures adequately safeguard the subject's privacy, welfare, civil liberties, and rights. The chairperson of the IRB may be reached through the Office of Grants and Research Services. The telephone number of the Office is (973) 275-2974.

Thank you for considering participating in this research study and for your cooperation with the research that I am undertaking as a requirement of my doctoral study at Seton Hall University, S. Orange, New Jersey. If you choose to participate in the research, please complete the Snapshot Survey after you complete your Model Schools course.

Sincerely,

Sheila K. Tebbano

Sheila K. Tebbano
stebban1@nycap.rr.com

The Snapshot Survey can be accessed at: http://snapshotsurvey.org/tebban

Please retain this letter until you leave the classroom, whether or not you choose to participate in the research. In an effort to maintain confidentiality, all other materials should be returned to the envelope, seal the envelope, and follow the direction on the envelope.

❖❖

Informed Consent – Please Return to the Envelope

The following has been explained to me and I understand that:

1. I am being asked by Sheila Tebbano, a doctoral students in the Department of Educational Administration and Supervision at Seton Hall University, to participate in a study of teachers in self-selected Web-based training and the impact of follow-up email support on teacher adoption of technology. This study will consist of completing two three surveys. If I am randomly selected to receive follow-up email, I understand that I will be asked to complete an online questionnaire about the emails.

2. Because my individual information is confidential, I will gain no direct personal benefit from this research. However, my participation may help in obtaining data to guide future teacher technology training.

3. The researcher, Sheila Tebbano, or her advisor, Dr. Elaine Walker, can answer any questions about this research project. Sheila can be reached at stebban1@nycap.rr.com or 518-782-0511. Dr. Walker may be reached at walkerel@shu.edu.

4. Participation is completely voluntary. I may decline to participate or withdraw from the study at any time without prejudice.

5. I understand that this project has been reviewed and approved by the Seton Hall University Institutional Review Board for Human Subjects Research. The IRB believes that the research procedures adequately safeguard the subject's privacy, welfare, civil liberties, and rights. The chairperson of the IRB may be reached through the Office of Grants and Research Services. The telephone number of the Office is (973) 275-2974.

6. If I choose to participate in this research and complete the required surveys, I understand that I will receive a Certification of Appreciation.

I have read the above material any my signature below indicates my participation in this research activity, realizing that I may withdraw without prejudice at any time.

Printed Name____________________________

Signature______________________________ Date____________________

Please return this form to the envelope

Please return this sheet to the envelope

Demographic Information for Research Subjects

Gender _____ Age in years _____ Years of full/part time teaching experience _____

School email address _____ Home email address _____

Model Schools Course Participant

Please read the descriptions of each of the six stages related to adoption of technology. Choose the number of the stage that best describes your level and check the appropriate box. Thank you.

Stages of Technology Adoption

☐	**Stage 1: Awareness** I am aware that technology exists but have not used it - perhaps I am even avoiding it. I am anxious about the prospect of using computers.
☐	**Stage 2: Learning the process** I am currently trying to learn the basics. I am sometimes frustrated using computers. I lack confidence when using computers.
☐	**Stage 3: Understanding and application of the process** I am beginning to understand the process of using technology and can think of specific tasks in which it might be useful.
☐	**Stage 4: Familiarity and confidence** I am gaining a sense of confidence in using the computer for specific tasks. I am starting to feel comfortable using the computer.
☐	**Stage 5: Adaptation to other contexts** I think about the computer as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid.
☐	**Stage 6: Creative application to new contexts** I can apply what I know about technology in the classroom. I am able to use it as an instructional tool and integrate it into the curriculum.

Capital Region BOCES
Northeastern Regional Information Center

Quick Reference Guide
Models Schools Summer 2001 Training Calendar

Date	Training Session	Time	Platform	Location	Room
06/25-06/27/01	Information Literacy: How to Make The Best Use of Your School's Media Center	9:00-12:00	Mac	Niskayuna HS	Media Center
06/25-06/29/01	Creating Web Resources	8:30-11:30	PC	Ryder ES – Cobleskill	Computer Lab
06/29/01	Introduction to PowerPoint	9:00-12:00	PC	Pastoral Care Center	Computer Lab
07/09/01	Using the World Wide Web Effectively	8:00-12:00	Mac	Schalmont MS	
07/09-07/10/01	Kid Pix Workshop	8:30-11:30	PC	St. Mary's Institute, Amsterdam	
07/09 & 07/10/01	Mastering PowerPoint	9:00-1:00	PC	Abrookin Vo-Tec	
07/09-07/11/01	Integrating PowerPoint Into Your Curriculum	9:00-3:00	PC	Schoharie CS	Computer Lab
07/09-07/13/01	Utilizing Web Resources	8:30-11:30	PC	Ryder ES	Computer Lab
07/09-07/12 & 07/16/01	iMovie-An Easy Way to Create Professional Looking Classroom Movies	8:00-11:00 & 7/16 12:30-3:30	Mac	VanAntwerp MS, Niskayuna	ETec Lab
07/10/01	Primary Sources on the Web	8:00-12:00	Mac	Schalmont MS	
07/10 & 07/12/01	Create a Web Site with FrontPage 98	8:30-11:30	PC	Voorheesville ES	Room 215
07/10-07/12/01	Information Literacy: How to Make The Best Use of Your School's Media Center	9:00-12:00	Mac	Niskayuna HS	Media Center
07/10, 17, 24, 31, 08/07 & 08/14/01	PhotoShop for Beginners	9:00-11:30	Mac/PC	Cohoes MS	Room 208
07/10, 17, 24, 31, 08/07 & 08/14/01	PhotoShop for Beginners	3:15-5:45	PC	100 Black Men Tech Center	
07/11/01	PowerPoint Basics	8:30-11:30	Mac/PC	St. Mary's Institute	
07/11/01	Using the World Wide Web as a Resource For Advancing Literacy	8:00-12:00	Mac/PC	Schalmont MS	
07/12 & 07/13/01	PowerPoint Workshop	8:30-11:30	Mac/PC	St. Mary's Institute	
07/12/01	Design Your Own Web Page Using Netscape Composer	9:00-12:00	PC	Pastoral Care Center –	
07/12/01	Using the World Wide Web and Internet Databases to Carry Out Standards for ELA, Social Studies, and Science	8:00-12:00	Mac	Schalmont MS	
07/16-07/18/01	Hotlists for Every Student!	9:00-3:00	PC	Schoharie CS	Computer Lab
07/16-07/19/01	Technology Integration Workshop	9:00-12:00	Mac	VanAntwerp MS	ETec Lab
07/16-07/20/01	Microsoft Office 2000	9:00-12:00	PC	Scotia Glenville HS	A22
07/17 & 07/18/01	Developing a Free Web Page	1:00-4:00	PC	Voorheesville HS	IBM Lab

07/16-07/19/01	Introduction to Microsoft Word and Excel	8:30-11:30	PC	Voorheesville ES	Room 215
07/18/01	PowerPoint Basics	8:30-11:30	PC	St. Mary's Institute	
07/19 & 07/20/01	PowerPoint Workshop	8:30-11:30	PC	St. Mary's Institute	
07/19-07/31/01	Introduction to Microsoft Office for Teachers	1:30-4:30	PC	Voorheesville HS	IBM Lab
07/23/01	Basics to Upgrade Your Computer	9:00-1:00	PC	Abrookin Vo-Tec	
07/23 & 07/25/01	How to Get Your Project on the Web	9:30-11:30	PC	Voorheesville ES	Computer Lab Room 215
07/23-07/26/01	Basic Web Site Design & Construction Using Inspiration and Netscape Composer	9:00-12:00	Mac	Niskayuna-VanAntwerp MS	eTech Training Center
07/24-07/26/01	Creating a Webquest: Utilizing Web Resources to Enhance Your Curriculum	1:00-4:00	PC	Guilderland HS	East Computer Lab
07/24-07/26/01	Non-Fiction on the Web: Creating the "Weekly Reader" Website	8:00-2:00	Mac	Schalmont MS	Computer Lab
07/25-07/27/01	Primarily Listening	12:00-3:00	Mac	Pinebush ES	
07/25-07/27/01	Visual Literacy and Digital Images	9:00-12:00	Mac	Pinebush ES	
07/26/01	Introduction to HyperStudio	9:00-12:00	PC	Pastoral Care Center	Computer Lab
07/30 & 07/31/01	FrontPage Basics	8:30-11:30	PC	St. Mary's Institute – Amsterdam	
07/30 & 07/31/01	Using the Drawing Tools in Microsoft Word & Appleworks, Grades 4-12	8:00-2:00	Mac	Schalmont MS	
07/30 & 08/03/01	Teaching PowerPoint for Student Use	9:30-11:30	PC	Voorheesville ES	Room 215
08/01 & 08/02/01	Four Great Websites to Supplement Your Science and Social Studies Curriculum Grades 4-12	8:00-2:00	Mac	Schalmont MS	
08/06/01	Be Inspired	9:00-3:00	PC	NERIC	Training Rms.
08/06/01	Internet Search Basics	9:30-11:30	PC	Voorheesville ES	Computer Lab Room 215
08/06 & 08/07/01	Using the Internet to Add Motivating and Exciting Multimedia to Your Curriculum Grades 4-12	8:00-2:00	Mac	Schalmont MS	
08/09/01	Introduction to HTML	9:00-12:00	PC	Pastoral Care Center	Computer Lab
08/13 & 08/14/01	Microsoft Access 97	12:00-2:00	PC	Voorheesville ES	Computer Lab
08/13 & 08/14/01	Microsoft PowerPoint 97	2:30-4:30	PC	Voorheesville ES	Computer Lab
08/13-08/17/01	Creating Curriculum Materials for the K-12 Classroom	8:30-11:30	PC	Cobleskill Richmondville HS	Room 297
08/16/01	Create Web-based Learning Activities Using "Filamentality"	9:00-12:00	Mac/PC	Pastoral Care Center	
08/20-08/24/01	iMovie-An Easy way to Create Professional Looking Classroom Movies	9:00-12:00	Mac	VanAntwerp MS	ETec Lab
08/20-08/23/01	Introduction to PowerPoint	8:00-2:30	Mac	Jefferson ES	
08/20-08/24/01	Integrating Technology in the Elementary Classroom	8:30-11:30	PC	Cobleskill Richmondville HS Lab	Room 297

08/20-08/24/01	Technology and the DBQ	12:00-3:00	PC	Cobleskill Richmondville HS Lab	Room 297
08/20-08/24/01	Sound Companion-Create Your Own Customized Sound Files	12:30-3:30	Mac	VanAntwerp MS	Etec Lab
08/21/01	Microsoft Access 2000	9:00-3:00	PC	Bethlehem HS	Library Media
08/22/01	Classroom Today for Tomorrow's Classroom	9:00-3:00	Mac/PC	Bethlehem HS	Library Media
08/22/01	Microsoft FrontPage 2000	9:00-3:00	PC	Bethlehem HS	Library Media
08/22/01	On-line Resources to Improve Assessment & Instruction	9:00-3:00	PC/Mac	Bethlehem HS	Media Center
08/27-08/30/01	Creating PowerPoint Presentations	8:30-12:30	PC	Cobleskill Richmondville HS	Room 297

BETHLEHEM TECH CAMP 8/20-8/24/01

08/20/01	Organizing Your Desktop Data and Files	9:00-3:00	Mac/PC	Bethlehem HS	Library Media
08/21/01	Creating Classroom Activities	9:00-3:00	Mac/PC	Bethlehem HS	Library Media
08/22/01	Using the Internet to Find Resources and Classroom Activities	9:00-3:00	Mac/PC	Bethlehem HS	Library Media
08/23/01	Creating PowerPoint Presentations	9:00-3:00	Mac/PC	Bethlehem HS	Library Media
08/24/01	Creating More Advanced PowerPoint Presentations	9:00-3:00	Mac/PC	Bethlehem HS	Library Media

Register by mail, fax or email. A registration form is attached here or go to http://neric.org/msregform.htm

If you need directions to school buildings, call 456-9233 or use MapQuest (http://www.mapquest.com).

APPENDIX B

Experimental Follow-Up E-mail

Thank you for your consent to participate in my dissertation research.

If you have not completed the Snapshot Survey, please take the survey that can be found at http://www.snapshotsurvey.org/tebban

It will take approximately 10 minutes of your time. After you complete the Survey, the follow-up project will begin.

If you have any questions, please feel free to email me.

Thank you.

Sheila Tebbano

Follow-Up E-mail # 1

To: Model Schools Course Participant

From: Sheila Tebbano

Re: Follow-Up to your course

Congratulations on completing your summer Model Schools course ad thank you for completing the Snap Shot Survey.

Did you know that ASCD offers online multimedia lessons on topics of interest to all levels of educators?

What Are Tutorials?

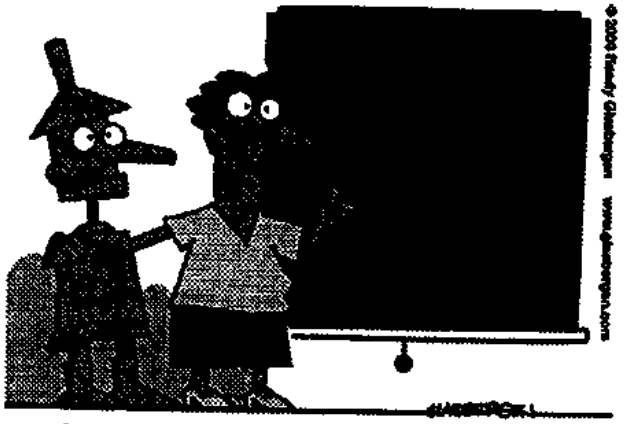
Tutorials are short multimedia lessons on topics that interest all levels of educators. Each lesson includes a definition, short articles on the topic, video and audio files of experts and practitioners, and a listing of resources that can be used to continue your professional development. Check it out at: http://www.ascd.org/frametutorials.html

Weekly Reader offers several sites for teachers and for students pre-K through teenagers.

Planet Cool! http://www.weeklyreader.com/features/plcool.html - Grades K-6

Teen Trek! http://www.weeklyreader.com/features/tt.html Current events, contests, trivia, and links to selected sites.

THE INTERNET CAN MAKE TEACHERS SMILE!



"CLASS, I'D LIKE YOU TO WELCOME OUR NEW FOREIGN EXCHANGE STUDENT! WHO'D LIKE TO COME UP HERE AND HELP US FIND "OZ" ON THE MAP?"

WestEd publication - ten teachers share "actual classroom experiences using the Internet in K-12 science and mathematics." Each story is followed by questions and issues. This is an ideal resource for teacher instruction on classroom use of technology.

http://www.wested.org/tales/

Welcome to
Tales from the Electronic Frontier,

a WestEd publication offered in print and electronic formats.

What is *Tales*? In *Tales,* ten teachers share actual classroom experiences using the Internet in K-12 science and mathematics. Their vivid, first-hand accounts illustrate how this powerful tool can enhance teaching and learning. Drawing on teacher successes and dilemmas, *Tales* can help expand classroom resources, engage students in new ways and connect with other teachers. *Tales* includes over 50 annotated resources, sharing information about online math/science organizations and Web sites.

- Tales Contents Page
- Browser and window sizing information.
- Order a print copy of the *Tales* book.
- A text only version is available for Lynx users.

Hope you find these Internet possibilities useful.

Follow-Up E-mail #2

To: Model Schools Course Participant

From: Sheila Tebbano

Re: Follow-Up to your Model Schools Course

LOOKING FOR WEBSITES FOR ELA, MATH, SCIENCE, SOCIAL STUDIES, AND MORE!
THE TITLE BELOW SAYS IT ALL.

PDI *Professional Development Institute*

Websites You've Gotta See

http://www.webteaching.com/web_sites_resources.htm

Teachers are always looking for a good quote or two! Check out this source of quotations on hundreds of subjects, authors, etc.
http://cybernation.com/victory/quotations/directory.html

In the end we retain from our studies only that which we practically apply.

~ Johann Wolfgang Von Goethe

HERE IS AN EXAMPLE OF WHAT YOU WILL FIND AT THE WEBSITE. SINCE YOU HAVE RECENTLY BEEN "LEARNING" AT A MODELS SCHOOLS CLASS, I THOUGHT YOU MIGHT ENJOY SOME QUOTES ON LEARNING.

Learning

QUOT

Great quotes to inspire, empower and motivate you to live the life of your

ESTO INSPIRE YOU

Learning is not attained by chance. It must be sought for with ardor and attended to with diligence.

~ Abigail Adams ~

It is always in season for old men to learn.

~ Aeschylus ~

Studies serve for delight, for ornaments, and for ability.

~ Francis Bacon ~

The man who graduates today and stops learning tomorrow is uneducated the day after.

~ Newton D. Baker ~

Don't just learn the tricks of the trade. Learn the trade.

~ James Bennis ~

Learning how to learn is life's most important skill.

~ Tony Buzan ~

It seems that we learn lessons when we least expect them but always when we need them the most, and, the true "gift" in these lessons always lies in the learning process itself.

~ Cathy Lee Crosby ~

Develop a passion for learning. If you do, you will never cease to grow.

~ Anthony J. D'Angelo ~

Learning is not compulsory but neither is survival.

~ W. Edwards Deming ~

Get over the idea that only children should spend their time in study. Be a student so long as you still have something to learn, and this will mean all your life.

~ Henry L. Doherty ~

In the end we retain from our studies only that which we practically apply.

~ Johann Wolfgang Von Goethe ~

Everyone and everything around you is your teacher.

~ Ken Keyes Jr. ~

When I learn something new-and it happens every day-I feel a little more at home in this universe, a little more comfortable in the nest.

~ Bill Moyers

Learning is what most adults will do for a living in the 21st century.

~ Sydney Joseph Perelman ~

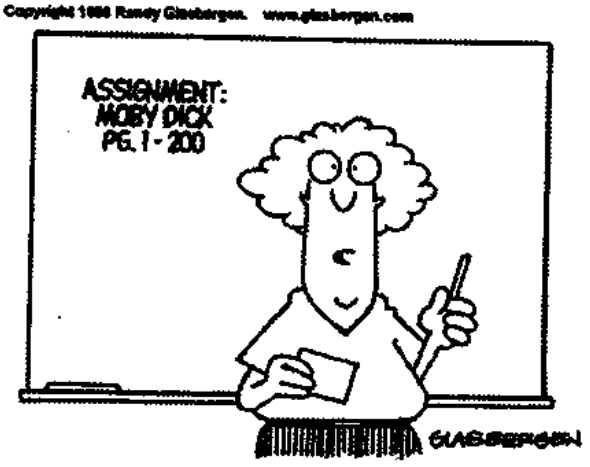
It is best to learn as we go, not go as we have learned.

~ Leslie Jeanne Sahler ~

The Association for Supervision and

Articles available on the Internet.
Click the logo.

A LITTLE HUMOR FROM THE INTERNET!



"I don't like to give a lot of homework over the weekend, so just read every other word."

I HOPE YOU FIND THESE WEB IDEAS USEFUL.

Follow-up E-mail #3

To: Model Schools Research Participants

From: Sheila Tebbano

Re: Course Follow-Up

It has been a while since you completed your Internet/Web course. Did you know research shows that you will remember what you learned if you practice it soon after you learn it?

The Internet can help you find classroom materials.

LESSON LIBRARY

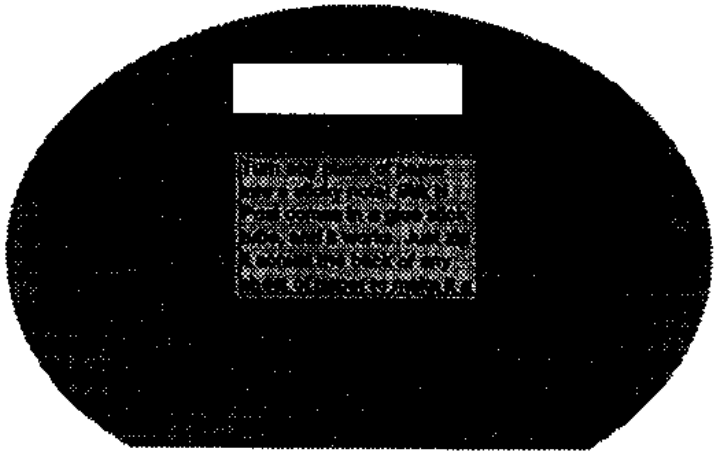
Math Goodies

http://www.mathgoodies.com/ **is a free educational web site featuring interactive math lessons, homework help, worksheets, puzzles, message boards, and more! We have over 400 pages of free math activities and resources for students, teachers, and parents.**
We invite you to join our growing community by subscribing to our free newsletter! We'll keep you informed of math news and site updates, while respecting your privacy.

[redacted]

http://www.teachnet.com/

Lots of ideas for busy teachers. Here's one that you can have updated to your computer every day!



Put TeachTips on your site (auto-updated each day)

Quote for Thought!

Home computers are being called upon to perform many new functions, including the consumption of homework formerly eaten by the dog. ~Doug Larson

CHECK OUT: CONVERGE MAGAZINE

http://www.convergemag.com/

OUR PURPOSE

There is a revolution going on in education. *The convergence of powerful digital technologies and education is creating a New World of learning.* A new generation of students and educators are changing the rules. *Hundreds of years of "traditional" instruction are being challenged.* Lines rigidly dividing the how, when and what of education are being erased. *New academic models are emerging as the Internet Age takes shape around us.* The mission of *Converge* magazine is to foster this new vision of Digital Education while maintaining the Human Touch.

"We need a wake-up call that the future is happening now."
-- David Thornburg, Ph.D.

Hope you can use this information. Until next time....Sheila

Follow-Up E-mail #4

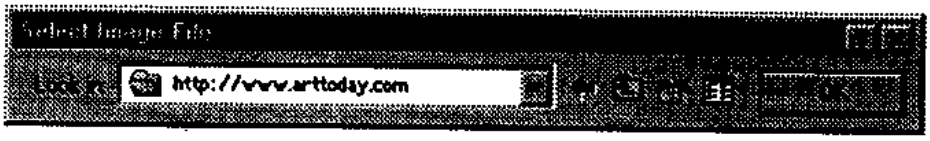
To: Model Schools Course Participants

From: Sheila Tebbano

Re: Follow-Up to your Model Schools Course

Have you ever worked with sound files? Here is an easy to manage sound file site. You can add some Beethoven or a laughing hyena to your next Powerpoint presentation.

Sound clips and sound effects web sites • Sounds for web site design



Sound Clips: categorized | assorted

Categorized:

Animals (Japan) - about 25 fairly lengthy animal sound clips; birds, domestic animals, wild animals and bugs; .wav format.

Animals (Sunsite) - about 45 animal noises: rattlesnake, monster, wolf, tiger, hyena, gorilla, bat, more; .au format.

Bathroom - and now a few sounds from La Salle De Bains; shower, flush, etc.; .au format.

Birds - about a dozen bird sounds; kookaburra, crow, bluejay, chickadee, more; in .au format.

Cans - a few canned sound effects related to cans; garbage cans, spray cans, kick-the-can; .au format.

Cats - about a dozen cat sounds, small files, .au format.

Classical Music Midi files - A large, well-organized collection, including: Bach, Beethoven, Brahms, Chopin, Debussy, Handel, Haydn, Liszt, Mendelssohn, Mozart, Scarlatti, Schubert and more.

Clicks and Beeps - very short sound files of various noises. Also some longer musical loops.

Domestic - about 25 home and garden type noises; shower, phone, door, hammering, typing, sawing, cooking, more; .wav format.

Doors - creaky doors, door buzzers, door bell, door knock; sorry, no Jim Morrison; .au format.

Emotions - people expressing their feelings with voiced sounds: yeah, wow, yuck, boo and lots more; about 45 sounds; .wav format.

Glass - glasses, dishes, bottle, plates and breaking glass; .au format.

Guns & Bombs - machine guns, explosions, mortar and more guns; .au format.

Greetings - about 40 voiced greetings, in English or Japanese; .wav format.

Japan Sounds - about 30 medium-length sound clips, assorted themes including music, combat, Japanese ceremonies and sound effects; .wav format.

Kitchen - a few kitchen noises; liquid pouring, cork popping, ice cubes, more; .au format.

Music: Joe's Original Wav Files - a nice assortment of unusual sound effects and musical interludes. Lots of music-related sounds bytes.

Nature - about 15 lengthy nature sounds: fire, typhoon, rain, earthquake, thunder, more; .wav format.

Paper - a few paper sounds: crumple, tear and cut; .au format.

People Noises - lengthy clips of snoring, clapping, drinking, laughing, walking, coughing, and the like; .wav format.

People Sounds - expressions and sounds, from 'groovy' to 'bummer' to 'back off man'; and some sound effects.
Sports - about 20 sports sounds from bowling, golf, car racing, diving, sumo wrestling, baseball, more; various lengths; .wav format.
Star Wars - sound effects and dialogue clips from the famous movie.
Street Sounds - about a dozen noises you might hear on a street (in Japan); lengthy files; .wav format.
TV Series Themes - about 50 well-known TV themes from recent years and the past; in .au format.
Vehicles - ambulance, bicycle, car, bus, helicopter, ship, crashes, more; .wav format.
Whales - yes, whale sound clips; eerie sounding whale cries; in .au format.

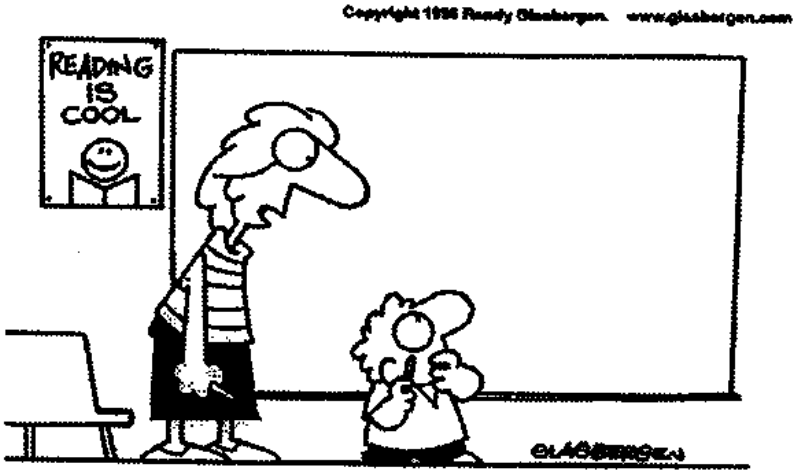
Assorted:

Artisto-Soft - 1,000 free sounds (as well as commercial products).
Japan: Sound Effects Index - index page for hundreds of sounds, many related to Japan, many with universal appeal.
Movie & TV - sound clips from well-known TV shows and movies.
Sunsite Sound Effects - well over 100 sound effects, small files, many inanimate noises: beeps, clicks, tones as well as human sounds, clocks and more; .au format.
Wav Central: Effects - a wide variety of short sound clips; about 75; includes such oddities as Tarzan yell, laser, antique car horn and more; .wav format. (Wav Central main page)

Here is a unique online puzzle maker and it is FREE! This free utility was developed by APTE, an educational software developer that specializes in Internet-related programs and is affiliated with Northwestern University. Hyperlinks to related sites can be place within the puzzles, so you can make a crossword puzzle about eh solar system and link it to the NASA homepage, where students can research the puzzle's answers.

Looking for movies to support your teaching? Brain POP offers health, science, and technology movies... and much more

Here's a laugh for you... Smile...



"There aren't any icons to click. It's a chalk board."

Hope you can use this resources to enhance what you learned in your Model Schools course.

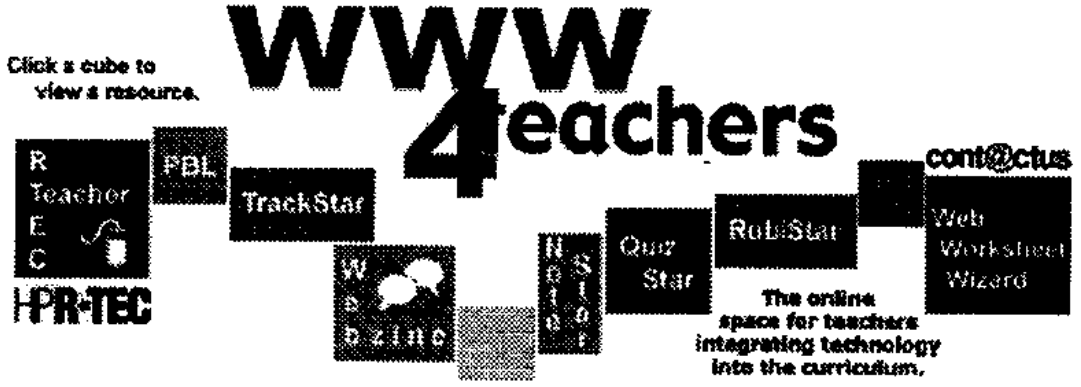
Follow-Up E-mail #5

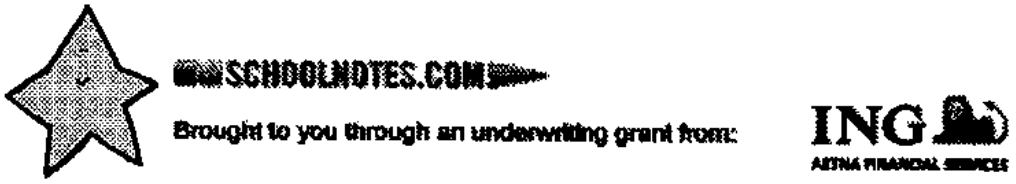
To: Model Schools Course Participants

From: Sheila Tebbano

Re: Research Project

This website is created for teacher by teachers and is very extensive. Teachers share their best practice.

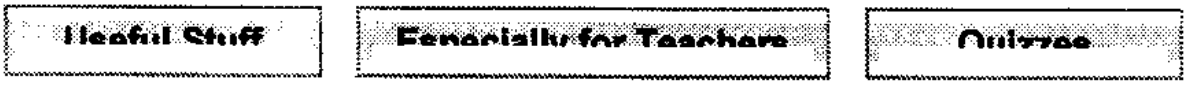




Check out schoolnotes.com – any teacher can create a simple (free) website in five minutes.

at: http://schmidel.com/webtools.cfm

Check out these web tools and tips for educational technology integration.



Domain Names
Google Search
Open Directory
NetMechanic
Product Reviews
Search Engines
Shields Up

Sound Effects

Cool Archive
Find Sounds
Flash Kit: SoundFX

Graphics

Art Today
Bullets & Buttons
Clipart Maps
Free Graphics
Free Icons
Free Photos
Photography Tips
Web Graphics

Photoshop

Adobe Tutorials
Computer Arts
Hands-On
McCanna's Tips

ColdFusion

CF Vault
DevCenter
Documentation
Flash CFM
Source Code
SQL Examples
SQL Jargon
Tutorials

BioChemLinks: Science
Buddy Project: Collaborations
Electric Teacher
ePals: Classroom Exchange
Flash Educational Applications
Filamentality: Create a Hotlist
FunBrain: K-8 Quiz Lab
High School Hub
KidsClick: Web Guide
NY Regents Exam Prep
Quia: Free Web Pages
Quiz Hub: Learning Activities
Schrock's Guide for Educators
WebQuests: Web Activities

Web Planning & Layout

Art & Zen of Web Sites
Copyright Questions
Educational Web Design Tips
Examples of School Web Pages
Web Site Planning Checklist
Yale C/AIM Web Style Guide

HTML Tools & Tutorials

Web Colors | Character Codes
Bare Bones Guide to HTML
HTML Goodies by Joe Burns

Web Site Development

CNET: Web Building
Developer Shed: Forums
Web Developer's Library
WebMonkey: Web Resources
ZDNet's Internet User

Authors/Literature
Astronomy: Planets
College Prep Quiz
Common Chemicals
French: Numbers
Geometric Shapes
German: Food
History 1900-2000
Human Bones
Human Diseases
Italian: Animals
Multiplication Drill
Musical Terms
Periodic Table
SAT Vocabulary
Spanish: Words 1
World Capitals
World Flags

Freeware

Acrobat Reader
Arachnophilia
Atomz Search
Flash Player
Free Fax Number
Free Fonts
Free Help Desk
Free Java Applets
MapMaker
Microsoft Browser
QuickTime Player
ScreenSeize
WebFetch
WS-FTP LE
ZoneAlarm

JavaScript

Cut-N-Paste
Dynamic Drive
JavaScript Guide
JavaScript Source
King Code
Reference

The New York Assessment Collection Web Version: Table of Contents
http://www.essentialschools.org/pubs/exhib_schdes/nyac_web/toc.htm

CRESST

The National Center for Research on Evaluation, Standards, and Student Testing.
CRESST Home Page
http://www.cse.ucla.edu/
Links to all their publicationsions in .pdf (Adobe Acrobat -- portable document format)
Assessment Links
http://cresst96.cse.ucla.edu/related.htm
Links to a variety of relevant assessment links, authentic and performance-based assessment links, and assessment in science and mathematics.

Electronic Teaching Portfolios

Assessment
http://teacherpathfinder.org/School/Assess/assessmt.html
Learn Live Resources
http://glef.org/learnlive/
Learn & Live - A brand new book and video tape from George Lucas Educational Foundation
HOME (Kathleen Fischer's Portfolio)
http://www.interactivate.com/people/kathy/portfolio/index.html
Resources: Electronic Teaching Portfolios
http://curry.edschool.Virginia.EDU/curry/class/edlf/589_004/resource.html
Links to Others' Electronic Teaching Portfolios
http://curry.edschool.Virginia.EDU/curry/class/edlf/589_004/sample.html
Teacher Portfolio Assessment
http://www.eyesoftime.com/teacher/pfolio.htm
Preparing a teaching portfolio
http://www.ilstu.edu/depts/CAT/prepaport.html
Dr. Nancy Yost's Electronic Portfolio links
http://www.coe.iup.edu/njyost/portfolios/
A comprehensive list of both examples and resources

Commercial electronic portfolio/assessment resources

Aurbach & Associates
http://www.aurbach.com/
The home page for the developers of The Grady Profile. Download demos and get lots of information about alternative assessment and electronic portfolios. Online demo available to download for Macintosh.
Sunburst: Learner Profile

http://www.sunburstonline.com:80/lplobby.html
Information about the first software for classroom observations, using either bar codes or Newton for Macintosh or Windows.
LearningQuest's Electronic Portfolio
http://www.learning-quest.com/ephome.html
Online demo available to download for Macintosh.
Roger Wagner's page on Creating Electronic Portfolios with HyperStudio
http://www.hyperstudio.com/resource/profdev/portfolio.html
Includes links to sample portfolios created in HyperStudio and a PDF file information booklet entitled, "Using the VCR as a Printer for HyperStudio Projects" located online at:
ftp://www.hyperstudio.com/resource/library/VCRPrint.pdf
IBM's SchoolVista Assessment Suite
http://www.solutions.ibm.com/k12
Traditional assessment (standardized test simulation) and authentic assessment tools available for Windows.
Stardata's InfoTracker Portfolio Builder
http://www.stardata-usa.com/
Online demo for Windows version available to download.
Superschool Software's Portfolio Assessment Kit
http://www.superschoolsoftware.com/
Pathways to Learning
http://www.pwtl.com/
HyperStudio templates for different age levels
Forest Technologies web site
http://www.foresttech.com/
Publishers of Designer Software for Learning "Portfolio Assessment Toolkit" designed by Karen Peterson and Scott Mengel, Peakview Elementary School - HyperStudio templates for different age levels
Electronic Portfolios
http://electronicportfolios.com
Training and Consulting on Electronic Portfolio Development through presentations in-person, on videotape, or using Internet-based technologies.

Commercial references

Portfolios and Self-Assessment
http://www.hmco.com/hmco/school/rdg/res/literacy/assess7.html
from Houghton Mifflin's Education Place - brief discussion plus link to references on assessment
Student Self-Assessment
http://www.hmco.com/hmco/school/rdg/res/assess/index.html
from Houghton-Mifflin's Education Place, included links to several brief discussions of students as active partners, self-assessment methods and self-assessment opportunities

Resources

School Odyssey
http://www.ideasconsulting.com/
http://home.att.net/~digitalportfolio/
David Niguidula and Hilarie Davis' web sites on digital portfolios
Feasible Electronic Student Portfolios: Global Networking for the Self-Directed Learner in the Digital Age
http://www.mehs.educ.state.ak.us/portfolios/why_digital_portfolios.html
Todd Bergman's excellent article on using portfolios to support self-directed learning.
Creating Electronic Portfolios
http://www.ash.udel.edu/ash/teacher/portfolio.html
A very nice article that summarizes the reasons for creating and using electronic portfolios.
Electronic Portfolios
http://www.edsupport.cc/mguhlin/webs/portfolio/index.html
By Miguel Guhlin, Educational Specialist and TENET Master Trainer, Technology Services, Education Service Center, Region 20, Texas -- A great slide show giving an overview of Electrtonic Portfolios
Lifelong Learning, Teaching, and Assessment
http://www.doe.mass.edu/doedocs/frameworks/comchp3.html
From the Massachusetts Board of Education Frameworks document--"Charting the Course: The Commom Chapters
FAQ's-Alternative Assessment
http://www.oise.on.ca/~ascarfone/faq.htm
Frequently asked questions about alternative assessment to accompany Anthony Scarfone's collection of resources for the busy school principal.
Martin Kimeldorf's Portfolio Library
http://amby.com/kimeldorf/portfolio/
A comprehensive guide to the author's work and books on portfolio development.

K-12 examples

Mt. Edgecumb's electronic student portfolios digital learning portfolio research
http://www.mehs.educ.state.ak.us/portfolios/portfolio.html
Many examples of student portfolios from Mt Edgecumb, Alaska's boarding school for rural high school students.
Video Portfolios.html
http://www.atg.apple.com/personal/Brian_Reilly/video_portfolios.html
Brian Reilly's information about the Bell High School Video Portfolios project.
Electronic Portfolio Home Page
http://longwood.cs.ucf.edu/~MidLink/elec.port.hp.html

A page that describes several middle school electronic portfolio projects published by Midlink online magazine.
http://www.alaska.net/~anndan/assessment.html
http://www.alaska.net/~anndan/assessment.html
Ann Anderson's paper, "Authentic Portfolios: An Incentive to Integrate Technology into the Classroom" written for UAA's class ED 625G.
Tammy Worchester's Technology Tips for Teachers - Electronic Portfolios pages
http://www.sv400.k12.ks.us/port/index.html
from Soderstrom Elementary, Lindsborg, KS
Susan Silverman's electronic portfolios for her students (four years).
http://kids-learn.org

Bibliographies

Portfolio Assessment
http://www.indiana.edu/~eric_rec/ieo/bibs/portfoli.html
ERIC citations on Portfolio Assessment.
ERIC Clearinghouse on Assessment and Evaluation
http://www.cua.edu/www/eric_ae/
A major resource on assessment & evaluation
NWREL Bibliographies - Portfolios
http://www.nwrel.org/eval/ea_bibs/folio.html
One of the most comprehensive annotated bibliographies on Portfolio Assessment (November, 1994), assembled by Judy Arter, Northwest Regional Education Lab.
Authentic Assessment Bibliography
http://www.sccoe.k12.ca.us/authasse.htm
a "current hot topics" bibliography on authentic assessment collected by the Educational Technology Access Center, a multimedia technology resource center for the Santa Clara County (CA) Office of Education.
Assessments of Multimedia Technology in Education: Bibliography
http://www.unc.edu/cit/guides/irg-11.html
a bibliography compiled by Carolyn Kotlas, MSLS, Institute for Academic Technology at the University of North Carolina at Chapel Hill

[redacted]

This is another way to use technology for alternative assessment, to highlight the work of your students, and to record your accomplishments.

Sheila

Follow-up E-mail #6

To: Model Schools Course Participants

From: Sheila Tebbano

Re: Research Project

Have you considered using what you know about computers to develop electronic portfolios for your students?
What about recording your professional accomplishments on an electronic portfolio?
There are a number of resources for electronic portfolios including these from Dr. Helen Barrett. The resources include information from the Coalition of Essential Schools, CRESST, Electronic Teaching Portfolios, Commercial Resources, and K-12 Examples of Electronic Portfolios.

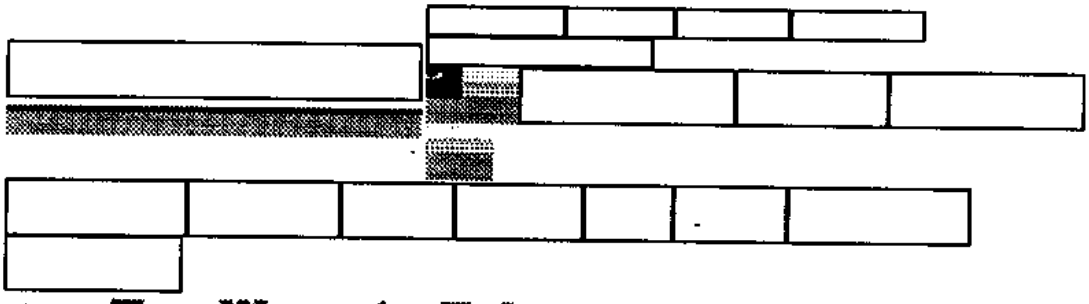
Dr. Helen Barrett's favorite links on Alternative Assessment & Electronic Portfolios

Coalition of Essential Schools

Files available at the **Coalition of Essential Schools**
Coalition of Essential Schools: Welcome
http://www.essentialschools.org
The main home page for the Coalition of Essential Schools
The Digital Portfolio: A Richer Picture of Student Performance
http://www.essentialschools.org/pubs/exhib_schdes/dp/dpframe.htm
The HTML version of an excellent CD-ROM produced by David Niguidula on the research conducted by the Coalition on digital portfolios in five different schools.
Technology in the Essential School: Making Change in the Information Age
http://www.essentialschools.org/pubs/horace/10/v10n03.html - Horace: vol. 10 no. 3
Demonstrating Student Performance in Essential Schools
http://www.essentialschools.org/pubs/horace/14/v14n02.html - Horace: vol. 14 no. 2
Show, Don't Tell: Video and Accountability
http://www.essentialschools.org/pubs/exhib_schdes/showvid.html
A research paper on the use of video and accountability.
The Digital Portfolio: A Richer Picture of Student Performance
http://www.essentialschools.org/pubs/exhib_schdes/dp.html
A research paper on the Coalition's design of a digital portfolio under development at several schools.

below to receive it every month by e-mail.

Here is an article from Scholastic Magazine, another online resource that can provide information
on a range of subjects with a click of your mouse. This article tells you ways to take charge
of the Web.



Ten Ways to Take Charge of the Web

Easy strategies for Internet Smarts

By Julie M. Wood, Ed.D.

Don't even get Mr. Harris started on the perils of teaching with the Internet. He's still recovering from what he considers the worst social studies class he's taught in his 18 years in the classroom. It began innocuously enough — his fourth graders had been begging for a chance to go on-line, and he thought that allowing them to do research in preparation for a visit to Washington, D.C., presented the perfect opportunity. It would also be a good chance to experiment with the World Wide Web as a teaching tool, something he had been meaning to do for some time.

Unfortunately, it had been a hectic week, and he had not had time to preview any sites or to visit the computer lab to get pointers from the tech specialist. Big mistake. Within minutes, it became obvious that the students knew more than the teacher. Lycos, HotBot, Yahoo. Students were surfing the Web with tools he had never heard of. And the information they were finding was confusingly random — two children were reading about the Washington Monument, but a third was becoming frustrated as she tried to navigate the sophisticated Web site of the Library of Congress.

Mr. Harris also noticed youngsters naively cutting and pasting information from Web sites directly into their "original" reports on historical monuments in the capital. But the final straw was when one child's simple typographical error in a URL accessed a pornographic site, causing a near frenzy among students.

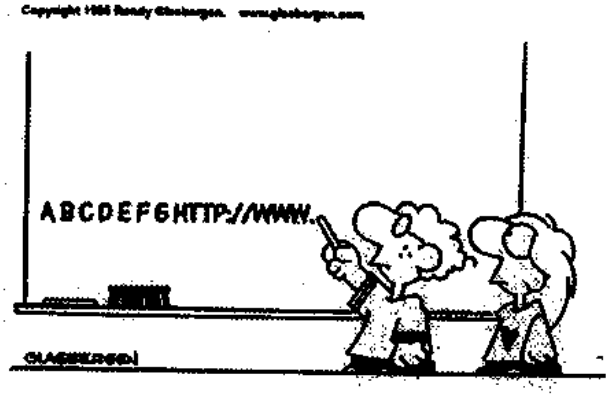
How did everything spin out of control so quickly? Our fictional fourth-grade teacher replayed the incident in his mind. How could he be smarter next time?

When it comes to using the Internet in elementary and intermediate education, critics and proponents agree on one thing: It is a powerful tool that has the potential to inform, teach, and facilitate communication in ways barely imaginable 10 years ago. But because the Web is so new and far-reaching, trying to master it as a teaching tool may be daunting and seem like more trouble than it's worth. The good news: Using the Web effectively comes easily once you develop some on-line "smarts." The following pointers will help you do just that. You'll be in charge before you know it!

1. *Explore your own interests on-line*. What holds for your students holds for you: Use your hobbies and passions as points of entry to the World Wide Web. There is no better way to familiarize yourself with it. Do you love auctions? Check out eBay (www.ebay.com), the on-line auction house, and bid on that old Brownie Hawkeye camera you've been longing for. Have you been meaning to join a book-discussion group but haven't gotten around to it? Join other literary-minded folks at Salon (www.salon.com) to discuss the classics or the latest best sellers on-line.

2. *Develop an acceptable use policy (AUP)*. The best way to keep Internet access safe and appropriate for children is to teach and monitor responsible use. Make your terms the children's "ticket" for going on-line. Begin by

And don't forget to smile while you learn~~~



I hope you find these sites useful in your daily work.
Sheila

Follow-Up Email #7

To: Model Schools Course Participants

From: Sheila Tebbano

Re: Research Project

Searching for school clip art can take a lot of time. Consider Bookmarking a few good clip art sites to use when you want to jazz up your work. CoolClips.com has education, history, seasonal, sports, technology, and more categories of clip art.

September 19, 2001

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CoolCLIPS Licence
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Special Occasions
- Halloween
- Autumn
- Thanksgiving
- Back to School
- Birthdays
- Elections
- Get Well Soon
- New Baby
- Religious
- Wedding & Anniversary

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- Music
- Drama
- Visual Arts
- Circus
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Education
- Reading
- School

Fantasy
- Myths
- Science Fiction

Food
- Beverages
- Desserts
- Fruits & Vegetables
- Meats & Dairy
- Junk Food

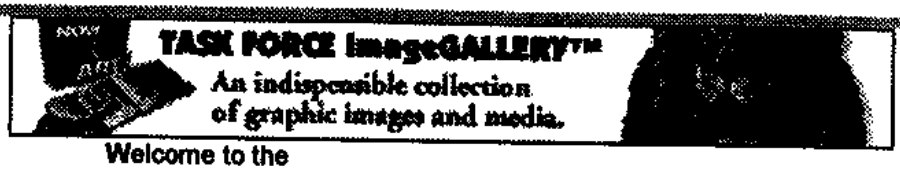
History
- Ancient Structures
- Historical People
- Medieval
- Statues & Monuments

Industry
- Construction
- Farming
- Manufacturing

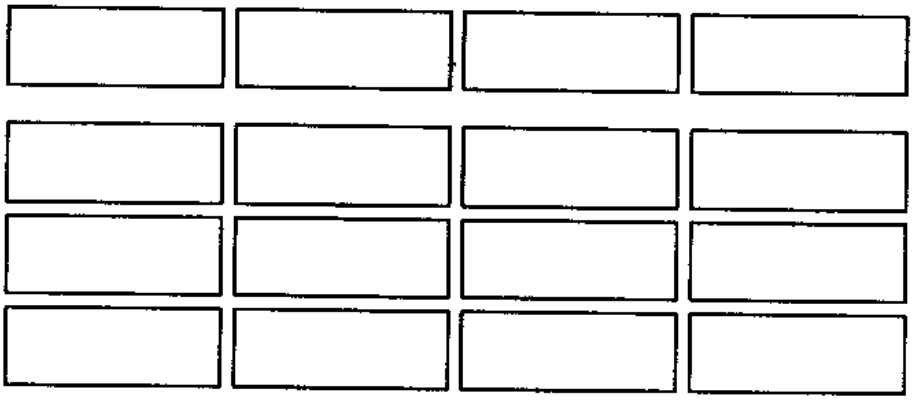
Military
- Airforce
- Army

Nature
- Animals
- Plants
- Seasons

People
- Babies
- Children
- Couples
- Seniors



Welcome to the wonderful world of CoolCLIPS.com! Here you will find every resource you could ever need to fulfill your graphic content requirements. Bookmark us today!



Special Occasions
Autumn | Back to School | Halloween | Columbus Day
Birthdays | Elections | Get Well Soon | New Baby | Religious
Wedding & Anniversary

Arts & Entertainment
Circus | Drama | Fun Stuff | Music | Visual Arts

Business
Concepts | Conferences | Finance & Money | Office & Stationery | Retail
Workplace

Education
Reading | School

Fantasy
Myths | Science Fiction

Food
Beverages | Desserts | Fruits & Vegetables | Junk Food | Meats & Dairy

History
Ancient Structures | Historical People | Medieval | Statues & Monuments

Industry
Construction | Farming | Manufacturing

Military
Airforce | Army

HERE IS A SEARCHABLE WEBSITE THAT YOU CAN USE FOR INFORMATION AND IDEAS. IT ALSO HAS ARTICLES AND DISCUSSION AREAS FOR TEACHERS.

LessonPlanZ.com is searchable directory of free online lesson plans and lesson plan resources for all grades and subjects. Launched on May 1, 1999, LessonPlanz.com was designed to provide an easier way for teachers to find online lessons and teaching resources! By eliminating search results that are not relevant to teachers, you also save time.

EducationNews.org Are you looking for articles related to education news? This site offers a free online subscription to article from around the world. There are articles from the New York Times, USA Today, and much more. There are also commentaries and reports of interest to educators. The site is updated and well maintained. It also has a bulletin board for teachers looking for information or willing to share with others.

Remember to take time to laugh each day.

"My report took me five hours—one hour for research and typing and four hours to get my sister off the computer."

I hope you find this information useful.

Sheila

Follow-Up E-Mail #8

To: Model Schools Research Participants

From: Sheila Tebbano

Re: Follow-up to your Model Schools Course

POWERPOINT PRESENTATIONS CAN PROVIDE VISUAL REINFORCEMENT TO YOUR DAILY LESSONS. THERE ARE A NUMBER OF WEBSITES THAT OFFER FREE POWERPOINT MATERIAL. MULTIMEDIA PRESENTATIONS ADDRESS A VARIETY OF LEARNING STYLES AT ONE TIME AND IS AN EFFECTIVE TEACHING TOOL FOR ENGAGING ALL STUDENTS.

CHECK OUT~ ~

http://www.essdack.org/tips/page3.htm

FROM TAMMY'S TIPS FOR EDUCATORS

Presentations include: Website Design, Building Integrated Projects, Problem-Based Learning, Web Delivered Instruction, and more.

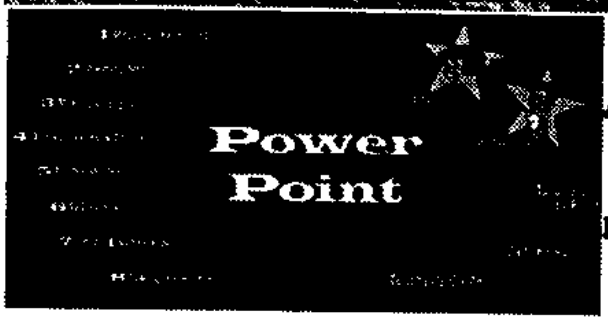
http://www.datasync.com/~teachers/powerpoint.html

Power Point for Teachers is an extensive site that has links to many sites.

Some of the PowerPoint sites you can search are:

- **CyberExchange – presentations for grades K-8 on all subjects**
- **Courseware Web – a PowerPoint Tutorial**
- **Kathy Schrock's PowerPoint Presentations**

- **PowerPoint Depot**



POWERPOINT IN THE ASSROOM

p://www.actden.com/pp/

PowerPoint in the Classroom

http://www.electricteacher.com/powerpoint.htm

This site contains tutorials, project ideas, PowerPoint 2000 for teachers, PowerPoint discussion, and links to other useful sites.

Follow-Up E-mail #9

To: Model Schools Course Participant

From: Sheila Tebbano

Re: Follow-Up to your Model Schools Course

The Internet provides many opportunities for continued self-directed learning.
Educators now have the opportunity to read, study, discuss, practice, and learn when and where it is convenient.
The websites listed here are examples of online learning opportunities.

OnlineClass *presents*

K-12 inquiry-based teaching units that focus on Internet resources. Now OnlineClass offers two kinds of teaching experiences.

http://www.onlineclass.com/

Have a question about OnlineClass? Want to receive the free monthly e-mail newsletter?

Our monthly e-mail newsletter contains tips on how to use the Internet in the classroom, technology reports, updates on our programs, and comments from educators using the Internet in the classroom.

You can download the latest newsletter in PDF by clicking on the icon to the left, or sign up

Reference

How can you integrate technology into your already-full work schedule? How can you capitalize on your students' and colleagues' knowledge? And where can you find the help you need? How can you integrate technology into your already-full work schedule? How can you capitalize on your students' and colleagues' knowledge? And where can you find the help you need? This feature article is done in Q & A format.

Integrating Technology Some Things You Should Know

By Laurie B. Dias

http://www.iste.org/L&L/archive/vol27/no3/features/dias/index.html

Smile! You can find these cartoons at http://www.glasbergen.com/

"I can suck pudding up my nose and blow it out the corner of my eye, but they *still* won't put me in the gifted class at school!"

Hope you find this information useful in your teaching position.
Sheila

Follow-Up E-mail #10

To: Model Schools Course Participant

From: Sheila Tebbano

Re: Research Project Follow-up

The Internet is all about information. This site is dedicated to helping people learn to use that information in a coherent manner. Beginners' Central is based on a chapter by chapter structure, you may skip to any chapter you're interested in, or if you wish, you can start at the beginning and work your way forward.

Before you begin your journey please a take a brief moment to learn how to navigate this learning site. The navigational buttons for this site are located at the top and bottom of every page. From there you can return to this main page, or move deeper into the tutorial. Windows users should remember that pressing CTRL (control) END simultaneously will bring you to the bottom of the page you're viewing.

- Make Money Fast
- Web Page Promotions
- Chapter Summary

- APPENDIX A - GLOSSARY OF NET TERMS
- APPENDIX B - NEWSGROUPS(PARTIAL LISTING)
- About Northern Webs
- Boring Copyright Stuff
- Awards
- The Beginners' Central BBS, Got a question? ASK IT HERE!

Educators can use the Internet to learn and find information. Do you get confused about Search Engines and web directories? Kathy Schrock has a Powerpoint slide show that explains the differences and how both can help you in your work.

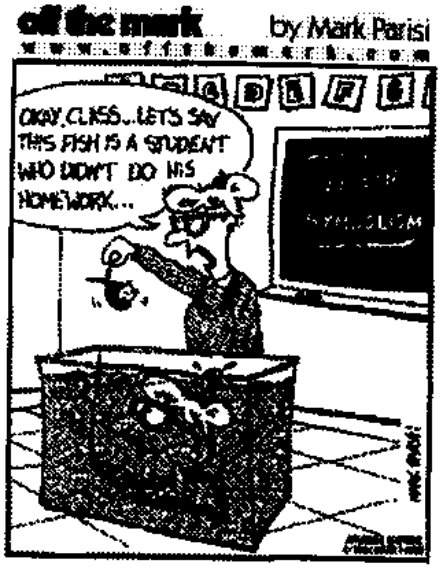
http://school.discovery.com/schrockguide/mystery/mystery1.html

Here is another Internet learning resource. Walter Howe's site includes links to the History of the Internet, an Internet and Web Glossary, navigating the web, and more.
The Internet Learning Tree is a very good link.

Walt Howe's
Internet Learning Center

http://www.walthowe.com/

And while you are learning about the Internet don't forget to keep your sense of humor.



Off the Mark by Mark Parisi has a number of school related cartoons on the Internet.

I hope you find this information useful in your work.
Sheila

Follow-Up E-mail #11

To: Model Schools Course Participant

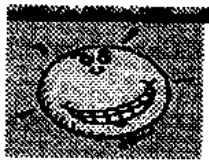
From: Sheila Tebbano

Re: Follow-Up Research Project

On the Internet in e-mail, chatting, and posted messages, an emoticon (sometimes referred to as a "smiley") is a short sequence of keyboard letters and symbols, usually emulating a facial expression, expressing a feeling that supplements the message.
One of our contributors says that to read these you can either tilt your head or turn the monitor on its side.
http://whatis.techtarget.com/definition/0,,sid9_gci212057,00.html

:-)	Smile
;-)	Smile with a wink
:<))	User with mustache, smiling
:-||	Mad
:-(	Sad
:'-(	Crying
:~	Also crying
:-))	Really happy
:-D	Big grin
:-*	A kiss
:-P~	A lick
:-o	Wow! or I'm surprised
:-|	Grim
:-P	Sticking out your tongue
:-	User happens to be Popeye
:-/	Perplexed
=:O	Frightened (hair standing on end)
=8O	Bug-eyed with fright
:-}	Embarrassed smile
:-)<>>>>>	Basic Smiley with a necktie
;-^)	Tongue in cheek
%*@:-(	Hung over
:~~~	Drooling
>:)	Perplexed look
.)	Keeping an eye out for you
8:-)	Glasses on forehead
8:[	Normal smiling face of a gorilla
0:-)	Angel
]:-|[	Robot
(:V)	Duck
3:-o	Cow
:-]	Vampire
(_8-(|)	Homer Simpson
C|:-=	Charlie Chaplin
=|:-)=	Abe Lincoln
*<:-)	Santa Claus
-:-)	User sports a mohawk and admires Mr. T
(:)-)	Scuba diver
:-'|	User has a cold
:-{}	User with heavy lipstick
:-)8	User is well dressed

>:-<	Mad
*#:-)	Scotsman wearing his Scottish tam
%-^	User is another Picasso
#-)	User partied all night
<:I	Dunce
:-|	"Have an ordinary day!" Smiley
:}{:	Kisses (stolen from June bug)
oooo(0) (0)oooo	Toes
(-_-)	Secret smile
#.-o	"Oh, nooooooo Mr. Bill!!!"



NetLearning Why Teachers Use the Inter

The Top Ten Reasons Why Teachers Use the Internet

This article can be found at: http://www.songline.com/teachers/ferdi.html

As students and teachers across the nation go back to school this fall, some are returning subtly, yet irrevocably, changed. The reason? They've brought the Internet into their classrooms, and learning will never again be limited to the confines of a classroom's four walls. Over the summer, teachers, as well as students and parents, have discovered that the Internet opens up a wide array of possibilities for lifelong learning. How is the Internet being used in schools-what's all the fuss? As one of these teachers, I'd like to explain...

1. The Internet provides teachers with free (or low cost) materials they need We teachers have always been a resourceful bunch. We befriend our local travel agents for posters, brochures, any source to liven up our classrooms. When you are able to connect to the Internet, a world of free or inexpensive materials can be either downloaded or sent for. **NASA** is one well-spring of online educational resources, the **PBS** and the **Discovery Channel** have a host of free activities that complement their video programming...even the CIA shares **mountains of information** you paid them to collect on every country. Some people (mistakenly) believe that this is the only reason for using the Internet-getting things. The reality is far richer.
2. No classroom is an island, on the Internet! To a classroom connected to the Internet, no place is more than a few mouse clicks away. Students routinely take virtual field trips to every corner of the earth from my classroom. When their Language Arts teacher wants them to explore the countries of their origin, the Internet is a logical tool. In our school, 44 languages are spoken, and so far we've yet to turn up empty in our searches. Many times, we collaborate with students from these countries, striking up relationships by electronic mail (email); it's free and fast! My daughter carried on conversations with a good friend who returned to Iceland for the summer, just as if she still was only a few blocks away (and without adding to our phone bill!).
3. The Internet releases you from being a "Prisoner of Time" In a recent study **"Prisoners of Time,"** the US Department of Education detailed how progress in educational achievement is stymied by schools' use of time. Every teacher knows he or she is time stressed. The Internet can help you focus on learning, instead of time, by assisting you in managing your communications, providing "just in time" materials, and by being "open" 24 hours a day, to allow you to plan when you can. Keeping in contact with people becomes increasingly difficult as our lives become more complex. Even our message machines seem to be playing phone tag sometimes! The introduction of the Internet into classrooms brings with it one important benefit of email: the person you're writing to

doesn't have to be at their machine when you send your message. They'll get the message the next time they check their mail. It is so much easier to control when this happens (as opposed to answering every phone call or cycling through dozens of voicemail messages) that most people I know prefer to be contacted by email. This doesn't mean we've forsworn phone or "face to face" contact-each is still vital, and each has its place. Using email first can actually make our phone conversations and meetings more focused and productive. Our email has prepared us by giving us time to think about the topics we're discussing and letting us reply when we're ready.

4. The Internet motivates your students This same benefit-being in control-also works its magic on students. Kids who are only reluctant writers find that access to audiences of large numbers of their peers gives them reason and confidence to express themselves. Research shows that the same students who could care less about grammar and punctuation suddenly become very particular when realizing that online they are only known by the quality of their words. Other cues, such as age, appearance, race and gender no longer get in the way of understanding. My students are now beginning to create their own web pages, moving from "surfers" to "settlers" of cyberspace, and are taking ownership of the Internet and of their own learning. The Science Learning Network is trying to keep up with **kids' creations** in all subject areas, and a visit is worth your while.
5. The Internet allows students to learn by doing Your students could read about DNA (if their textbook is not too outdated!). Or, they could manipulate a 3-D rendering of a DNA molecule, determining its chemical composition, size, construction and function in our world. All for free, using software developed by the National Institute for Health, and worldwide protein databases-the same ones scientists use. Got a question? Increasingly, some of these scientists are available to interact with students.
6. The Internet allows expanded opportunities for mentoring In fact, it has a name: Telementoring. According to the Center for Children & Technology (CCT), telementoring describes "formal and informal on-line exchanges among teachers, students, and/or scientists usually collaborating on specific curriculum-related topics." Among the variations, **CCT's Telementoring project** differs in that it "builds on the traditional concept of mentoring; a supportive relationship, sustained over a period of time, between a younger person and an older person". Another flavor is Judi Harris' **Electronic Emissary project**, where hundreds of volunteer Subject Matter Experts serve thousands of students, by sharing what they know.
7. The Internet ends teacher isolation All of these benefits apply equally, if not moreso, to educators. After all, it's really about lifelong learning. Responding to necessity, early educational networkers soon realized that they were the trailblazers and pioneers, going into unknown territory, and thus had to depend upon each other. The resulting ethos (share what you know with whomever needs to know it, the same way you were helped in the beginning) continues to this day. For an evolving, exciting example of how this idea can flourish, please visit the **Online Internet Institute**, where hundreds of educators are using an online community to support their individual successes in their classrooms. Together, we are developing class curricula, evaluating Internet resources, trading tips, and finding partners for our educational journeys.
8. The Internet can bring schools and communities closer together When our school published our Board of Education policies, schedules for Board meetings, and homework assignments on our **Web server**, reaction was instant and positive. It's difficult for people to understand what they can't see, and the Internet reduces the distance that often hinders the growth of effective school/community relations. The Internet has become a hot button. Following the first wave of hype, the pendulum swung back to hysteria about the perils facing youth on the Internet. The reality is, of course, somewhere in-between. Not only do most people realize that networks are here to stay, and that ability to use networks will be an important qualification for employment, learning (and citizenship), most communities respond positively and enthusiastically to evidence of their students' success on the Internet.
9. The Internet can spread good news about your program Real students, doing authentic tasks, and solving real-world problems-this is the type of good news that provides much needed support for your educational program. Every day, I am astounded by how students exceed the limits of what I thought possible. Soon after you begin exploring ways to make your classroom come alive with the new power the Internet can bring, your students will surprise you, too. Let the public know, invite them in, tell the papers and media. For example, last spring our school collaborated with a school in Millburn, NJ to help one of their students. Vova had contracted leukemia in Chernobyl

at the age of two. Now in the States, he was in remission, but faced a return to Ukraine because his dad was denied a green card. If Vova returned, it would be a death sentence, as there exists no medical help in Ukraine should his remission end. Our students in Princeton worked with the Millburn students and partners in Hawaii who heard of **our efforts to help Vova**. Our community responded by having a radiologist and environmental scientist answer all the questions students encountered as they did their research. The Millburn students did a letter writing campaign. The result: New Jersey state legislators learned of the web site, realized the good PR value, visited Vova's school with a film crew, and passed a resolution asking the Secretary of Labor to approve Vova's dad's request for a green card. These students now know that their learning is powerful, and they know how to use the Internet as a tool in ways that no one could have predicted.

10. The Internet rejuvenates your professional life! Bob Marley's advice to "lively up yourself" could have been a prescription for Internet use. Releasing yourself from the Prisoners of Time syndrome, ending professional isolation, steering newly discovered energies and motivation among your students-it all adds up to transforming the context and support you experience as an educator, for the rest of your career. To those who say, "that sounds like more work," I reply, "maybe so, but it's better work!" As my students and I return to our classroom, all of us are excited about the discoveries that lie ahead. None of us would ever go back to the way things were before!

Ferdi Serim teaches people to use computers for lifelong learning at the Princeton Regional Schools. He is co-author, with Melissa Koch, of NetLearning: Why Teachers Use the Internet, from which many of the examples in this article are drawn. NetLearning: Why Teachers Use the Internet By Ferdi Serim & Melissa Koch A Songline Guide from O'Reilly & Associates 292 pages; ISBN: 1-56592-201-8, $24.95 (US) Available in bookstores or from publisher from O'Reilly & Associates at 800-889-8969 (US & Canada) or order@ora.com.

Are your students this comfortable with computer language?

I hope you enjoy the emoticons (smileys) and the article on reasons teachers use the Internet.
Smile!
Sheila

Follow-Up E-mail #12

To: Model Schools Course Participants

From: Sheila Tebbano

Re: Research Follow-Up

Searching on the Internet can provide you with an overwhelming amount of inform Many school websites are producing easy to access guides to curriculum, lesson pla more. This information was taken from: http://www.tie.net/train/doug_rowe/Emerging/page7.htm page on the Mitchell School District, Mitchell, South Dakota website. The site inclu to "inservice sites". Searching school district websites is an easy way to keep up to what is available for teachers on the Internet.

http://marcopolo.worldcom.com

http://www.classroom.com

http://www.teachernet.com/index.tpl

http://www.teachersfirst.com

DAILY LessonPlan

nytimes.com/learning/teachers/lessons/index.html

South Dakota Launches Online Te
eschoolnews.org/showstory.cfm?Articl

Training Resources by TIE St
http://www.tie.net/train/train.ht

WebQuests and More
http://www.ozline.com/learnin

Newton's Apple Teaching Guid
http://www.pbs.org/ktca/newtons/alp

Educational Links & Lessons Pl
http://www.coollessons.org
http://www.hol.edu/main/resource

Thematic Teaching Units
http://www.teachertimesavers.c

Project Ideas & Teaching Strate
http://www.creativeclassroom.o

Content Knowledge Database
http://www.mcrel.org/standards-ben

Academic Journals
http://www.facultyconnection.o

The Gateway to Educational Mat
http://www.thegateway.org/

http://horizon.unc.edu/TS

http://teachers.work.co.nz/

http://www.educationplanet.com

21st Century
Teachers Network
http://www.21ct.org/sit08_pub/owa/main

Library in the Sky
http://www.nwrel.org/sky

Folk Tales from the South
http://www.themoonlitroad.com/featurest

Internet 101
http://internet-101.com/main.ht

Helping your Child learn Mat
http://www.ed.gov/pubs/parents/Math/i

Top Web Sites for 2000 (from a HomeSc
http://www.homefires.com/clicktop

Nieman Webliographer
http://relax.ltc.vanderbilt.edu/nieman/v

Virus Encyclopedia
http://www.avp.ch/avpve/

Online Curriculum

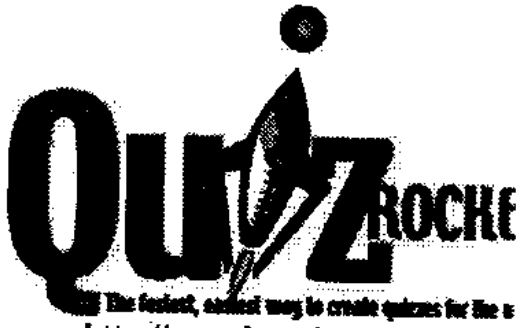
http://www.accesslearning.com/classroom.html

http://www.thinkquest.org

Heritage Institute Online

Continuing Education for K-12 Teachers

http://www.hol.edu/



http://www.learningware.com

Web Worksheet Development

http://wizard.hprtec.org/

Curriculum Design for Excellence - O

http://www.rogertaylor.com

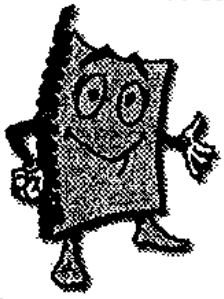
OnlineClass

http://www.onlineclass.com/

Learning more about Nature

http://www.beyondbooks.com/

Internet Resource Room



LESSON PLANE

lessonplanet.com/search/Online_Projects/

http://members.aol.com/my166web/1curriculum.html

New Forum Publishers, Inc.

http://www.schoolkit.com

http://www.beyondbooks.com/

I hope you have found these follow-up emails helpful in your work.

Sheila

I appreciate your participation in my dissertation research and I hope the email follow-up has been useful to you in your teaching position. In order to finish the research, I need you to complete the Snap Shot Survey again. The survey is located at http://snapshotsurvey.org/tebban and will take approximately ten minutes of your time. Make sure you hit submit at the end of the survey.

You were randomly selected to be a part of the experimental group for my research. You received twelve follow-up emails from me. I will be emailing you a questionnaire regarding the follow-up emails your received. It need you to complete this questionnaire and that will complete your participation in my research.

After you complete the survey and questionnaire, I will send you a certificate to recognize your professionalism and contribution to educational research. I hope the results of the research will be useful to school districts as they plan technology training projects.

To: Model Schools Course Participants

From: Sheila Tebbano

Re: Dissertation Research Participation

I appreciate your participation in my dissertation research and I hope the email follow-up has been useful to you in your teaching position. In order to finish the research, I need you to complete the Snap Shot Survey again. The survey is located at http://snapshotsurvey.org/tebban and will take approximately ten minutes of your time. Make sure you hit submit at the end of the survey. If you have any difficulty accessing the survey, please email me at mtebban1@nycap.rr.com

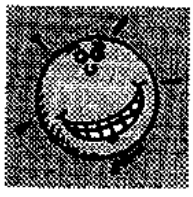
When you agreed to participate in my study, you were randomly selected to be a part of the experimental research group. This group received course follow-up email. In order to assess the email follow-up, I need you to complete a brief questionnaire regarding the follow-up emails you received. I will email the questionnaire. Responding to this questionnaire will complete your participation in my research.

After you complete the survey and questionnaire, I will send you a certificate to recognize your contribution to my educational research. I hope the results of my research will be useful to school districts and BOCES, as they plan future technology training.

This proverb supports the essence of my dissertation research. "By learning you will teach, by teaching you will learn." *Latin Proverb* Your participation in a Model Schools course and willingness to participate in my research are indications of your professionalism and vision.

Much thanks and best wishes for continued success with all aspects of technology and Internet use.

Sheila



Dear Research Participant,

The research period for my study has concluded. Your continued participation is very important to the study. In order to complete your participation you need to again take the Snap Shot survey that is located at:

http://www.snapshotsurvey.org/tebban

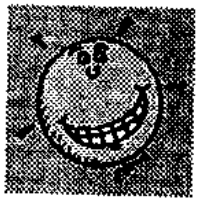
Click on the web address and you can begin the survey that will take approximately ten minutes of your time. If you have any questions or difficulty accessing the survey, please email me at mtebban1@nycap.rr.com.

Completing the survey will conclude your participation in my dissertation research. After you complete the survey, I will email you a certificate of participation as a way of recognizing your participation in my research.

This proverb supports the essence of my dissertation research. "By learning you will teach, by teaching you will learn." *Latin Proverb* Your participation in a Model Schools course and willingness to participate in my research by taking the Snap Shot Survey are indications of your professionalism and vision.

Much thanks and best wishes for continued success with all aspects of technology and Internet use.

Sheila Tebbano



APPENDIX C

Instruments

Welcome to the survey! The questions are broken up into two sections. The first section asks about who you are and what your role is in education. Please give answers to each of the questions and then click the button at the bottom of the page to continue to the next section. If a particular question does not apply to your current position, please leave the question blank.

Contact: Sheila Tebbano
Technical Questions: benlevy@mac.com

Demographics

Part One of Two

Please select your school or building:

-- Pick --

What best describes your current position?

○ Teacher	○ Site Administrator	○ Instructional Aide
○ All Other Classified	○ Administration: Educational Services	○ Administration: Business/Personn Services
○ Media Specialist	○ Curriculum Coordinator	○ Technology Coordinator
○ Special Education	○ Guidance Counselor	

If you are a teacher, what best describes your assignment?

○ Elementary	○ Language Arts	○ Math
○ Foreign Language	○ Social Studies	○ Science
○ Computer Science	○ Industrial Technology	○ Business
○ Music	○ PE/Health	○ Art
○ Special Education	○ Teacher on Special Assignment	

What is your degree status at this time?

○ BA/BS ○ BA/BS+15 ○ Masters ○ Masters+15 ○ Masters+30 ○ CAS ○ Doctorat

What best describes your grade level assignment:

○ Pre-K ○ Elementary ○ K-8 ○ K-12 ○ Middle School ○ High School ○ Post-Secondary

What best describes your grade level assignment; check all that apply:

☐ Pre-K ☐ K ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ post-secondary

How many years have you worked in education?

○ 1-3 ○ 4-6 ○ 7-9 ○ 10-12 ○ 13-15 ○ 16-18 ○ 19-21 ○ 22-24 ○ 25 or more

How many hours of technology related professional development outside of Model Schools Program courses have you completed during your career?

○ 1-2 ○ 3-5 ○ 6-10 ○ 11-15 ○ 16-20 ○ >20

What is your age?

○ 20-25 ○ 26-30 ○ 31-35 ○ 36-40 ○ 41-45 ○ 46-50
○ 51-55 ○ 56-60 ○ 61-65 ○ 66-70 ○ 71-75 ○ >75

What is your gender?

○ male ○ female

Clear Answer | Continue To Part Two

Please answer the following questions, which are required, before you continue with the survey.

Contact: Sheila Tebbano
Technical Questions: benlevy@mac.com

Demographics

Part One of Two

Please select your school or building:

-- Pick --

What best describes your current position?

- ○ Teacher
- ○ Site Administrator
- ○ Instructional Aide
- ○ All Other Classified
- ○ Administration: Educational Services
- ○ Administration: Business/Personn Services
- ○ Media Specialist
- ○ Curriculum Coordinator
- ○ Technology Coordinator
- ○ Special Education
- ○ Guidance Counselor

Clear Answer | Continue to Part Two

The second part of the survey asks questions about the role of technology in your school or classroom. Again, please fill out all the questions and then click the "finish" button at the bottom of the page. If a particular question does not apply to your current position, please leave the question blank.

Contact: Shelia Tebbano
Technical Questions: benlevy@mac.com

Part Two of Two

What is the availability of an Internet-connected computer for your use at home?

- ○ There is no computer available
- ○ An available computer is not convenient
- ○ An available computer is convenient

What is the availability of an Internet-connected computer for your use at work?

- ○ There is no computer available
- ○ An available computer is not convenient
- ○ An available computer is convenient

Please indicate the number of typical (or average) minutes PER WEEK that:

	zero	less than 15	15-45	46-90	more than 9
YOU use the Internet at school	○	○	○	○	○
YOU use the Internet at home	○	○	○	○	○

If my district offered professional development activities delivered via the Internet, I w use them.

○ Strongly Disagree ○ Disagree ○ No Opinion ○ Agree ○ Strongly Agree

What specific topic would you like to have a professional development training sessio address?

Your answer: _____

Please indicate your level of agreement with the following statements:

Please rate the following from 1 to 5, where 1 means "Strongly Disagree" and 5 means "Strongly Agree."	Strongly Disagree 1	2	3	4	Stro A
I believe that electronic media will replace textbooks within 5 years	○	○	○	○	
I believe the positive effects of computer use on students in my school or district outweigh any negative effects such use might have	○	○	○	○	
I believe that the role of schools will be dramatically changed because of the Internet within 5 years	○	○	○	○	
I believe that the role of the teacher will be dramatically changed because of the Internet within 5 years	○	○	○	○	
I believe that the emerging palm-sized computing devices have more of a chance to significantly impact K-12 teaching and learning than do personal computers	○	○	○	○	
I believe that I am a better educator when I use technology for my work	○	○	○	○	
I believe that the teachers in my school or district are more effective when they use technology	○	○	○	○	
I believe that having students search the Internet for information for a classroom assignment is time well spent	○	○	○	○	

Which of the following types of software are used in your school or district?

	NOT used	Used	D Kn
Word processors (e.g., Microsoft Word, ClarisWorks, AppleWorks)	○	○	○
Office Productivity Tools: Spreadsheets (Excel, ClarisWorks) or Databases (FileMaker, ClarisWorks) or Presentation programs (PowerPoint, ClarisWorks)	○	○	○
Tools (e.g., KidPix, Inspiration, HyperStudio)	○	○	○
Non-curricular Software (e.g., Solitaire, PacMan, other games)	○	○	○
Curricular-based Software (e.g., MathBlasters; Carmen SanDiego; Logical World of the Zoombinies; ScienceSleuth; Choices, Choices; Oregon Trail)	○	○	○
Teacher developed web pages authored especially for a particular topic or lesson	○	○	○
Internet search engines (e.g., Yahoo, Yahooligans, Lycos)	○	○	○
Internet web page authoring (e.g., Dreamweaver, HomePage, FrontPage, PageMill)	○	○	○

What was the focus of your most recent technology-related professional development activity?

Your answer: [ ]

Please read the descriptions of each of the six stages related to adoption of technolo Choose the stage that best describes where you are in the adoption of technology[2].

Stage 1: Awareness

○ I am aware that technology exists but have not used it - perhaps I'm even avoiding it. I a anxious about the prospect of using computers.

Stage 2: Learning the process

○ I am currently trying to learn the basics. I am sometimes frustrated using computers. I lac confidence when using computers.

Stage 3: Understanding and application of the process

○ I am beginning to understand the process of using technology and can think of specific tasks in which it might be useful.

Stage 4: Familiarity and confidence

○ I am gaining a sense of confidence in using the computer for specific tasks. I am starting feel comfortable using the computer.

Stage 5: Adaptation to other contexts

○ I think about the computer as a tool to help me and am no longer concerned about it as technology. I can use it in many applications and as an instructional aid.

Stage 6: Creative application to new contexts

○ I can apply what I know about technology in the classroom. I am able to use it as an instructional tool and integrate it into the curriculum.

[redacted]

1 - modified from the TPSA developed by Dr. Meg Ropp
2 - Stages of Adoption developed by Dr. Rhonda Christensen, University of North Texas

Thank You

Thank you for taking the time to respond to the Model Schools/Tebbano Research (follow-up) Snapshot Survey.

If you would like to register to have your own Snapshot Page which will show you the cummulative survey results, please enter your e-mail address:

[redacted]

Your e-mail address will be kept private and only used for Snapshot Survey purposes

Sponsored By

Texas Center for Educational Technology, Univ. of North Texas
Center for Highly Interactive Computing in Education, Univ. of Michigan

Contact: Sheila Tebbano
Technical Questions: benlevy@mac.com

Follow-Up Questionnaire

Model Schools Participant Summer 2001

You were randomly selected to receive follow-up email support after completing your Model Schools Web-based technology course. As part of my research, you received 12 course follow-up emails from me.

Please take a few minutes to answer the following questions regarding the follow-up email. As I previously explained, your answers are confidential and will be used only for purposes of educational research. The analysis of your responses will be used as part of my dissertation.

Thank you for taking a few minutes to complete these questions and submit the page to me. This completes your participation in my doctoral research and I will send you a certificate of participation.

Sheila Tebbano

mtebban1@nycap.rr.com - Email me if you have any questions or problems with this questionnaire. Your participation is very important to my research.

---

1. Do you regularly check your email?

- ○ Several times each day
- ○ Daily
- ○ Weekly
- ○ Occasionally
- ○ Rarely

2. Did you read any of the emails that you received from this researcher?

- ○ Yes - All or Most
- ○ Yes - Many
- ○ Yes - Some
- ○ Yes - A Few

- No

3. Did you open any of the links that were part of the follow-up emails?

- Yes- All or Most
- Yes- Many
- Yes -Some
- Yes - A Few
- No

4. Did you print any of the emails you received?

- Yes
- No

5. Did you save any of the follow-up emails for future reference?

- Yes - All or Most
- Yes - Many
- Yes - Some
- Yes - A Few
- No

6. If you opened any of the Internet links to educational sites, did you bookmark any of the links that you opened?

- Yes
- No

7. If yes, how do you think you will use the bookmarked links?

8. Did you forward any of the follow-up information to anyone else? ○ Yes

○ No

9. Do you feel that the emails your received were:

(Choose as many as appropriate)

☐ Useful

☐ Relevant to my work

☐ Increased my use of the Internet

☐ Did not increase my use of the Internet

☐ Not helpful to me

10. Do you believe the follow-up email increased or enhanced your use of the skills you learned in your Model Schools course?

○ Yes

○ No

○ Unsure

11. Please provide this researcher any additional comments regarding follow-up emails that you would care to share. Positive and negative comments are appreciated.

Enter your comments in the space provided below:

Thank you for completing this questionnaire. This completes your participation in the research project. You will receive a certification of participation in recognition of your

professionalism and vision as an educator.

Name

E-mail

Submit Comments | Clear Form