THE EFFECT OF INSTRUCTIONAL TECHNOLOGY TRAINING ON THE PERCEIVED SELF-EFFICACY OF PRESERVICE TEACHERS

ANNE SAUDER WALL

The Effect of Instructional Technology Training on the Perceived Self-Efficacy of Preservice Teachers

A Field Study

Presented to the

Graduate and Research Council of

Austin Peay State University

In Partial Fulfillment

of the Requirements for the Degree

Education Specialist

Anne Sauder Wall

July 2002

To the Graduate Council:

I am submitting herewith a Field Study written by Anne Sauder Wall entitled "The Effect of Instructional Technology Training on the Perceived Self-Efficacy of Preservice Teachers." I have examined the final copy of this paper for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Education Specialist, with a major in Elementary Education.

Dr. Don Buck
Major Professor

We have read this Field Study
and recommend its acceptance.

Dr. Ann Harris

Dr. John Mark Hunter

Accepted for the Committee

Dean of the Graduate School

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Date August 2, 2002

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ABSTRACT

This research attempted to determine the level of perceived self-efficacy of preservice teachers regarding their computer integration skills following a one semester instructional technology course. The Self-Evaluation Rubric for Basic and Advanced Teacher Computer Use was administered to 77 education students prior to and following the completion of the required course.

The results of the posttest were analyzed using a *t*-test of means to determine a significant difference between the perceived competency level of elementary majors versus secondary majors and traditional students versus non-traditional students ($p<.05$). The gain scores between pretest and posttest were also analyzed to determine areas in need of instructional modification.

The findings of this study indicated elementary majors had a higher perceived self-efficacy of computer integration skills than did secondary majors, and traditional students had a higher perceived self-efficacy than did non-traditional students. Areas of technology instruction that may require modification were Web page construction, database use, real-time technologies, and network use.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

Departments, schools, and colleges of education are attempting to determine if today's new teachers are adequately prepared to effectively integrate technology into the K-12 curriculum. Most teacher education programs require a minimum of one technology course as a foundation for their preservice teachers, but with the wide variety of backgrounds and teaching goals of these students, teacher educators are challenged to meet students' diverse educational needs. (Gershner, Snider, Huestis & Foster, 2000; Molebash & Milam, 2000; Parker, 1993; Perschitte, Tharp, & Caffarella, 1997; Yildirim, 1999).

Some instructional technology programs focus on training teachers in basic computer skills, while others prepare future teachers to utilize technology to encourage higher level thinking skills in the classroom. The challenge that confronts teacher educators is to "…provide effective instructional technology training to preservice teachers so that they will develop appropriate teaching styles to function well while teaching with computers" (Wang, 2000, p.4). Hargrave and Hsus (2000) note a change occurring within

instructional technology courses in teacher preparation programs. Their investigations reveal a "…growing emphasis on curriculum integration of technology, in contrast to the use of technology for personal use or teacher productivity" (p.303).

While the need to prepare preservice teachers to effectively integrate technology is apparent, many teacher educators struggle to find productive methods of evaluating curriculum to determine effectiveness. Though total revamping of all existing programs is excessive, most would benefit from periodic evaluation and revision. Additionally, many teacher preparation institutions need to closely examine their "one size fits all" educational technology course to determine if it is meeting the needs of all students: traditional as well as non-traditional, elementary majors as well as secondary.

Statement of the Problem

The conceptual framework of the National Council for Accreditation of Teacher Education (NCATE) includes a commitment to technology that states teacher candidates should understand how "…knowledge, skills, and dispositions related to educational and information technology are

integrated throughout the curriculum, instruction, field experiences, clinical practice, assessments, and evaluations" (NCATE, 2002, p.16).

The technology standards recognized by NCATE are those of the International Society for Technology in Education (ISTE) (NCATE, 2002). The ISTE standards are designed to provide guidelines for teacher educators to prepare teachers to replace conventional teaching methods with methods that integrate technology into the learning process (ISTE, 2000).

The standards emphasize establishing new learning environments that will encourage students to apply strategies to solve problems while incorporating new technology skills and concepts. The ISTE standards include a subset of standards for inservice teachers as well as preservice teachers. It is ISTE's recommendation that preservice teachers should attain these standards prior to student teaching experiences (ISTE, 2000).

One way to achieve this goal is to evaluate instructional technology programs to determine if they are effectively preparing new teachers to meet these standards. Specifically, instructors can discover if all categories of

preservice teachers are being adequately prepared to effectively integrate technology into the curriculum upon completion of the educational technology program required for teacher certification.

Unfortunately, many new teachers are leaving teacher education programs and entering classrooms using technology in more conventional ways rather than utilizing computers to improve students' problem solving and higher level thinking skills (Duhaney, 2001; Yildirim, 1999). In order for students to reap the rewards current technology has to offer, teachers must enter the classroom confident in the use of computers while maintaining positive attitudes toward the impact of technology use in the classroom (Pina & Harris, 1993). Cafolla and Knee (1995) emphasize that effective technology training must make teachers feel competent with computers.

Researchers agree that new teachers feel inadequately prepared to use technology as a teaching tool and are hesitant to integrate technology into the curriculum (Molebash & Milman, 2000; O'Neil, 1995; Parker, 1993; Yildirim, 1999). McGraw (1996) feels the problem may result from the design of the existing technology education

courses (Kirby & Schick, 1998). With the rapidly changing technology available, teacher educators must continually evaluate and make changes to their programs to effectively prepare preservice teachers for the classroom (Gershner et al., 2000).

Although a shift in focus is occurring in instructional technology courses from training preservice teachers to use technology for personal use or teacher productivity to training them to integrate technology into the curriculum, Beisser, Kurth, and Reinhart state "…radical changes are slow to occur in teacher education programs at the university level" (1997, p.2). Though radical changes may not be prudent, it is imperative for preservice teachers to begin their teaching careers confident in their abilities to effectively use computers in the classroom. Technology courses in teacher education programs must be flexible enough to adapt to the needs of individual students while continuing to accommodate new and emerging technologies (Gershner et al., 2000).

Yildirim (1999) wrote "The best way to encourage teachers to use computers in the classroom is to increase their level of competency" (p.6). Insuring that new

teachers for students of all ages, disciplines, and grade levels leave their teacher education programs with high levels of computer integration competency is the responsibility of the teacher educators accountable for developing and instructing educational technology courses.

Continual evaluation of instructional technology courses in teacher education programs is essential to ensuring preservice teachers are receiving the technology instruction necessary to achieve competence. Prior to changing the curriculum or adopting a new instructional model, teacher educators must take a close look at the program already in place to determine strengths and weaknesses. Because "…technology is in constant flux, it becomes imperative to evaluate the use of educational technology as a process of change" (Gershner et al., 2000, p.4).

Research Purpose

The purpose of this research was to investigate the effects of instruction in a Foundations of Educational Technology course on the perceptions of effectiveness of preservice teachers toward curriculum integration of

technology. The results of the study may be used to improve future educational technology courses.

Research Questions

1. Is there a significant difference between the perceived self-efficacy of computer use between elementary preservice teachers and secondary preservice teachers?
2. Is there a significant difference between the perceived self-efficacy of computer use between non-traditional students and traditional students?

Hypotheses

There is no significant difference between the perceived self-efficacy of computer use between non-traditional students and traditional students.

There is no significant difference between the perceived self-efficacy of computer use between elementary education students and secondary education students.

Definition of Terms

Computer literacy - A knowledge and understanding of computers and their uses

Higher order thinking skills - Skills that involve problem-solving, critical thinking, and the ability to interpret complex issues.

Integration literacy - The ability to use computers and other technologies combined with a variety of teaching and learning strategies to enhance students' learning.

Non-traditional students - Foundations of Instructional Technology students 23 years of age and over

Perceived self-efficacy - Personal attitudes of ones' ability to organize and implement action in new situations.

Preservice teachers - university students training to be teachers

Traditional students - Foundations of Instructional Technology students under 23 years of age

Limitations

This study was confined to those students enrolled in spring 2002 sections of Foundations of Instructional Technology at a midsize liberal arts university in the southeastern United States.

The number of students available to participate was approximately 92. Because the participants were volunteers, that number was somewhat reduced. These factors may

decrease the ability to generalize the findings to a larger population.

CHAPTER II

REVIEW OF LITERATURE

Today's educators are in the middle of a powerful technology revolution requiring them to take a critical look at how they are using computers in their classrooms. (Forcier & Descy, 2002). The challenge for teacher educators is to prepare future teachers for this task by providing carefully developed and evaluated technology instruction in teacher education programs.

Several recent studies reveal programs must continually review and redesign their courses to keep new teachers abreast of current developments in the field of instructional technology (Gershner et al., 2000).

A Longitudinal Analysis

"Studying the process of change becomes imperative as preservice teachers adopt and adapt to the use of educational technology to meet the needs of their 21st century students" note Gershner and associates (2000, p.4). The researchers, teacher educators at Texas Women's University, used several instruments to gather data on the individual attitudes and competencies of preservice

teachers as well as their instructors and mentor teachers. Among those instruments was the Self-Evaluation Rubric for Basic and Advanced Teacher Computer Use. Students completed the questionnaire at the beginning of each semester as they progressed through the teacher education program and again after they completed their final semester. The data from these assessments was then used to assist program developers refine and improve their instructional technology program.

Non-traditional vs. Traditional Students

In his research, Fred Parker (1993) surveyed 226 elementary education majors at Henderson State University in Arkansas to determine the perceived self-efficacy of non-traditional students versus traditional students. Although Parker did not elaborate on how his data might be used for future course development, he notes a "...high percentage of both traditional and non-traditional students felt inadequate with regards to computers while maintaining a positive attitude toward computer use in the school setting" (p. 7).

The Single Course Model

Perhaps these feelings of inadequacy are due to the content of the "one-size fits all" instructional technology courses available. Researchers question the ability of these courses to effectively reach all prospective teachers.

However, a single technology course for all education students appears to be the norm in teacher preparation programs across the country (Gershner et al., 2000; Molemash & Milman, 2000; Perschitte et al. 1997; Yildirim, 1999). Hargrave and Hsus (2000) used the Institutional General Information Survey and the Survey of Instructional Technology Courses to study a sample of 88 teacher preparation institutions about their methods of preparing preservice teachers to effectively integrate technology into the curriculum. They found that while a single three-hour class is indeed the dominant model for technology preparation in teacher education programs, there is a growing emphasis on curriculum integration in the curriculum within that course (Hargrave & Hsus, 2000).

Content Related Technology Instruction

Teacher educators at the University of Virginia's Curry School of Education attempted to increase the perceived self-efficacy of their preservice teachers by offering introductory instructional technology courses designed for specific content areas. The 95 participants in Molemash and Milman's (2000) study completed pretest and posttest surveys to determine whether students majoring in different areas tended to display different levels of confidence. Their findings suggest secondary math/science preservice teachers tended to score higher at the pretest level while elementary preservice teachers scored higher on the posttest. Overall, students' confidence levels increased significantly in all groups as a result of the content related technology courses (Molemash & Milman, 2000).

This study is significant to the field of teacher education because it provides baseline data about the confidence of teacher education students toward using technology and also provides concrete information for the design and development of future educational technology courses. Additionally, the researchers can use the results

of this study to determine if students are meeting state and ISTE technology standards.

National Educational Technology Standards

Among ISTE's recommendations are the National Educational Technology Standards for Teachers (NETS). These standards focus on the education of preservice teachers by defining "…the fundamental concepts, knowledge, skills, and attitudes for applying technology in educational settings" (ISTE, 2000, p.8). The ISTE standards further suggest it is the "…responsibility of faculty across the university and at cooperating schools to provide opportunities for teacher candidates to meet these goals" (2000, p.8). Attainment of NETS' six goals and 23 performance indicators prior to certification will insure that future teachers will be skilled in the use of technology for learning.

Discussion

Hargrave and Hsus (2000) suggest "…future studies are needed to examine the skills, attitudes and knowledge that preservice teachers develop by completing the basic instructional technology course" (p.303). Previous research indicates the effectiveness of the use of a pretest/posttest survey to determine the strengths and

weaknesses of a course. Selection of a survey that addresses the goals and performance indicators suggested by ISTE insures compliance with NCATE recommendations. The use of demographic information about the participants in conjunction with the survey results will also allow investigators to identify specific strengths and weaknesses within subsets of the sample.

CHAPTER III

METHODOLOGY AND PROCEDURE

The Sample

Ninety-three students enrolled in an instructional technology course for education students volunteered to complete the questionnaires. The students represented traditional and non-traditional students, ages eighteen and above, including both elementary and secondary majors. All participants read and signed an informed consent form prior to completing the first survey (see Appendix A). Approval for research involving human subjects was obtained from Austin Peay State University's Institutional Review Board in November, 2001 (see Appendix B).

Due to student attrition and incomplete surveys, the final number of participants was 77. Table 3-1 presents demographic information about the sample.

Table 3-1 Demographic Description of Sample

Whole Group	Elementary Majors	Secondary Majors
N=77	n=44 (57%)	n=33 (43%)
Whole Group	**Traditional**	**Non-traditional**
N=77	n=34 (44%)	n=43 (56%)

The Survey

The Self-Evaluation Rubric for Basic and Advanced Teacher Computer Use (USDE, OERI, 1998) was used to determine the perceived self-efficacy of pre-service teachers prior to and following the instructional technology course (see Appendix C). It was modified slightly to insure appropriateness for preservice teachers. Several additional items on the survey requested demographic information from the participants. Permission for use was freely granted through the American Institutes for Research and the United States Department of Education (USDE, OERI, 1998) (see Appendix D).

The survey consisted of twenty-four topics representing basic computer literacy, Internet use, and integration literacy. Each survey topic contained four levels of perceived self-efficacy ranging from little or no competency to full integration competency. These levels related to numerical scores of 1 to 4.

The topics correlated to the ISTE National Educational Technology Standards for Teachers (see Appendix E). Information based on the resulting data from this survey can help course developers determine which standards

were met in the teacher education program and which standards were not met.

The demographic component of the instrument requested information in categories including age, gender, class level, education program, and cognate area. The resulting information was used to analyze the data.

Data Collection

The participants in this study completed a self-evaluation survey to determine their perceived abilities toward integrating computer use in K-12 classrooms. The information was compiled based on survey responses and demographics (traditional versus non-traditional students and elementary majors versus secondary majors).

The questionnaire was given during class at the beginning of the spring semester 2002, and again near the end of the term to determine the participants' self-perception of computer integration skills following instruction. A disinterested third party administered the survey. Participants were assigned identifying numbers to insure confidentiality.

At the beginning of the designated class period, the examiner explained the purpose and procedures of the

research to the students and introduced them to the survey administrator. Those who volunteered to participate were given class time to complete the survey and those who preferred not to participate used class time to read and review appropriate literature.

Only the survey administrator, who kept a coded master list in a personal locked file cabinet in his office, knew the names and numbers of the participants. Upon completion, the questionnaires were stored in a locked file cabinet in the examiner's office. The documents were destroyed when all resulting data had been compiled.

Statistical Procedures

Based on demographic information, the original sample was divided into two groups, elementary and secondary majors. Pretest and posttest scores were compiled and the mean score was determined for each participant. The *t*-test for independent samples was used to test for a significant difference between the posttest scores of each group. This procedure was then repeated for the groups of traditional and non-traditional students.

CHAPTER IV

DATA AND RESULTS

Survey scores for the 44 elementary majors and 33 secondary majors were analyzed and, using a confidence level of .05, a statistically significant difference was found between the two groups on their overall perceived competency level of computer use (see Table 4-1).

Table 4-1

Analysis of Differences Between Elementary and Secondary Majors

Statistic	Elementary Majors	Secondary Majors
No. of Scores	44	33
Sum of Scores	3565	2596
Mean Score	81	78.6
Sum of Squared Scores	293099	206988
SS	4253	2770
t-Value		2.21*
Degrees of Freedom		75

*$p<.05$

These results indicated that upon completing the technology course the elementary education majors had a significantly higher perception of their self-efficacy toward computer use in the classroom than did the secondary education majors. Figure 4-1 illustrates that elementary majors scored the same or higher than secondary majors in all but two of the 24 competency topics.

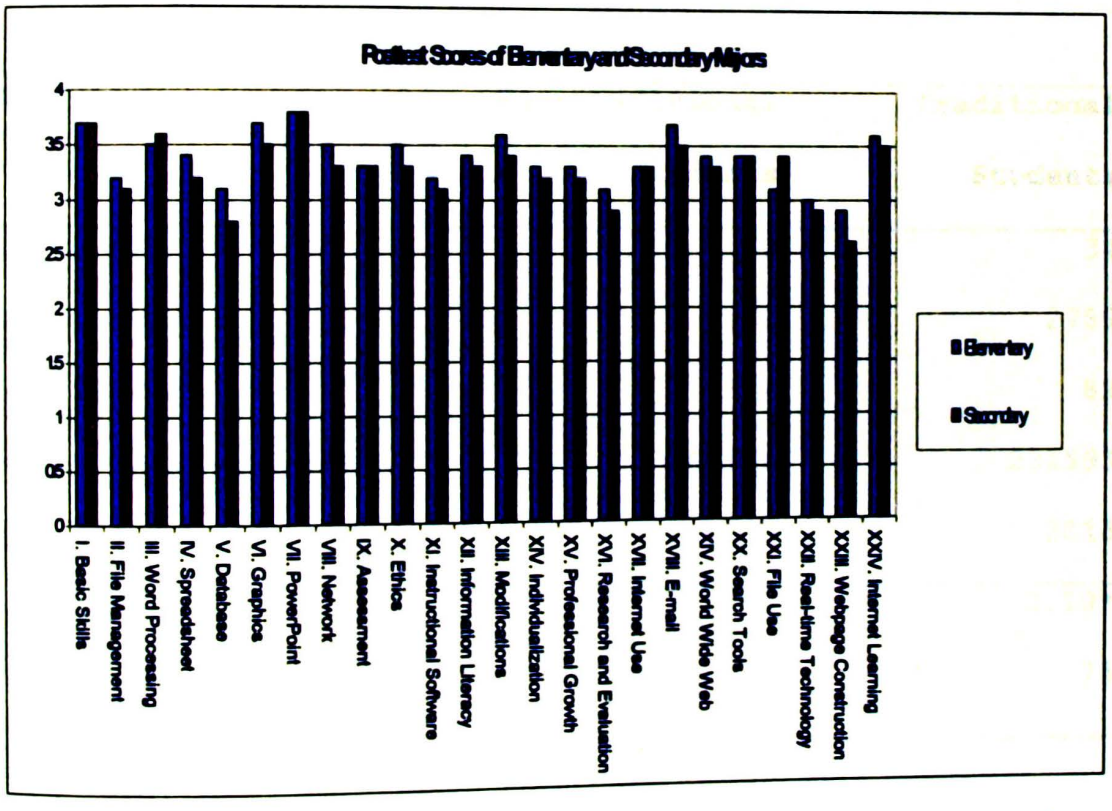

Figure 4-1 Mean posttest scores of elementary and secondary education majors.

Survey scores for 34 traditional students and 43 non-traditional students were analyzed and, using a confidence level of .05, a statistically significant difference was found between the two groups on their overall perceived competency level of computer use. Information used to analyze the data is presented in Table 4-2.

Table 4-2

Analysis of Differences Between Non-traditional and Traditional Students

Statistic	**Non-traditional Students**	**Traditional Students**
No. of Scores	43	34
Sum of Scores	3372	2789
Mean Score	78.4	82
Sum of Squared Scores	268494	231593
SS	4067	2813
t-Value		2.18*
Degrees of Freedom		75

*$p<.05$

The outcome of this analysis indicated that upon completing the educational technology course the

traditional education majors had a significantly higher perception of their self-efficacy toward computer use in the classroom than did the non-traditional education majors. Figure 4-2 illustrates that traditional students scored the same or higher than non-traditional students in all of the 24 survey categories.

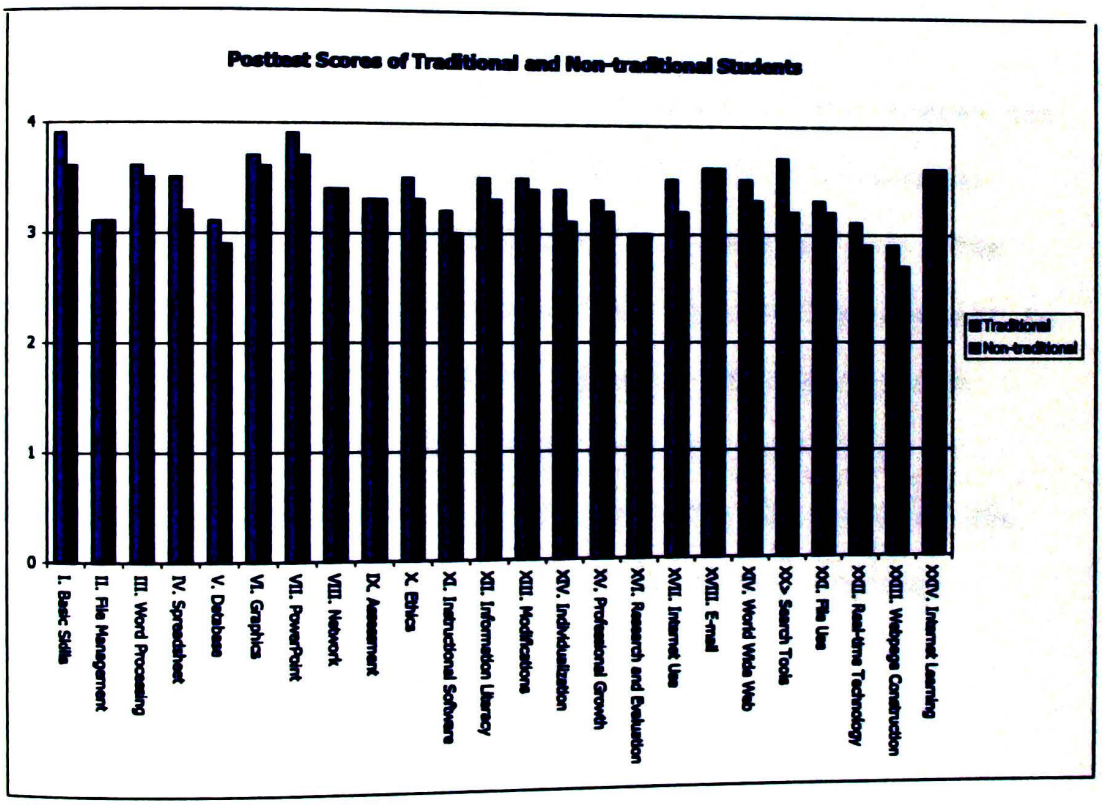

Figure 4-2 Mean posttest scores of traditional and non-traditional students.

Analysis of the data provided interesting information in other areas as well. The results indicated specific areas of computer use and integration literacy where preservice teachers felt least competent following the completion of the educational technology course. This data pointed toward areas that might be modified to better prepare preservice teachers to integrate technology into K-12 curriculum.

The change in the mean pretest and posttest scores for all students in each of the 24 topics indicated several areas of low perceived self-efficacy (see Fig. 4-3). The questions that showed relatively low growth from pretest to posttest were file management, network management, and basic computer skills. The score gain for the file management question was .48, the gain for the network use question was .66, and the gain for the basic computer skills question was .75.

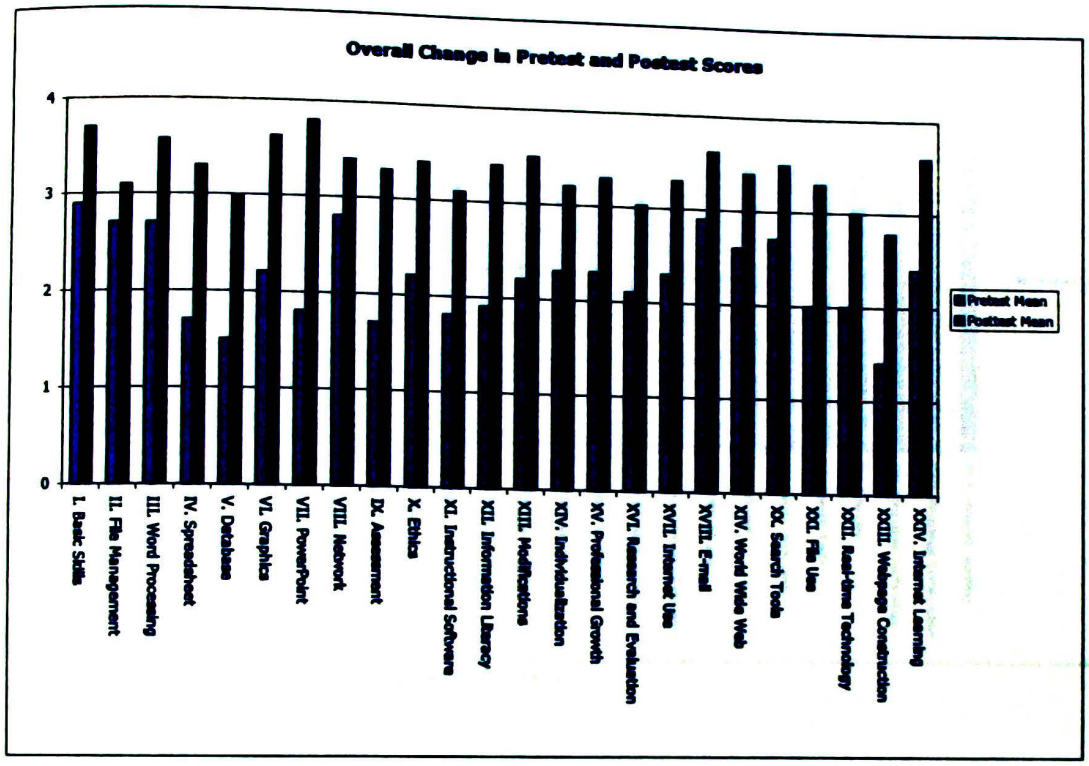

Figure 4-3 Change in mean pretest and posttest scores.

Three topics showed relatively low posttest scores (see Figure 4-4). The question involving Web page construction received a mean posttest score of 2.78. The question regarding database use received a mean score of 2.97 and the question about real-time technology received a mean score of 3.00.

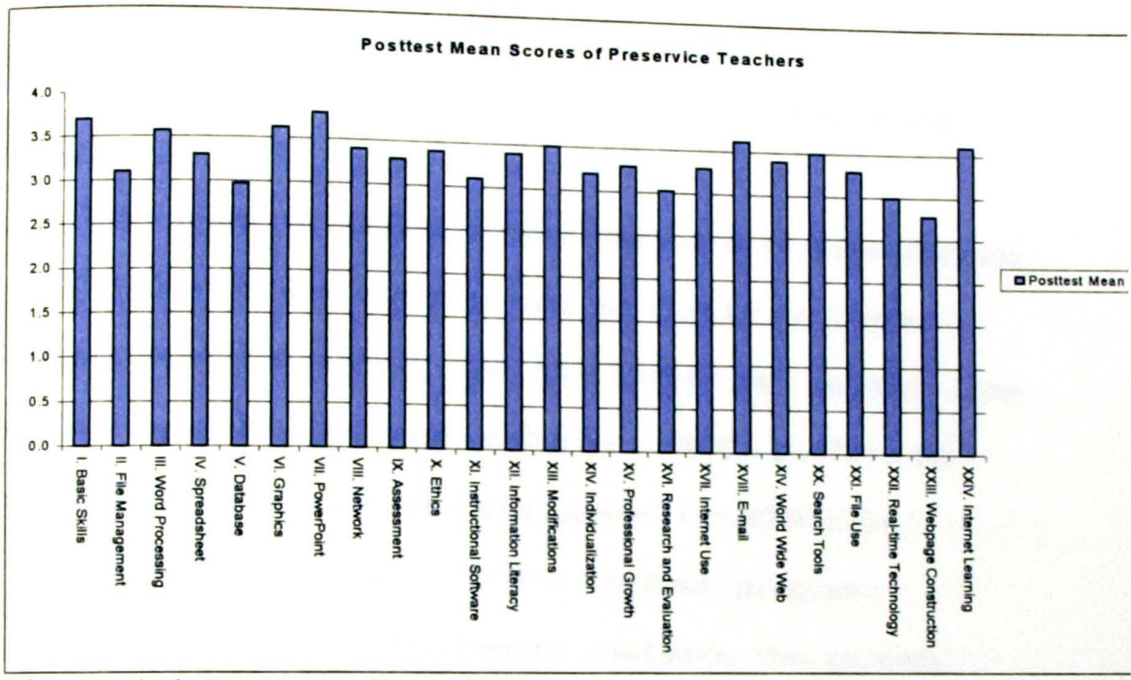

Figure 4-4 Posttest Mean Scores.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

"The computer training that teachers receive through their teacher education programs is likely to foster positive computer affect, yet the change may require time and development" (Milbrith & Kinzie, 2000, p.373). An integral component of the development of effective instruction is evaluation of the current program.

This study was conducted to evaluate the current instructional technology program for preservice teachers to determine if all students, regardless of their age or major, were being adequately prepared to integrate technology into the school curriculum. Additionally, the study sought to discover which particular areas of technology integration students felt least competent upon completion of the course. The survey, The Self-Evaluation Rubric for Basic and Advanced Teacher Computer Use (USDE, OERI, 1998), was selected to collect information on education students' self-perceptions of their computer integration competencies prior to and following the completion of the instructional technology course.

Using a t-test of independent samples, the mean posttest scores of elementary majors were compared to those of secondary majors to determine if one group expressed significantly higher levels of perceived self-efficacy than the other. This process was repeated for traditional and non-traditional students. The gains from pretest to posttest were examined to determine which areas might be modified to better prepare preservice teachers to integrate technology into the curriculum. Finally, mean posttest scores were analyzed to determine specific weak areas of perceived competency among all students.

Conclusions

Based upon the analysis of the data, there was a significant difference between the perceived self-efficacy of computer use between elementary preservice teachers and secondary preservice teachers. The results of the study indicated elementary preservice teachers had a significantly higher level of perceived self-efficacy than did secondary preservice teachers, so the null hypothesis can be rejected.

The information collected indicated there was a significant difference between the perceived self-efficacy of computer use between non-traditional students and traditional students. The outcome of the posttest responses showed a significantly higher level of perceived competency among traditional students. Based on this data, the null hypothesis can be rejected.

The data gathered from the survey identified several specific areas of computer use and integration literacy in which preservice teachers demonstrated little growth from pretest to posttest. These areas included file management, network use, and basic computer skills, each of which had a gain of .75 or less. While these low gain scores seem to implicate the need for instructional modification, this may not necessarily be the case. Two of these areas, basic computer skills and file management, had higher than average mean pretest scores. Consequently there was less room for improvement in these areas.

Additionally, the data indicated several areas preservice teachers felt less competent following the completion of the educational technology course. The three areas with the lowest mean scores were Web page

construction, database use, and real-time technologies. These areas of the required instructional technology course might be modified to better prepare preservice teachers to integrate technology into K-12 curriculum.

Recommendations

The following recommendations are based on an analysis of the data resulting from this study.

1. It is recommended that a replication of this study be administered to future instructional technology classes.

2. It is recommended that modifications be made within the instructional technology course to effectively address the needs of secondary majors and non-traditional students.

3. It is recommended that more effective methods of teaching Web page construction, database use, real-time technologies, and network use be incorporated into the instructional technology course.

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APPENDIXES

APPENDIX A

Informed Consent

Consent to Participate in a Research Study Austin Peay State University

You are being asked to participate in a research study. This form is intended to provide you with information about this study. You may ask the researchers listed below about this study or you may call the Office of Grants and Sponsored Research, Box 4517, Austin Peay State University, Clarksville, TN 37044, (931) 221-7881 with questions about the rights of research participants.

1. TITLE OF RESEARCH STUDY

The Effect of Instructional Technology Courses on Pre-service Teachers' Attitudes Toward Computer Use in the Classroom

2. PRINCIPAL INVESTIGATOR

Anne Wall
Assistant Professor and Ed.S. student, Austin Peay State University

Dr. Don Luck, faculty supervisor
Associate Professor, Austin Peay State University

3. THE PURPOSE OF THE RESEARCH

This research is being performed as a partial requirement for completion of an Educational Specialist degree at APSU. The purpose is to investigate the knowledge and attitudes of pre-service teachers about computer integration in the classroom prior to and following the completion of a basic instructional technology course. Resulting data can be used to modify future educational technology courses and may be published or used in presentations.

4. PROCEDURES FOR THIS RESEARCH

Education students who are enrolled in Foundations of Instructional Technology will be asked to volunteer to complete a questionnaire to determine their ability to integrate technology in education. The information will be collected and analyzed based on survey responses and demographic information. A disinterested third party will administer the questionnaire, and numbers rather than names will identify all participants. The completed questionnaires will be stored in a locked file cabinet in the researcher's office until the study is complete when they will be destroyed. Data will be kept confidential to the extent provided by law. If the data is published or presented, it will be done in a way that does not reveal the identities of participants.

5. POTENTIAL RISKS OR BENEFITS TO YOU

This study is designed to reveal which areas in the educational technology curriculum for pre-service teachers are effective and which areas might be improved. If you participate in the study, you do not have to answer any question you do not wish to answer, and the risks of harm to you are minimal.

6. INFORMED CONSENT STATEMENT:

I have read the above and understand what the study is about, why it is being done, and any benefits or risks involved.
I understand that I do not have to take part in this study, and my refusal to participate will involve no penalty or loss of rights.
I agree to participate in this study and understand that by agreeing to participate I have not given up any of my human rights.
I understand that I have the right to withdraw my consent and stop participating at any time during the study and all data collected from me will be destroyed.
If I choose to withdraw, that choice will be respected and I will not be penalized or coerced to continue.
I understand that I will receive a copy of this form.

If I have questions about this study I may call Anne Wall (graduate student, Education Department) at 931-221-7509 or Dr. Don Luck (faculty supervisor, Education Department) at 931-221-7368.

_____

Signature of Research Participant Date

_____

Signature of Researcher

APPENDIX B

Research Involving Human Subjects

Austin Peay State University
Institutional Review Board

November 13, 2001

Anne Wall
c/o Don Luck
Education Dept.
APSU Box 4545

RE: Your application dated October 26, 2001 regarding study number 02-017: The Effect of Instructional Technology Training on Pre-service Teachers' Attitudes Toward Computer Use in the Classroom (Austin Peay State University)

Dear Ms. Wall:

Thank you for your response to requests from a prior review of your application for the new study listed above.

Congratulations! This is to confirm that your application is now fully approved. The protocol is approved through one calendar year. The consent form as most recently revised is approved. You must obtain signed written consent from all subjects. This approval is subject to APSU Policies and Procedures governing human subjects research. You may want to review this policy which can be viewed on the APSU website at : www2.apsu.edu/www/computer/policy/2002.htm

You are granted permission to conduct your study as most recently described effective immediately. The study is subject to continuing review on or before November 5, 2002, unless closed before that date. Enclosed please find the forms for reporting a closed study and for requesting approval of continuance.

Please note that any changes to the study as approved must be promptly reported and approved. Some changes may be approved by expedited review; others require full board review. If you have any questions at all do not hesitate to contact Lou Beasley (221-6380; fax 221-7595; email: beasleyl@apsu.edu) or any member of the APIRB.

Again, thank you for your cooperation with the APIRB and the human research review process. Best wishes for a successful study!

Sincerely,

Lou M. Beasley/cg

Dr. Lou M. Beasley
Chair, Austin Peay Institutional Review Board

APPENDIX C

Self-Evaluation Rubric for Basic and Advanced Teacher Computer Use

Self-Evaluation of Computer Use

Number_____

Please judge your level of achievement in each of the following competencies. Circle the number that indicates your current level of skill attainment.

I. Basic Computer Skills

Level 1	I do not use a computer.
Level 2	I can use the computer to run a few specific, preloaded programs. It has little effect on either my work or home life. I am somewhat anxious I might damage the machine or its programs.
Level 3	I can set-up my computer and peripheral devices, load software, print, and use most of the operating system tools like the clock, note pad, find command, and trash can (recycling bin).
Level 4	I can run two programs simultaneously, and have several windows open at the same time. I can customize the look and sounds of my computer. I look for programs and techniques to maximize my operating system. I feel confident enough to teach others some basic operations.

II. File Management

Level 1	I do not save any documents I create using the computer.
Level 2	I save documents I've created but I cannot chose where they are saved. I do not back-up my files.
Level 3	I have a filing system for organizing my files, and can locate files quickly and reliably. I back-up my files to floppy disk or other storage device on a regular basis.
Level 4	I regularly run a disk-optimizer on my hard drive, and use a back-up program to make copies of my files on a weekly basis. I have a system for archiving files which I do not need on a regular basis to conserve my computer's hard drive space.

III. Word processing

Level 1	I do not use a word processor, nor can I identify any uses or features it might have which would benefit the way I work.
Level 2	I occasionally use the word processor for simple documents that I know I will modify and use again. I generally find it easier to hand write or type most written work I do.

Level 3	I use the word processor for nearly all my written professional work: memos, tests, worksheets, and home communication. I can edit, spell check, and change the format of a document. I can paginate, preview and print my work. I feel my work looks professional.
Level 4	I use the word processor not only for my work, but have used it with students to help them improve their own communication skills.

IV. Spreadsheet use

Level 1	I do not use a spreadsheet, nor can I identify any uses or features it might have which would benefit the way I work.
Level 2	I understand the use of a spreadsheet and can navigate within one. I can create a simple spreadsheet that adds a column of numbers.
Level 3	I use a spreadsheet for several applications. These spreadsheets use labels, formulas and cell references. I can change the format of the spreadsheets by changing column widths and text style. I can use the spreadsheet to make a simple graph or chart.
Level 4	I use the spreadsheet not only for my work, but could use it with students to help them improve their own data keeping and analysis skills.

V. Database use

Level 1	I do not use a database, nor can I identify any uses or features it might have which would benefit the way I work.
Level 2	I understand the use of a database and can locate information within one that has been pre-made. I can add or delete data in a database.
Level 3	I use databases for personal applications. I can create an original database - defining fields and creating layouts. I can find, sort and print information in layouts that are clear and useful to me.
Level 4	I can use formulas with my database to create summaries of numerical data. I can use database information to mail merge in a word processing document. I use the database not only for my work, but could use it with students to help them improve their own data keeping and analysis skills.

VI. Graphics use

Level 1	I do not use graphics in my word processing or presentations, nor can I identify any uses or features they might have which would benefit the way I work.
Level 2	I can open and create simple pictures with the painting and drawing programs. I can use programs like PrintShop or PrintArtist.
Level 3	I use both pre-made clip art and simple original graphics in my word-processed documents and presentation. I can edit clip art, change its size, and place it on a page. I can purposefully use most of the drawing tools, and can group and un-group objects. I can use the clipboard to take graphics from one application for use in another. The use of graphics in my work helps clarify or amplify my message.
Level 4	I use graphics not only for my work, but could use it with students to help them improve their own communications. I can use graphics and the word processor to create a professional looking newsletter.

VII. PowerPoint

Level 1	I do not use presentations software (PowerPoint), nor can I identify any uses or features it might have which would benefit the way I work.
Level 2	I can navigate through a pre-made presentation program.
Level 3	I can create my own PowerPoint for information presentation. These presentations use transitions, sounds, animations, graphics, and templates. I can use an LCD projection device to display the presentation to a class.
Level 4	I could teach students to use PowerPoint and make their own presentations.

VIII. Network use

Level 1	I do not use on-line resources, nor can I identify any uses or features they might have which would benefit the way I work.
Level 2	I understand that there is a large amount of information that will be available to me as a teacher that can be accessed through networks, including the Internet. With the help of the media specialist, I can use the resources on the network.
Level 3	I use the networks to access professional and personal information from a variety of sources including networked CD-ROM reference materials, on-line library catalogs, the ERIC database, and the World Wide Web. I have an e-mail account that I use on a regular basis.

Level 4	Using telecommunications, I am an active participant in on-line discussions and can download files and programs from remote computers. I could use telecommunications with my students.

IX. Student Assessment

Level 1	I could not use the computer for student assessment.
Level 2	I understand that there are ways I could keep track of student progress using the computer. I would keep some student produced materials on the computer, and write evaluations of student work and notes to parents with the word processor.
Level 3	I could effectively use an electronic grade book to keep track of student data and/or I could keep portfolios of student produced materials on the computer. I could use the electronic data during parent/teacher conferences.
Level 4	I rely on the computer to keep track of outcomes and objectives individual students have mastered. I use that information in determining assignments, teaching strategies, and groupings.

X. Ethical use

Level 1	I am not aware of any ethical issues surrounding computer use.
Level 2	I know that some copyright restrictions apply to computer software.
Level 3	I clearly understand the difference between freeware, shareware, and commercial software and the fees involved in the use of each. I understand the school board policy on the use of copyrighted materials. I could demonstrate ethical usage of all software and let my students know my personal stand on legal and moral issues involving technology. I have a personal philosophy I can articulate regarding the use of technology in education.
Level 4	I am aware of other controversial aspects of technology use including data privacy, equitable access, and free speech issues. I could speak to a variety of technology issues at my professional association meetings, to parent groups, and to the general community.

XI. Instructional software use

Level 1	I would not use instructional software as a part of my instructional program, nor am I aware of any titles that might help students meet their learning goals.
Level 2	I could use a few computer programs as an instructional supplement, as a reward, or with special needs children.

Level 3	I could use several programs (drill and practice, simulations, tutorials, etc.) chosen by my department or grade level to help all students meet specific learning objectives. The software would allow me to teach and/or reinforce concepts more effectively than traditional methods. I would use the software's management system to help assess individual student performance. I would use technological resources to meet the needs of students who do not respond to traditional methods of instruction.
Level 4	I seek out new programs for evaluation and adoption. I know sources of software reviews and keep current on new developments in computer technologies through professional reading and conference attendance. I would share my findings with other professionals.

XII. Information Literacy Skills

Level 1	I am not familiar with the term information literacy, nor do I know why such skills are important.
Level 2	As a part of my curriculum, I would have library research projects and support the library skills taught by the media specialist. I am aware that there are electronic resources available to students.
Level 3	My curriculum would include multiple projects that have an information literacy component. These would be team taught with the media specialist. I understand the information literacy process and would design student projects so that they require higher level thinking skills, use electronic information sources, require the use of computer productivity software, and are authentically assessed
Level 4	I could actively participate in curriculum planning teams and advocate units and activities that require information literacy skills. I would share successful units with others through print, electronic publishing, presentations and workshops.

XIII. Modification of instructional delivery

Level 1	I know one or two effective methods of delivering content or teaching skills to students. I would not use technology that requires that changing instructional methodology.
Level 2	I would try units or projects that are student-directed, use small groups, or are highly individualized, but I would prefer using teacher-directed, whole group instruction.
Level 3	I could use a variety of instructional delivery methods and student grouping strategies routinely. I could design activities and approaches that best fit the learning objectives and the availability of the technology available to me. I could use small groups working cooperatively or in rotation to take advantage of student to equipment ratios of greater than one to one. I would modify instructional methods to take advantage of the learning styles of individual students.

Level 4	I would continuously try new approaches suggested by research or observation to discover the most effective means of using technology to engage my students and meet curricular goals. I would work with a team of fellow teachers to create, modify and improve my practices in this area.

XIV. Individualization of the educational program

Level 1	I would modify my curriculum or instructional methods only for students with identified special needs.
Level 2	I would occasionally give students the choice of assignments in my class, but all class members (unless they are in special education) must meet in the same learning objectives within the same time frame. Skill remediation is done during summer school or informally during or after school.
Level 3	With the assistance of the student, parents and appropriate specialists, I could create an individualized learning plan for each of my students. I would track the accomplishment of learning goals in the plan using a computerized tool. I would use this tool during parent conferences and for school or state reporting. Students and their parents have networked access to this tool for continuous monitoring of progress and plan modification.
Level 4	I would provide suggestions about the content and design of the individualized computerized planning and report tools.

XV. Professional growth and communication

Level 1	I do not use electronic resources for professional growth or communication.
Level 2	I can find lesson plans and some research in on-line databases. I would correspond with parents and other teachers using e-mail.
Level 3	I would use the Internet and other on-line resources to obtain research findings, teaching materials and information related to the content of my classes. I read electronic newsletters and journals to keep current on educational practices. I participate in electronic discussion groups and chat rooms that are related to my area of education, and both contribute to and use the best practices discussed there. I use technology to take part in distance learning opportunities for my own professional development.
Level 4	I organize professional growth opportunities for teachers and feel comfortable teaching other educators about the use of technology.

XVI. Research and evaluation of technology use

Level 1	I have not attempted to determine whether the use of instructional technology would make a difference in students' learning or classroom climate.

Level 2	I would gather, use and share anecdotal information and observations about student use of technology in my classroom.
Level 3	I would use action research and aggregated data to accurately determine whether the technology and methodology I am using has an impact on how well my students learn and on school climate.
Level 4	I would participate in formal studies of the impact of technology on student learning conducted by professional groups and academics. I could design such studies as part of my own professional education. I would report electronically and in print the findings of my research to other professionals.

XVII. Internet use

Level 1	I do not understand how networks work, nor can I identify any personal or professional uses for networks, including the Internet. I do not have an account on any network nor would I know how to get one.
Level 2	I can identify some personal or professional uses for networks, and understand they have a value to my students and me. I've read some articles about the Internet in the popular press. I can directly use network access to a library catalog or CD-ROM.
Level 3	I can describe what a computer network does and how it can be useful personally and professionally. I can distinguish between a local area network, a wide area network, and the Internet and can describe educational uses for each. I can describe the history of the Internet, recognize its international character, and know to a degree the extent of its resources. I have personal access to the Internet that allows me to receive and send email, download files, and access the World Wide Web. I know that I must protect my password, and should restrict access by others to my account
Level 4	I use networks on a daily basis to access and communicate information. I can serve as an active participant in a school or organizational planning group, giving advice and providing information about networks. I can recommend several ways of obtaining Internet access to others.

XVIII. E-mail and electronic mailing lists

Level 1	I do not use email.
Level 2	I understand the concept of email and can explain some administrative and educational uses for it.

Level 3	I use email regularly and can: • read and delete messages • send, forward and reply to messages to • create nicknames, mailing lists, and a signature file • send and receive attachments • use electronic mailing lists and understand the professional uses of them • read and contribute to a professional electronic mailing list
Level 4	I can send group mailings and feel confident that I could administer an electronic mailing list. I would use activities that require email in my teaching. I can locate lists of subject-oriented mailing lists.

XIX . The World Wide Web

Level 1	I do not use the World Wide Web.
Level 2	I am aware that the World Wide Web is a means of sharing information on the Internet. I can browse the Web for recreational purposes.
Level 3	I can use a Web browser like *Explorer* or *Netscape* to find information on the World Wide Web, and can list some of the Web's unique features. I can explain the terms: hypertext, URL, http, and html. I can write URLs to share information locations with others. I can use Web search engines to locate subject specific information and can create bookmarks to Web sites of educational value.
Level 4	I can configure my web browser with a variety of helper applications. I understand what "cookies" do and whether to keep them enabled. I can speak to the security issues of on-line commerce and data privacy.

XX. Search Tools

Level 1	I cannot locate any information on the Internet.
Level 2	I can occasionally locate useful information on the Internet by browsing or through remembered sources.
Level 3	I can conduct an efficient search of Internet resources using directories like Yahoo or search engines like Google or Altavista. I can use advanced search commands to specify and limited the number of hits I get. I can state some guidelines for evaluating the information I find on the Internet and can write a bibliographic citation for information found.
Level 4	I can identify some specialized search tools for finding software and email addresses. I can speculate on future developments in on-line information.

XXI. Obtaining, decompressing, and using files

Level 1	I cannot retrieve files from remote computers.
Level 2	I know that documents and computer programs that could be useful to my students are stored on computers throughout the world. I cannot retrieve these files.
Level 3	I understand the concept and netiquette of "anonymous FTP" sites. I can transfer files and programs from remote locations to my computer and can use programs or plug-ins that help me do this. I can extract compressed files and know some utilities that help me view graphics and play sounds and movies. I understand the nature and danger of computer viruses, and know how to minimize my risk of contracting a computer virus. I can send group mailings and feel confident that I could administer an electronic mailing list. I would use activities that require email in my teaching. I can locate lists of subject-oriented mailing lists.
Level 4	I could use information I have retrieved as a resource for and with my students. I understand the concept of a network server, and the functions it can serve in an organization. I can use an ftp client to upload files to a server.

XXII. Real-time and push technologies

Level 1	I use only static documents and files I retrieve from the Internet.
Level 2	I have some information sent to me on a regular basis through e-mail and I check some sites on a regular basis for information.
Level 3	I use chat-rooms and customized news and information feeds. I can listen to audio streamed from the web. I know the hardware and software requirements for web-based videoconferencing.
Level 4	I can use real-time applications to design a "virtual" classroom or interactive learning experience. My students could use videoconferencing for communication with experts and project collaboration with other students.

XXIII. Webpage construction

Level 1	I cannot create a page that can be viewed with a web browser.
Level 2	I can save text I've created as an html file with a command in my word processor. I know a few, simple html commands.

Level 3	Using hand-coded html or a web page authoring tool, I can: • view web pages as a source documents • create a formatted web page that uses background color, font styles and alignment, graphics, and tables • include links to other parts of my document or other Internet sites in my page • know basic guidelines for good web page construction and the district's web policies
Level 4	I can use the web as an interface to databases. When appropriate, I can register my pages with search engine sites. I can help write web creation policies for design, content, and use.

XXIV. Learning opportunities using the Internet

Level 1	I am not aware of any ways the Internet can be used with students in the classroom.
Level 2	I would occasionally allow my students to use the Internet to find information.
Level 3	I know a variety of projects and activities that effectively use the Internet to instruct and involve students. I know a source for collaborative projects, can direct students to on-line tutorials and learning resources, and encourage a variety of key-pal activities.
Level 4	I can design and implement an Internet project or maintain an educational Internet site.

XXV. Demographic Information (Please circle the appropriate response.)

Age	18-22	23-27	28-32	33-37	38+
Gender	Male	Female			
Class	Freshman	Sophomore	Junior	Senior	Post Bachelors
Education Program	K-8	5-8	Secondary	Special Education	Other
Cognate Area	Science	History/ Social Studies	Math	Reading/ English	Other

APPENDIX D

Permission for Use of Survey

An Educator's Guide to Evaluating The Use of Technology in Schools and Classrooms

December 1998

Prepared by:

Sherri Quiñones and Rita Kirshstein
Pelavin Research Center
American Institutes for Research
1000 Thomas Jefferson St., NW, Suite 400
Washington, D.C. 20007

Prepared for:

U.S. Department of Education
Office of Educational Research and Improvement
Nancy Loy, Project Officer

December 1998

http://www.ed.gov/pubs/EdTechGuide/title.html

Appendix E

ISTE National Educational Technology Standards

Technology Standards (Nets)
And Performance Indicators for Teachers

All classroom teachers should be prepared to meet the following standards and performance indicators.

I. TECHNOLOGY OPERATIONS AND CONCEPTS

Teachers demonstrate a sound understanding of technology operations and concepts.

A. demonstrate introductory knowledge, skills, and understanding of concepts related to technology (as described in the ISTE National Educational Technology Standards for Students).

B. demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies.

II. PLANNING AND DESIGNING LEARNING ENVIRONMENTS AND EXPERIENCES

Teachers plan and design effective learning environments and experiences supported by technology.

A. design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.

B. apply current research on teaching and learning with technology when planning learning environments and experiences.

C. identify and locate technology resources and evaluate them for accuracy and suitability.

D. plan for the management of technology resources within the context of learning activities.

E. plan strategies to manage student learning in a technology-enhanced environment.

III. TEACHING, LEARNING, AND THE CURRICULUM

Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student

learning.

A. facilitate technology-enhanced experiences that address content standards and student technology standards.

B. use technology to support learner-centered strategies that address the diverse needs of students.

C. apply technology to develop students' higher order skills and creativity.

D. manage student learning activities in a technology-enhanced environment.

IV. ASSESSMENT AND EVALUATION

Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.

A. apply technology in assessing student learning of subject matter using a variety of assessment techniques

B. use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.

C. apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

V. PRODUCTIVITY AND PROFESSIONAL PRACTICE

Teachers use technology to enhance their productivity and professional practice.

A. use technology resources to engage in ongoing professional development and lifelong learning.

B. continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.

C. apply technology to increase productivity.

D. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

VI. SOCIAL, ETHICAL, LEGAL, AND HUMAN ISSUES

Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in PK-12 schools and apply that understanding in practice.

A. model and teach legal and ethical practice related to technology use.

B. apply technology resources to enable and empower

learners with diverse backgrounds, characteristics, and abilities.

C. identify and use technology resources that affirm diversity.

D. promote safe and healthy use of technology resources.

E. facilitate equitable access to technology resources for all students.