8-2008

Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008

Shelley A. McCoy
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Shelley A. McCoy entitled "Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Michael Waugh, Major Professor

We have read this dissertation and recommend its acceptance:

Schuyler Huck, Jay Pfaffman, Gary Skolits

Accepted for the Council:
Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a dissertation written by Shelley Ann McCoy entitled "Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Dr. Michael Waugh, Major Professor

We have read this dissertation
and recommend its acceptance:

Dr. Schuyler Huck

Dr. Jay Pfaffman

Dr. Gary Skolits

Accepted for the Council:

Carolyn R. Hodges,
Vice Provost and Dean of the Graduate School

Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008

A Dissertation Presented for
the Doctor of Philosophy Degree
The University of Tennessee, Knoxville

Shelley Ann McCoy
August 2008

ACKNOWLEDGMENTS

I would like to express my sincerest thanks to my committee chairperson, Dr. Michael Waugh, for his patience, encouragement, and insight during the process of completing this dissertation. In addition, I would like to thank Dr. Sky Huck, Dr. Jay Pfaffman, and Dr. Gary Skolits for their feedback and for their willingness to make accommodations to make it possible for us to meet, sometimes with little notice.

I would also like to thank my family: my husband, David; my son, Brock; and, my daughter Kelley. Their lives were often disrupted due to my work on this dissertation and they were always supportive.

I owe a great deal to the encouragement of my friends, Susan Sutton and Connie Shih, for keeping me on track and repeating the phrase, "Dissertation, dissertation, dissertation!"
In addition, I would like to thank my "civilian" friends, also known as the Huckleberry Poker Gang, Laura Crowley, Janie Pollard, Kim Waller, Nancy Signer, and Mary Beth New who kept me balanced when school seemed to be consuming an inordinately large portion of my life.

ABSTRACT

By means of a researcher-created survey instrument, this study sought to determine: 1) whether teacher education programs differ in the ways in which they deliver technology training for preservice teachers; 2) to what degree technology training for preservice teachers is offered partially online or completely online and/or as distance learning; and, 3) whether schools, colleges, or departments of education (SCDEs) make provisions for preparing preservice teachers to be online teachers in a virtual classroom or school.

The findings, based on the responses of 41 participants, showed that most schools, colleges, and departments of education in the study rely primarily on a stand-alone technology course and integrating technology into other education courses. Although schools, colleges, and departments of education in this study offer some education courses online, few (less than 12%) of them characterized their technology courses for preservice teachers as "online." In addition, only 14% of those participating in this study indicated their programs directly address the competencies needed for teachers to be online instructors in a virtual setting.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION 1
- **Statement of the Problem** 4
- **Purpose of the Study** 5
- **Design of the Study** 5
- **Need for the Study** 6
- **Assumptions** 7
- **Limitations** 8
- **Delimitations** 9
- **Definitions of Terms** 9

CHAPTER 2: REVIEW OF THE LITERATURE 13
- **Introduction** 13
- **Historical Basis for Preservice Teacher Training in the Use of Technology** 14
- **Technology Training for Preservice Teachers** 15
- **Online and Distance Education Coursework in Preservice Teacher Education** 27
- **Teacher Education Programs Preparing Preservice Teachers for Virtual Education** 31
- **Summary and Identification of Gaps in the Literature** 34

CHAPTER 3: METHODOLOGY 37
- **Introduction** 37
- **Population and Sample** 37
- **Instrument Development** 41
- **Data Collection Procedures** 46
- **Data Analysis** 47

CHAPTER 4: FINDINGS 49
- **Introduction** 49
- **Response Rate** 49
- **Demographics** 50
- **Responses to Open-Ended Survey Items** 68
- **Summary of Findings** 70

CHAPTER 5: CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH 73

REFERENCES 83

APPENDICES 94
- **APPENDIX A - Additional Tables** 95
- **APPENDIX B1 - Survey Instrument** 102
- **APPENDIX B2 - Survey Instrument with Results** 114
- **APPENDIX C - Contact with Participants** 135
- **APPENDIX D - Timeline** 140

VITA 142

LIST OF TABLES

Table 1 *Characteristics of Types of Online Education* 28
Table 2 *Membership in Professional Organization(s) for Teacher Preparation* 40
Table 3 *Size of Undergraduate Population and Teacher Education Graduates Per Year* 52
Table 4 *Membership in Professional Organizations** 53
Table 5 *Job Titles/Positions of Participants* 54
Table 6 *Categories Collapsed for Purposes of Data Analysis* 59
Table 7 *Delivery of Technology Training for Preservice Teachers* 63
Table 8 *Online Delivery of Technology Course(s) for Preservice Teachers* 65
Table 9 *Preparing Preservice Teachers to be Instructors in an Online Environment* 67
Table 10 *Comparison of Results of NCES Study and Current Study* 75

LIST OF FIGURES

Figure 1. Numbers and percentages of participants (by region) included in the data analysis .. 51
Figure 2. Size of undergraduate population (as of Fall 2007) 52
Figure 3. Course management systems used by participants' teacher education programs..... 55

CHAPTER 1: INTRODUCTION

Due to the widespread availability of instructional technology, specifically computers and Internet access in schools, a need has arisen for P-12 teachers possessing expertise in implementing such technology to support instruction. Studies have shown that, despite initiatives to provide training for both inservice and preservice teachers, there is still a lack of technology expertise among P-12 educators (Basham, Palla, & Pianfetti, 2005; Collier, Weinburgh, & Rivera, 2004; Pope, Hare, & Howard, 2002; Shoffner, Dias, & Thomas, 2001). These studies refer to *Teachers' Tools for the 21st Century: A Report on Teachers' Use of Technology* (National Center for Education Statistics, 2000) which compiled results from 3 national surveys. Using the Fast Response Survey System (FRSS) a survey of over 2,000 public school teachers at all grade levels revealed that only about 33% of teachers felt adequately prepared to use technology with students. However, when examining the responses of teachers new to the profession (three years or less), 45% of the newer teachers reported feeling prepared to use technology in the classroom.

Research shows that most schools, colleges, and departments of education (SCDEs) provide some sort of technology training for prospective teachers, however this training is provided in a variety of ways (Hammond, 2007). Some approaches for teaching technology include: offering one or more stand-alone technology classes; integrating technology in other education courses; infusing technology training in field experiences prior to student teaching/internship; the inclusion of technology training within student teaching/internship; and, combinations of these various technology training methods (Mehlinger & Powers, 2002). A stand-alone technology class for preservice teachers is the most common model for teaching

future teachers how to use computer technology (Wang & Chen, 2006). Many researchers say the stand-alone technology class is outdated and should be eliminated in favor of integrating technology training into other non-technology focused education courses, field experiences, and student teaching/internship (Brush, Glazewski, & Rutowski, 2003; Collier, Weinburgh, & Rivera, 2004; Eifler, Greene, & Carroll, 2001) . Other researchers assert that the stand-alone course is essential to providing teachers with basic skills necessary to be comfortable using technology in the classroom (Wang & Chen, 2006; Wepner, Bowes, & Serotkin, 2005). However, the majority of studies about preservice technology training agree that teaching about the use of technology both in stand-alone courses *and* technology infusion throughout other areas of teacher education are preferable (Aust, Newberry, O'Brien, & Thomas, 2005; Beyerbach, Walsh, & Vannatta, 2001; Doering, Hughes, & Huffman, 2003; Duhaney, 2001; Hargrave & Hsu, 2000; Hartshorne, Ferdig, & Dawson, 2005; Hofer, 2005; Kajder, 2005; Kay, 2006; Mehlinger & Powers, 2002; Pierson & Thompson, 2005; Strudler & Wetzel, 1999; Wright & Wilson, 2005; Zheng & Young, 2006).

Besides deciding whether to offer technology primarily in a stand-alone course or include it as a part of other coursework, SCDEs now also face having to decide whether technology training can be offered online and either partially or wholly at a distance. Until the advent of the Internet, preservice technology training was usually delivered in a face-to-face setting. However, it is now possible for preservice teachers to receive teacher education course content online for both technology courses and other education courses (Crawford & Willis, 2002; Unal, 2005). The extent to which SCDEs provide course information, entire courses, or entire programs online varies.

For a variety of reasons, SCDEs may choose to offer teacher education classes wholly or

partially online rather than in traditional, totally face-to-face settings. Five reasons institutions might choose to provide online courses or entire online programs include: 1) competition from online colleges and concomitant offerings of coursework over computer networks, i.e. via the Internet (Goodyear, Salmon, Spector, Steeples, & Tickner, 2001; Harrell & Harris, 2006; Leydon, 2001); 2) the perceived, impending shortage of teachers and accompanying need to bring new teachers into the profession quickly via alternative certification routes (Aust, Newberry, O'Brien, & Thomas, 2005; Hussar, 1999; Moursund & Bielefeldt, 1999); 3) the desire to provide non-traditional students, and/or students unable to attend classes in person, the opportunity to become teachers (Blair, 2001; Cavanagh, 2004); 4) the availability of relatively new technology commonly referred to as a Course Management System (CMS) which enables institutions to organize course content and make it available to students anytime, anywhere (Marra, 2004); and, 5) to allow students to work at their own pace, thus alleviating the problems that may arise from having basic and advanced students in the same traditional classroom (Lohr et al., 2003).

In addition to the need for future teachers to be able to use technology with students in a traditional classroom setting, a recent trend toward offering online classes in P-12 schools will necessitate preparing teachers who can facilitate the delivery of course content online (Davis, Demiraslan, & Compton, 2007; Davis & Niederhauser, 2007a; Davis et al., 2007). Taking an online, or *virtual*, class would be useful in order to prepare future teachers to become virtual instructors themselves (Davis, Demiraslan, & Compton, 2007). Sprague, Maddux, Ferdig, and Albion (2007) go so far as to say that, "for K-12 teachers to be effective in teaching in virtual environments they need to have experience with learning in them [online courses] during their professional preparation," (p. 158). Therefore, providing technology training for preservice

teachers in a wholly or partially online format would accomplish both the delivery of the content and provide experience in an online setting.

Statement of the Problem

Due to the variety of ways in which schools, colleges, and departments of education (SCDEs) incorporate technology training for preservice teachers, some confusion may result as to what works best. Research proposes that the more opportunities preservice teachers have available to use technology during their teacher education programs, the more likely they will be to use it when they have classrooms of their own (Doering, Hughes, & Huffman, 2003; Duhaney, 2001; Kajder, 2005; Kay, 2006; Pierson & Thompson, 2005; Pope, Hare, & Howard, 2002; Russell, Bebell, O'Dwyer, & O'Connor, 2003). However, even many of the teacher education programs rated as exemplary do not include an online component other than as an add-on to a traditional technology class (Hofer, 2005; Strudler & Wetzel, 1999)

Because there is a nationwide trend to offer online courses to students in P-12 settings (Setzer, Lewis, & Greene, 2005; Watson & Ryan, 2006), there is a need for teachers who are competent in facilitating such courses. Such teachers need to be comfortable with technology and capable of facilitating online instruction. Schools, colleges, and departments of education can do much toward alleviating the need for future professional development by ensuring that their graduates already have the skills to conduct online instruction (Sprague, Maddux, Ferdig, & Albion, 2007).

One of the ways in which SCDEs can prepare future teachers for online learning is to require online class(es) in order to give preservice teachers a perspective of what is involved in the online delivery of instruction/learning (Norton & Smith, 2007). Since most teacher

preparation programs offer, or require, technology training for preservice teachers, one option for making sure future teachers have had an online learning experience is to ensure that the *technology training* they receive as part of their teacher preparation program is delivered at least partially in an online format. Some SCDEs are already putting their technology class(es) for preservice teachers wholly or partially online (Mehlinger & Powers, 2002; University of Texas at Dallas, 2007). Currently, it is unclear how widespread the move toward online delivery of teacher education classes, and technology training classes in particular, might be.

Purpose of the Study

The purpose of this study is to describe the current delivery methods of technology training for preservice teachers and the degree to which such training may be delivered online at higher education schools, colleges, and departments of education (SCDEs) who are members of *at least* one of three nationally recognized associations for providers of training for preservice teachers. The study will also collect information about whether these SCDEs are preparing future teachers to be virtual, online teachers.

Design of the Study

The research methodology for this study is descriptive and presents an analysis of the results of a survey completed by administrators, program coordinators, faculty, and/or instructors at institutions with teacher preparation programs. The participants have been drawn from research universities with a very high level of research activity (RU/VH) as identified by the Carnegie Foundation for the Advancement of Teaching and that are members of the National Council for Accreditation of Teacher Education (NCATE), the American Association of

Colleges for Teacher Education (AACTE), or both. In addition, members of The Holmes Partnership are included as participants in the survey. The study has been designed to answer three research questions.

Research Questions

1. How do teacher education programs differ in the ways in which they deliver technology training for preservice teachers?
2. To what degree is technology training for preservice teachers available partially online or completely online and/or as distance learning?
3. Have schools, colleges, or departments of education (SCDEs) made provisions for preparing preservice teachers to be online teachers in a virtual classroom or school?

Need for the Study

The most recent comprehensive studies of teacher education programs were done in the late 1990's and early 2000's. Many such studies were generated as a result of grants from *Preparing Tomorrow's Teachers to use Technology (PT3)*. The funding for PT3 grants ended in 2003 and consequently fewer studies about preservice teacher technology education have been reported. Additional research needs to be done to determine how to best prepare new teachers to use technology. Even studies that do examine best practices in teaching preservice teachers about technology offer little evidence that these practices are being widely implemented (Bielefeldt, 2001; Mehlinger & Powers, 2002).

Recently, the state of Michigan mandated that all public high school students must complete an online course as one of the requirements for graduation (Furger, 2007). Across the nation with the trend toward more P-12 classes being offered online, SCDE's will need to find

effective ways to educate future teachers to be comfortable using newer modes of delivering instruction, such as online teaching/learning. On its web site, the National Education Association provides a guide for teaching online and in the guide NEA states that preservice teacher education must address online skills (National Education Association (NEA), 2006). With the exception of a few universities that are taking the lead in educating teachers for virtual environments, very few studies exist about whether SCDEs include online competencies in their teacher education programs (Compton, Follett, & Demiraslan, 2007; Davis & Roblyer, 2005). "Research is needed to determine the extent to which teacher education students experience online education and virtual environments in their teacher preparation programs" (Sprague, Maddux, Ferdig, & Albion, 2007, p. 163). Determining how SCDEs deliver technology training for preservice teachers and whether they have made their technology classes wholly or partially available online can help guide other SCDEs in making decisions about the best ways to make sure their graduates are comfortable in an online learning situation both as learners and, perhaps, as future online instructors.

Assumptions

1. The survey questions are understandable by educators of preservice teachers.
2. The panel of experts who reviewed the survey are representative of the respondents who participated in the study and/or experienced in survey research.
3. The respondent completing the survey is familiar with the means whereby his/her institution delivers technology training for preservice teachers.
4. The respondent completing the survey will answer truthfully, to the best of his/her knowledge.

5. The survey would be reliable if such reliability testing had been undertaken.

Limitations

1. The data reported in this study are based on responses from institutions characterized by the Carnegie Foundation for the Advancement of Teaching as being research universities with high-research activity (RU/VH) that are members of *at least one* of the following: National Council for Accreditation of Teacher Education (NCATE), American Association of Colleges for Teacher Education (AACTE). In addition, members of The Holmes Partnership will be included, whether or not they are high research (RU/VH) institutions. These participants may not represent the full range of responses that would have been obtained if other colleges and universities with teacher education programs had been included.
2. The data gathered from this study are based on self-reporting of individuals and may contain inaccuracies due to carelessness or lack of knowledge by participants about specific items contained in the survey.
3. The data cannot be generalized to other institutions with teacher education programs because the respondents were not chosen randomly.
4. The survey instrument was evaluated by a relatively small panel of experts.
5. The survey was researcher-created and has not been tested for validity or reliability on a large sample.

Delimitations

1. Fifty-eight higher education institutions that are members of the National Council of Accreditation for Teacher Education (NCATE), or the American Association of Colleges for Teacher Education (AACTE), or both, were selected as participants in the study, as well as all members of The Holmes Partnership. From this population, a sample of 89 institutions was obtained. Of these 89, three institutions were removed because they did not offer teacher licensure/certification. The 86 remaining institutions were contacted and asked to participate in the study.
2. Only participants who were selected and agreed to participate in the study were included.
3. The data were gathered in the Spring Semester, 2008.

Definitions of Terms

The following terms are used in the study

American Association of Colleges for Teacher Education (AACTE) - An organization of schools, colleges, and departments of education whose mission is to ensure quality teacher educators in order to provide the best teachers for P-12 students.

Asynchronous communication - Interaction among parties that does not take place simultaneously, for example e-mail or discussion boards.

Blended education – Having between 30 percent and 79 percent of course content delivered online (see also ***hybrid course delivery)*** (Allen & Seaman, 2006).

Content Management System (CMS) – An online system created for the purpose of managing the content of a course, including such things as a syllabus, calendar, and assignments (Carliner,

2005). Such systems also provide ways to track student progress and provide space for online discussions. Examples include Blackboard, Moodle, and WebCT.

Distance Education - The process of providing instruction when students and instructors are separated by physical distance, it may include correspondence courses, videoconferencing, and/or access to materials via the Internet. It is a more inclusive term than ***online learning***.

Face-to-Face (f2f) – An instructional situation where a significant component of the instruction requires the presence of both the instructor and learner in the same physical space at the same time (Duggleby, 2000). Characteristic of what is sometimes referred to as ***traditional education***.

Hybrid course delivery- Blends online and face-to-face delivery. A substantial portion of the content is delivered online with some face-to-face meetings (Allen & Seaman, 2006).

Inservice teachers – Practicing teachers who have received certification to work in a school system.

Instructional Technology - electronic technologies such as microcomputers and other microprocessor-based devices used to deliver and/or enhance learning. See also ***Technology*** and ***Technology Integration.***

National Council for Accreditation of Teacher Education (NCATE) – An organization to establish high standards of quality in teacher education. Institutions must pay a fee and go through a review process to earn endorsement from NCATE.

Online Learning - "Involves information, instruction, and/or interaction through the Internet or an intranet using instructional materials and tools such as Web-based resources, e-mail, discussion boards, blogs, chats, and video" (Lamb & Callison, 2005, p. 29).

P-12 - Pre-kindergarten through grade 12.

Preparing Tomorrow's Teachers to use Technology (PT3) - One of the largest federally

supported programs specifically focused on improving on preservice teacher technology education. Funded from 1999-2003 (U.S. Department of Education, 2005).

Preservice teachers – Future teachers. Students in a teacher preparation program who have not yet completed all the requirements for licensure or certification.

RU/VH - Research universities with very high research activity. A designation of the Carnegie Foundation for the Advancement of Teaching.

School/College/Department of Education (SCDE) – Subsidiary of an institution of higher education whose mission is to educate students for future positions as teachers in P-12 school settings.

Stand-Alone Technology Training Course(s) – Teacher education course(s) devoted entirely to instruction about using electronic technologies such as microcomputers and other microprocessor-based devices to enhance instruction. Requirements generally range from 1 to 6 credit hours (Mehlinger & Young, 2002).

Synchronous Communication – Participating parties involved in communication are simultaneously online or in contact in some way, for example in a chat room.

Technology – "Relatively new electronic media, such as computers and video and the associated hardware, networks, and software that enable them to function" (Mehlinger & Powers, 2002, p. 10). See also ***Instructional Technology.***

Technology Integration - Using technology in such a way it becomes part of teaching/learning routines and blends with other content delivery mechanisms to the extent it becomes just another instructional tool like paper and pencils. See also ***Instructional Technology***.

Technology Training - Training in the use of technology for both personal productivity and in the use of technology for instruction.

Traditional Education - The way education was practiced in most of the 20th century and into the new millennium. It involves a face-to-face setting with a teacher/instructor and several to many students. Generally, the teacher is the center of the classroom activities and students are there to learn specific information and/or skills.

Virtual Education - Educational settings that involve little or no face-to-face interaction and exist primarily in electronic form

Virtual School - An educational organization offering entire courses via the Internet or other electronic network (generally used in the context of P-12 rather than higher education).

Web-Facilitated - the use of Internet resources to help deliver course information, but not the sole mechanism for course delivery.

CHAPTER 2: REVIEW OF THE LITERATURE

Introduction

For the purposes of this study, the majority of the review of literature focuses on technology training for preservice teachers from the 1990's to the present. After a brief summary of the historical basis of technology training for preservice teachers, the remainder of the chapter examines literature related to the three research questions stated in Chapter 1. These questions are:

1. How do teacher education programs differ in the ways in which they deliver technology training for preservice teachers?
2. To what degree is technology training for preservice teachers available partially online or completely online and/or as distance learning?
3. Have schools, colleges, or departments of education (SCDEs) made provisions for preparing preservice teachers to be online teachers in a virtual classroom or school?

After the first section which gives a brief, historical overview of technology training for preservice teachers, the second section, "Technology Training for Preservice Teachers," presents the various methods of technology training for preservice teachers in terms of whether it is:
1) offered as a single, stand-alone course; 2) taught across the curriculum in non-technology-focused teacher preparation classes; 3) taught both in stand-alone course(s) *and* within other teacher preparation classes; 4) incorporated in field experiences and student teaching/internship; or, 5) delivered in still other ways. A third section, "Online and Distance Education Coursework in Preservice Teacher Education," addresses the offering of teacher preparation courses in a partially or wholly online format, with an examination of the research about the extent to which SCDEs offer preservice technology

training online. The fourth section, "Teacher Education Programs Preparing Preservice Teachers for Virtual Education," discusses research about the trend toward virtual schools in the P-12 sector and implications for preservice teachers who may be faced with teaching in an online, virtual classroom format. Finally, the "Summary" section provides a review of the main points of the chapter and point out gaps in the research based on findings in the literature review.

Historical Basis for Preservice Teacher Training in the Use of Technology

The history of technology training for preservice teachers goes back to the early 1900's when it was hoped that new electronic and mechanical devices would enhance education. In the 1920's, the first technology instruction for teachers provided training in the creation of graphs as well as how to use photography and slide-making for educational purposes (Saettler, 1990). Later, in the 1930's, the usage of filmstrips, films, and lantern slides were covered in educational media courses. Then, in the 1940's, transparencies and audio and/or video recordings came into existence as educational media largely as a result of training soldiers for World War II (Counts, 2004). With the advent of the *Space Age* which began in the late 1950's and continued into the1960's, the United States sought new educational media and techniques in the hopes that they would propel the country ahead of the Soviet Union, especially in the areas of science and technology. One development was the use of computers by children, but since the computers of the time were large mainframes, this was only possible in limited areas. However, once computers had made headway into the educational milieu, they were there to stay. In the 1970's computer assisted instruction (CAI) emerged and with it the idea of creating customized tutorials. Programmed Logic for Automatic Teaching Operations (PLATO) was heralded as a way to revolutionize teaching and learning (Roblyer, 2003). But even as computers became

smaller and more readily available at the building level in the 1980's, most colleges of education taught preservice teachers how to create media rather than how to use computers for student-centered learning (McCutcheon, 1984). It was not until the early 1990's, and the availability of the Internet in public schools, that computer technology became a central part of technology courses for preservice teachers.

Technology Training for Preservice Teachers

The National Center for Education Statistics (NCES) surveys citing a lack of expertise in classroom technology integration among teachers, as mentioned in Chapter 1, were done in 1999 at a time when the government funded a major project called *Preparing Tomorrow's Teachers to Use Technology* (PT3) (Hussar, 1999; U.S. Department of Education, 2005). This project provided over $330 million in funding to institutions of higher education to provide technology training for preservice teachers (Kayne Chaplock, Whipp, & Schweizer, 2004). The availability of PT3 grant money enabled schools, colleges, and departments of education (SCDEs) to conduct research to examine and improve technology training for future teachers. Funding for PT3 was discontinued in 2003. In addition, two other grants available to universities for technology innovation in teacher education, the Technology Innovation Challenge Grants and Learning Anytime Anywhere Partnerships, ceased to be funded after 2001 (Bakia, Mitchell, & Yang, 2007). As a result of these funding cuts, up-to-date, large-scale research about technology training for preservice teachers has diminished.

The Stand-Alone Technology Course

Since the early 1900's teacher education programs have required training in the use of technology by future teachers (Betrus, 2000). The nature of the training has evolved from

workshops and non-credit courses to current requirements of one or more courses earning from one to six credit hours (Mehlinger & Powers, 2002). "In preservice teachers' instructional technology (IT) training, very few course models have been so severely criticized, yet so widely adopted as the stand alone IT course" (Wang & Chen, 2006, p. 133). Although the stand-alone course is widely used, not all teacher education faculty members feel it is valuable in teaching preservice teachers how to use technology.

The stand-alone technology course may have its shortcomings, but it is still commonly used (Hammond, 2007). According to a report published by the National Center for Education Statistics (NCES), approximately 50 percent of the teacher education institutions surveyed reported offering either a three-hour or four-hour educational technology course (Kleiner, Thomas, & Lewis, 2007). In a study of institutions who were members of The Holmes Group, now called The Holmes Partnership, a consortium of 45 research universities whose mission is to improve teacher education (Holmes Partnership, 2008), Hargrave & Hsu (2000) found that 73%, 53 out of the 88 respondents, still used an introductory course in technology in their preservice teacher education programs. One of the reasons it continues to be commonplace in SCDEs is that it allows for the teaching of a wide range of skills to all students completing the program (Kay, 2006). Another reason the stand-alone course remains a staple in teacher education is that it improves self-efficacy in the use of technology among preservice teachers and improves attitudes toward technology (Bielefeldt, 2001; Doering, Hughes, & Huffman, 2003; Gunter, 2001). In a survey of 416 teacher preparation institutions responding from 1326 institutions contacted, Moursund and Bielefeldt (1999) found that insuring preservice teachers' proficiency with technology is one of the best predictors of later technology integration even though proficiency alone does not guarantee technology use in the classroom once teachers are in

schools[1]. Despite the belief that students entering SCDEs nowadays probably have a high degree of technology literacy, research shows that such beliefs may be overly optimistic. Other factors, such as concerns about classroom management and the time needed to learn the contents of the curriculum, also impact whether new teachers ultimately decide to use technology with students (Russell, Bebell, O'Dwyer, & O'Connor, 2003; Swain, 2006; Wang & Chen, 2006) .

Advantages of the stand-alone technology course

Though a single course in technology training has a number of drawbacks, it does offer some advantages. For one thing, such a course is easy to staff and schedule and it can insure consistency across multiple sections of the same course *if properly monitored* (Hammond, 2007). The stand-alone course can insure that students have at least some basic technology skills which may be lacking if students are allowed to opt for not taking any technology course, or courses, at all (Whetstone & Carr-Chellman, 2001).

Disadvantages of the stand-alone technology course

In redesigning technology training in their teacher education program, Ross & Wissman (2001) noted several problems with their existing stand-alone technology course. For one thing, reaching consensus on what students should be able to know and do after completing the course presented a challenge. In addition, students entered the class with a wide range of technology skills. Some students found the class too easy and slow-paced while others were overwhelmed by the amount of content and the pace. Another problem was that several sections of the course were offered and instruction across the sections proved to be inconsistent. *Qualified* instructors were difficult to find. Finally, the time and location constraints of traditional face-to-face

[1] The survey was initially distributed in April 1998 to Deans and Faculty at SCDEs on a commercially available mailing list. Other contacts were added over a period of months and included members of ISTE's Special Interest Group for Teacher Education (SIGTE), NCATE, and AACTE. (Moursund & Bielefeldt, 1999, p. 11).

delivery made it difficult for students to work the course into their schedules and sometimes resulted in students being forced to delay graduation.

A disadvantage that is more philosophical in nature is the issue of changing teachers' beliefs about the value of technology for teaching and learning. "One difficulty in changing the way teachers do things may be that our educational system self-replicates: a new generation of teachers inherits the last generation's classroom practices" (Willis & Sujo de Montes, 2002, p. 76). Consequently, a single course may have little effect on changing a lifetime of non-technology educational experiences.

Testing out of the stand-alone course

One Southeastern university has chosen to allow students to take an exam that would determine pre-course proficiency in skills to be taught in the traditional technology course (Wiencke, 2002). These skills include familiarity with operating systems, online resources, word processing, databases, spreadsheets, and presentation tools. The technology proficiency exam is given twice a semester. As of 2002, the exam had been given 12 times, but only 33 students had taken it. Of the 33 who took it, only 16 passed. Wiencke postulates one possible reason for the lack of interest in the exam is that students must make up the hours missed by taking another course (of their choice) with the same number of credit hours. Wienke suspects another reason for students' choosing to take the course rather than opting out of it via the exam is that students who *are not* proficient in technology are afraid to attempt the exam, and those who *are* proficient expect the technology course to be an easy way to make a good grade.

Variations on the stand-alone course

A criticism of the stand-alone technology class is that it focuses on the hardware and software rather than on the most appropriate ways to use them. To overcome this flaw, one

school of education changed the framework of its preservice technology course from tool-centered to task-oriented (Hammond, 2007). The institution in Hammond's study emphasizes open-source tools and preservice teachers' performance of tasks similar to those that take place in a classroom setting. These tasks include: communicating, collaborating, doing research, assessing student work, composing, presenting, and publishing. Both teacher-productivity projects and student-centered activities are included. Performing the above-mentioned tasks during coursework, using technology, makes it more likely that teachers will emulate these behaviors upon entering the classroom. One caveat to the task-oriented framework method in a stand-alone technology course is that it must continually evolve as new technologies become available, which means frequent adjustments and revisions to the syllabus and class assignments.

Rather than eliminating the stand-alone technology course, one institution has chosen to divide its three-hour technology course into three, one-hour courses (Pierson & Thompson, 2005). However, the one-hour courses are somewhat different from the original stand-alone course. The first course is intended to provide students with an opportunity to create educational materials. Any lack of skills by students in the class is addressed by providing print-based and online tutorials as well as university-provided workshops. The second course is geared toward having preservice teachers create technology-enhanced lessons and to engage in online discussions with currently practicing classroom teachers. The third, and final, one-hour course is taken during the same semester as field placement so that preservice teachers have an opportunity to use their technology-enhanced lesson plans in a real classroom. During the final course, a great deal of the interaction among preservice teachers, inservice teachers, and education faculty takes place online.

Using a similar format of three, one-hour technology classes, another teacher education program paired each of the technology classes with a methods class (Wepner, Bowes, & Serotkin, 2005). This pairing enabled preservice teachers to use products they created in the technology course to meet requirements in methods classes. Although pairing technology classes and methods classes sounds like a viable option for technology training, it does have flaws. One of the problems is the increased workload for instructors in methods classes. Including technology in existing classes results in the time-consuming process of trying to restructure the methods classes. Another problem is that preservice teachers may lack basic technology skills that it is assumed they possess. Because of these problems--restructuring methods courses and lack of student technology competencies--Wepner, Bowes, & Serotkin report that a Technology Committee has been formed at their institution to work through the issues and ease the transition to the new method of delivery of technology training for preservice teachers.

Technology Training Infused in Non-Technology-Focused Education Classes

Unlike the studies in the preceding section, "Variations on the stand-alone course," the studies discussed in this section will address teacher education programs that have discontinued the stand-alone technology course in favor of infusing technology in non-technology focused classes. The studies in the previous section provide research about programs that maintained at least some form of stand-alone class as well as the possible inclusion of technology in other education courses.

Advantages of infusing technology training in other classes

Including technology in all teacher education courses allows preservice teachers to observe the use of technology within their specific subject area rather than in a generic, one-size-fits-all, stand-alone course. In other words, infusing technology in classes throughout the entire

teacher education program provides students the chance to see technology used in a variety of settings and see it modeled by faculty who teach methods courses in the student's own subject-area, not in isolation (Brush, Glazewski, & Rutowski, 2003). Infusion of technology in other classes also gives preservice teachers a chance to have more practice with technology, rather than limiting it to one setting. The more practice preservice teachers have in the use of technology, the more likely they are to implement technology in their future classrooms (Moursund & Bielefeldt, 1999). Including technology in non-technology classes can also alleviate the problem of how to allocate credit hours for a separate technology class (Mehlinger & Powers, 2002).

Disadvantages of infusing technology training in other classes

Although infusing technology in classes other than a technology-focused class is desirable, using only that method can present problems. For example, if preservice teachers do not have the technology skills necessary to use the hardware or software, valuable class time must be spent in teaching basic skills. Consequently, time is taken away from the content in the non-technology class and students may ultimately be less prepared both in using technology *and* the content of the non-technology class (Wang & Chen, 2006; Wepner, Bowes, & Serotkin, 2005). Embedding technology in other education courses hinges on the cooperation of the faculty members that teach the non-technology classes (Whetstone & Carr-Chellman, 2001) as well as their technology expertise, or possible lack thereof (Wepner, Bowes, & Serotkin). In addition, dispersing technology training across a number of different classes may result in inconsistent coverage of technology skills among students from various subject-area majors (Whetstone & Carr-Chellman).

In a study that compared using a stand-alone technology course and infusing technology in a non-technology focused education class, Anderson and Borthwick (2002) found that preservice teachers who took the stand-alone course scored statistically higher on measures of proficiency with technology and ability to integrate technology into an educational setting. Nevertheless, some teacher preparation institutions have decided to eliminate the stand-alone technology course, as will be discussed in a later section.

Teacher education programs that use an infusion-based model

A private university in the Pacific Northwest found that the teacher education faculty were in agreement that technology needed to be judiciously infused throughout the teacher education curriculum rather than relegated to one course (Eifler, Greene, & Carroll, 2001). Subsequently, the faculty completed a survey and responded to qualitative measures to determine their technology usage, attitudes toward technology, and commitment to the use of technology. Although faculty members' perceptions varied widely about the use of technology in the courses they teach, the faculty agreed that technology is important in education. Transition to the infusion model has been ongoing and follow-up assessment is being done using quantitative and qualitative data to determine the impact of the new mode of technology training.

Another study from a teacher preparation program (Brush, Glazewski, & Rutowski, 2003) relates that they are planning to use field experience as the primary method for delivering technology training. The results of this study will be discussed in more depth in the following section. The reason it is mentioned here is that, in this case, the field experience method of technology training is being implemented with the long-range goal of eliminating the stand-alone technology class that had been required in the past.

Technology Training in Field Experiences and Student Teaching/Internship

Technology training need not be limited to the campus of the college or university where the teacher education program is located. In fact, it is beneficial for at least some technology training to take place in a real-life, classroom setting. "The key element is that preservice teachers demonstrate their competency with technology by using it in the field--in real classrooms, with real children" (Mehlinger & Powers, 2002, p. 98).

Advantages of technology training in field experiences and student teaching/internship

Using technology in an actual classroom can benefit both the student teacher and the mentoring teacher (Snider, 2002). The student teacher can see a practicing teacher model the use of technology and the mentoring teacher can learn new skills and technologies from the student teacher.

Mehlinger and Powers (2002) point out two benefits of integrating technology training in field experiences. First, the institution that houses the teacher education program may be able to share the expense of technology hardware and software with the P-12 school system. In addition, the student teachers and supervising faculty members may gain a better understanding of what hardware and software are actually being used in the schools.

Disadvantages of technology training in field experiences and student teaching/internship

The success of technology training in field experiences depends on a number of variables. According to Doering, Hughes, & Huffman (2003), one of the major problems may be access to technology. The technology available in the P-12 classroom may not be comparable to what preservice teachers have available on the college campus. A particular hindrance to preservice teachers' use of technology in P-12 classrooms can be the small number of computers that are available for student use in classrooms. In 2003, the average ratio of students to instructional

computers with internet access in public schools was 4.4 to 1 which represents an improvement over previously reported data (Parsad & Jones, 2005), but may still be prohibitive in using technology for instructional activities. If a computer lab is available, it may alleviate the problem of having enough computers to go around, but create another problem faced by student teachers--fear of losing control of the class. Still other problems arise that are people-based. Technology support staff in a school setting may be scant or non-existent. A cooperating teacher may not buy-into the value of using technology or may lack sufficient expertise to feel comfortable in having it used in his or her classroom.

Teacher education programs that use a field-based or student teaching/internship model

The University of Southern Maine relies completely on technology training during field experience in its teacher preparation program (Mehlinger & Powers, 2002). The technology training itself is provided at P-8 schools by media specialists and even by students enrolled at the school. Once student teachers have gained technology skills, they work with a technology-using cooperating teacher. Integrating technology in field experience is possible in this instance because there is a good working relationship between the university and the school system where student teachers are placed.

Arizona State University has gone to a field-based model for their entire teacher education program (Brush, Glazewski, & Rutowski, 2003). The goal is to provide "preservice teachers with field-based, situation-specific technology training they are able to integrate into the initial teaching activities they complete as part of their teaching methodologies experience" (p. 16). In implementing this model of technology training, Arizona State staff and mentoring teachers have taken on new roles in the education of future teachers. Two graduate students with experience in technology integration and usage are provided as support for the mentoring and

preservice teachers. As a result, the teacher preparation program at Arizona State plans to completely drop the stand-alone technology classes it previously provided.

Other Methods of Technology Training

In order to insure consistency across all sections of preservice technology classes and to accommodate the varying schedules of students, Kansas State University implemented instruction via videotape (Ross & Wissman, 2001). To produce the 13 modules used for the course, the college bought a digital editing system and also created manuals with step-by-step instructions, assignments, and additional resources. To find out how students responded to the video format, the researchers ran a study that compared responses to survey items from students in the traditional course and responses from students in the new videotaped course. The researchers found that when they asked students in the traditional class whether they would have preferred content delivered via videotape, the majority replied in the negative. The explanation for this might lie in the perception that the *entire course* would be delivered via videotape rather than just lab exercises. The college also found that it was difficult for students to use a videotape machine while also using computers and subsequently put all the video files on one CD. The researchers did not address the effectiveness of the videotape format and recommend future performance assessments to determine whether it yielded long-term, successful outcomes.

Still another study, based on a teacher education program at a southeastern Ohio university, related the results of using anchored instruction to provide technology training (Kariuki & Duran, 2004). An anchor is similar to a theme that runs throughout instruction. In the case of this study in Ohio, the anchor was "The Coal Project Expedition." Using the anchor allowed preservice teachers to work with eighth-graders to investigate the implications of coal mining. The preservice teachers and eighth-grade students used: 1) web searching to find out

about coal mining; 2) presentation tools to present what they found; 3) spreadsheets to plan a field trip to the coal mining area; 4) databases to keep track of what they were learning; 5) curriculum mapping software to brainstorm about what aspects of coal mining they wished to explore; and, 6) a graphics program to create a "reader's theater." An analysis of transcripts from journals kept by preservice teachers during the course provided evidence that using anchored instruction to teach technology implementation with students provided flexibility, just-in-time learning, and a great deal of motivation.

What Methods of Technology Training are Recommended?

The consensus is that multiple methods of technology instruction for preservice teachers work best. Historically, the line of thought in teacher education seems to have been that a school, college, or department of education (SCDE) must choose *a* specific method for technology training. "Dichotomous thinking distorts the lens through which we view pre-service teachers' IT training" (Wang & Chen, 2006, p. 145). Teacher preparation programs should think in terms of multiple methodologies for technology training rather than taking an either/or perspective.

In a study of seven exemplary teacher education programs as identified by ISTE, Hofer (2005) found that six of them require at least one stand-alone technology course. However, most require additional technology training. An important component identified in the study is modeling of technology use in a variety of education courses. Two of the exemplary programs use curriculum mapping to make sure technology is used in other teacher education courses. All of the seven exemplary programs include technology training for preservice teachers during their field experiences.

Recommendations from a Milken/ISTE survey of 416 teacher education institutions and

conducted by Moursund and Bielefeldt (1999) substantiate the findings of the studies described by Hofer (2005). These findings are: 1) technology should be infused in other courses rather than limited to stand-alone classes; 2) faculty should model the effective use of technology in all education classes; 3) students should have opportunities to apply technology during field experiences; and 4) teacher education institutions should seek out technology-using inservice teachers to mentor student teachers.

Online and Distance Education Coursework in Preservice Teacher Education

Sometimes the terms "online" and "distance education" are used interchangeably. In presenting the remainder of the review of literature, every effort will be made to distinguish between courses whose content is partially online and those that are online for the purpose of being offered at a distance with little or no face-to-face contact. For a more thorough explanation, see Table 1, which was adapted from *Making the Grade: Online Education in the United States, 2006* (Allen & Seaman, 2006, p. 4).

Institutions across all levels, P-12 through higher education, are making classes available online. As of 2005, using the term "online" where there are few or no face-to-face meetings as described in Table 1, 17% of students in higher education were described as "online" (Allen & Seaman, 2006). This number has been increasing at a rate of approximately 20% per year, or about 360,000 students each year. In addition to online coursework, larger institutions are more likely than smaller ones to have entire programs available online. Many reasons exist for the growth of online education, but perhaps online education is becoming more popular because, "The industrial model of education, where one size fits all, is rapidly being replaced by what might be considered a service-economy model, where learning is tailored to the learner" (Brown, 2003, p. 29).

Table 1

Characteristics of Types of Online Education

Type of Course	Description	Percentage of Content Delivered Online
Traditional	Course with no online technology used. Content is delivered face-to-face in writing or via lecture.	0
Web Facilitated	Course that uses Web-based technology to facilitate what is basically a face-to-face course.	1-29%
Blended/Hybrid	Course that blends online and face-to-face delivery. A substantial portion of the content is online, but has some face-to-face meetings.	30-79%
Online	A course where most or all of the content is delivered online. Few or no face-to-face meetings.	80-100%

Non-Technology-Focused Teacher Education Courses Online and Via Distance Education

Online coursework and entire online programs are becoming more available in teacher preparation just as they are in other areas of higher education. One online program is offered by California State University-Fresno (Blair, 2001). The purpose of the Cal-State program is to enable adults who want to change careers, stay-at-home parents, and working parents, among others, to have an opportunity to become teachers. A wholly online teacher preparation program at Western Governors University was recently accredited by NCATE (Cavanagh, 2004).

Some institutions, such as the University of North Texas, have put post-baccalaureate teacher education programs online (Harrell & Harris, 2006). The goal at UNT is to recruit degreed individuals who want to enter the field of teaching, especially in areas of teacher shortages such as math and science. The UNT online program also has been successful in recruiting from ethnically diverse groups, more so than in the traditional program. Research about the online program at the University of North Texas remains to be done in a number of areas, including: the attrition rate of online students compare to traditional students; the long-term satisfaction of the online candidates with their teacher preparation; and, the relationship, if any, between the success of online candidates and the success of their students.

Although online teacher preparation is gaining momentum, not all institutions have found it to be popular among students. Texas State University-San Marcos offered a problem-based learning (PBL) course in both online and face-to-face formats (Peterson & Bond, 2004). Both formats used the same syllabus, assignments, and provisions for preservice teachers to observe in a secondary classroom. The traditional, face-to-face class held weekly discussions in a classroom whereas online students participated in discussions asynchronously, online throughout the week. The results showed no difference in the quality of work produced by the students in

the two formats. However, interviews revealed that the online students were less satisfied with the course than those who had participated in the traditional format. One of the areas where the online students felt shortchanged was in the opportunity to teach in front of a group of peers and to see peers teach.

Technology Training Courses Online and Via Distance Education

Since some teacher preparation institutions are putting part, or all, of their teacher education programs online, there are implications for how technology-training courses for preservice teachers may be impacted. The University of Illinois at Urbana-Champaign (Basham, Palla, & Pianfetti, 2005) put the skills portion of its preservice technology course online by means of tutorials created in *Flash*. Basham, Palla, & Pianfetti found that students preferred using an online tutorial for learning skills rather than attending a lecture for the same information. However, because one of the requirements for the class included working collaboratively on projects, it is unclear whether the success of the online portion of the class was due to the tutorials or to the group projects which allowed students to practice their technology skills.

Because of problems characteristic of the commonly used stand-alone technology class (inconsistency across different sections, outdated course materials, varying technology skills among students, scheduling conflicts), one Western university with a student population of approximately 12,000 decided to create online modules for the various units generally covered in class (Lohr et al., 2003). In total, 11 modules were created. Students met only twice--once at the beginning of the semester and once at the end. Students were required to complete up to six of the modules which were offered “in a specific two-week time period, and students were required to complete the instruction no later than three weeks after the start date for each unit of

instruction" (Lohr et al., p. 47). In addition, students had access to step-by-step instruction guides, workshops where tools were demonstrated, and open labs where one-on-one help was available. Overall students had a favorable experience with the self-paced, online course as indicated by their responses on a Likert-scale survey administered at the end of the course. One of least positive responses to the self-paced, online course dealt with students' admission of their lack of self-discipline in taking an online class.

Teacher Education Programs Preparing Preservice Teachers for Virtual Education

Virtual schools have become increasingly popular in the United States. What is meant by the term "virtual schooling" is explained by Davis & Niederhauser (2007)**:**

> Virtual schooling includes all of the elements associated with learning in an online environment. The virtual classroom provides the context for learning, and online teachers and students act as participants. Often virtual schooling includes considerable infrastructure with required technology, technical, and pedagogical support staff and administrators. The complete system that enables the delivery of online distance learning constitutes virtual schooling (p. 11).

According to the North American Council for Online Learning (NACOL), 38 states have established e-learning initiatives and 25 states have state-wide or state-led virtual schools in the United States (Watson & Ryan, 2006). Note that these figures reflect P-12 schools and do not include higher education. Seventy-two percent of school systems that in some way already have distance education programs indicate that they plan to expand their programs. In addition, based on a survey of over 2,000 school districts in the United States, Setzer, Lewis & Greene (2005)

found that over 300,000 students in P-12 were enrolled in online courses during the 2002-2003 school year. The majority of students taking online courses continues to be high school students (76%); however, the trend toward online is beginning to spread into middle schools as well.

In spite of the growth in online education at the P-12 level, Smith, Clark, & Blomeyer (2005) estimate only about 1% of teachers have been trained as online teachers. Those who have been trained are likely to have undergone the training via professional development rather than in a teacher preparation program. Teacher education as a whole has failed to address preparation of teachers to deliver instruction in an online environment (Compton, Follett, & Demiraslan, 2007).

Iowa State University is one of the few institutions with a teacher preparation program that has done extensive work preparing preservice teachers to become teachers in an online environment. In 2004, Iowa State University received a grant to develop a model for including virtual school (VS) training in teacher education (Davis & Roblyer, 2005). In addition to Iowa State University, other participants in the grant are the University of Florida, the University of Virginia, and Graceland University. The resulting program is called Teacher Education Goes into Virtual Schooling (TEGIVS). TEGIVS has three main objectives: 1) to develop curriculum in teacher education to incorporate training in virtual schooling across several courses; 2) to expose teacher education candidates to the tools used in virtual schooling; and, 3) to develop a nationwide community of practice. In creating the curriculum for preservice teachers to become online teachers, Iowa State defines four possible roles teachers may assume. These roles are hierarchical in terms of the responsibilities they entail. The first role is a Virtual School Counselor who would provide teacher candidates with the skills to advise students who participate in virtual schooling. A second role is Virtual School Assistant, which prepares the preservice teacher to assist a Virtual Teacher in providing an online class. A third role is a

Virtual School Teacher who would actually teach an online class. Finally, a fourth role is that of Virtual Designer who would both design and teach a virtual course.

In 2007, representatives from Iowa State University presented a progress report on TEGIVS at the Society for Information Technology and Teacher Education International Conference in San Antonio (Davis, Demiraslan, & Compton, 2007). The progress report describes the methodology used to incorporate skills for virtual schooling into teacher education. The primary method is creating, in an online format, scenarios typical of events that occur in virtual schooling (VS). Teacher education students analyze these scenarios, which deal with issues such as pedagogy, technology, assessment, and classroom management. Currently the project is still in the pilot stage and revisions are being made based on feedback from students and through formative evaluations. As a result of feedback, improvements are being made in the quality of the scenarios themselves which are housed on a website and consist of a variety of media and resources. Improvements include making sure best practices are illustrated, expanding TEGIVS training scenarios to include teacher candidates who anticipate teaching at the elementary level, reducing distracting elements, and improving navigation. Further piloting is underway involving more students at the four participating institutions.

In spite of the growth in P-12 virtual education and in spite of the need for teachers to teach in that milieu, a review of the literature turns up very little evidence indicating that teacher preparation programs are addressing the need for teachers in a virtual, online environment. The preponderance of such training appears to be offered via professional development once teachers enter the classroom. Spector and de la Teja (2001) call for not only training teachers in online competencies, but also special certification for online teachers.

Summary and Identification of Gaps in the Literature

Historically, technology training for preservice teachers dealt primarily with production of media to use in instruction rather than as a tool for students to use in the classroom. It has only been in the past few decades that computers have come into widespread usage in schools. Computers have become more popular as a tool for teaching and learning since the Internet has become ubiquitous in both P-12 and higher education settings.

Technology Training for Preservice Teachers

In order to take advantage of the opportunities afforded by computers and the Internet, nearly all schools, colleges, and departments of education (SCDEs) with teacher preparation programs offer technology training for preservice teachers. The ways in which technology training for preservice teachers is provided varies from one institution to another. One of the primary ways SCDEs provide technology training is by offering one, or more, credit courses devoted to technology. Still other SCDEs embed technology training in other, non-technology focused courses. Finally, some SCDEs incorporate technology training into field experiences in real, P-12 settings during or prior to student teaching/internship. Research has shown that exemplary teacher education programs provide technology training for their preservice teachers in multiple ways rather than choosing just one.

Online and Distance Education Coursework in Preservice Teacher Education

A recent development in teacher education is the offering of teacher preparation courses online. In fact, a few institutions offer their entire teacher preparation programs online, capable of being taken at a distance. Although distance education in teacher preparation has not been the norm, some SCDEs offer a few courses (including technology training for preservice teachers) in the teacher education program in an online format and available as distance education.

Teacher Education Programs Preparing Preservice Teachers for Virtual Education

In keeping with the trend in higher education to offer online courses, P-12 schools have begun to offer online courses, primarily at the high school level, for their students. A few states have actually developed entire online, or virtual, schools.

One of the most important roles in virtual education is that of the online teacher. Despite the rapid growth in online education, very few SCDEs with teacher preparation programs have addressed the need to prepare preservice teachers to teach in an online environment. As a result of this oversight, most preservice teachers enter the P-12 education system with no skills in conducting online courses.

Gaps in the Literature

Although Wang & Chen, (2006) identify the stand-alone technology course as being the primary mode of technology delivery for preservice teachers, still other researchers point out the flaws in such a course. Indeed some researchers and instructors in the field of teacher preparation have advocated doing away with the stand-alone course and favor teaching technology for preservice teachers in other ways (Brush, Glazewski, & Rutowski, 2003; Mehlinger & Powers, 2002). There is no research to indicate whether discontinuing the stand-alone technology is being done on a widespread basis or whether those who have chosen to abandon this method of technology training simply represent an anomaly.

In addition, although research has been presented that indicates multiple methods of teaching technology are best (Bielefeldt, 2001), only research involving a small number of exemplary institutions has been done. The degree to which a large number of institutions use multiple methods for teaching preservice teachers about technology remains unknown.

Even though online education has become more popular and has filtered into P-12 schools, primarily at the high school level although middle schools indicate a growth in online offerings, only a few institutions have reported using online delivery for teacher education courses.

Related to the issue of online delivery of teacher education courses is the extent to which SCDEs are preparing teachers to deliver online courses. Other than four teacher preparation programs, associated with a grant at Iowa State University, there is scant evidence that SCDEs have begun to include any training whatsoever to prepare graduates of their programs to teach online courses in a P-12 environment.

CHAPTER 3: METHODOLOGY

Introduction

For this study, the researcher created a survey to be completed by deliberately-selected institutions of higher education for the purpose of examining the nature of their technology training for preservice teachers. Information gained from the completed surveys includes how technology training is delivered to preservice teachers, i.e. a course or courses, integrated into other education courses, in real classroom settings such as field experiences, or during student teaching/internships. Such technology training may be delivered in more than one of the above-mentioned ways and by other approaches that were unanticipated by the researcher. The study also sought to determine the extent to which technology training for preservice teachers is delivered partially or wholly online via the Internet. Finally, this study attempted to ascertain whether higher education institutions provide preservice teachers with training in order to prepare them to deliver instruction online in a P-12 setting (as is characteristic of a virtual school).

Population and Sample

The participants in this study was drawn from institutions of higher education that make up the population of institutions based on one dimension in the system of classification provided by the Carnegie Foundation as well as all members of The Holmes Partnership. The researcher chose to use institutions falling under the basic classification of "RU/VH: Research Universities (very high research activity)" (The Carnegie Foundation for the Advancement of Teaching, 2006) that are members of national organizations for teacher education.

The Carnegie Foundation no longer uses the familiar R1-type classification system. The new system enables the user to compare institutions using a number of variables.

> Based on the highest degrees an institution awarded and their mix across broad domains (e.g., professional fields such as business or engineering as opposed to arts and sciences), the old Carnegie classification provided a shorthand for the "type" of college under discussion. It classified all postsecondary institutions by a single method--the number and type of degrees awarded across different fields--and each institution could fall into only one category. These categories (liberal-arts colleges, research-intensive universities, and so on) are retained in the new taxonomy as the "basic" classifications. (Doyle, 2006, p. 51)

In the interest of maintaining the simplicity of the older classification system, the researcher based the selection of participating institutions on only one basic categorization as described in the new Carnegie classification system, as mentioned above, “Research University with Very High research activity (RU/VH).”

Using only the RU/VH dimension to categorize institutions of higher education produced a list of 96 possible participants. Since only one dimension (very high research activity) was used to compile the initial list, a means of determining whether institutions in the list of 96 had a teacher education program was to cross-reference them with a list of members of the National Council of Accreditation for Teacher Education (NCATE) and a list of members of the American Association of Colleges for Teacher Education (AACTE).

Both NCATE and AACTE are national organizations. To become a member of NCATE an institution must apply and go through a review process that examines the institution’s teacher education program based on *NCATE Unit Standards*. In addition, the institution must pay a fee based on the number of graduates from its teacher education program (National Council for the Accreditation of Teacher Education, 2007). To become a member of AACTE an institution must

simply fill out an application and pay dues based on a flat fee plus additional charges based on specializations in the teacher education program (e.g. administration or counseling) and on whether graduate degrees are awarded. Using the criterion of RU/VH classification, plus membership in either NCATE or AACTE (or both), from the original list of 96, there were 58 institutions that met the criteria. In addition, higher education members of The Holmes Partnership were included, see Appendix A, Table A1.

> The Holmes Partnership is a consortium of universities, public school districts, teachers associations and local as well as national organizations. It is truly a model of partnerships at work. Our partnerships serve as a major vehicle to reform teaching and learning whether in a public school or a higher education setting. (Thurman, n.d.)

The rationale for including The Holmes Partnership was that it would result in the inclusion of institutions with teacher preparation programs that have a commitment to quality teacher education, but may not fall into the RU/VH classification. Previous research has included institutions that are members of The Holmes Partnership (formerly known as The Holmes Group) as its sample (Hargrave & Hsu, 2000) while other research has cited findings by The Holmes Group (Hartshorne, Ferdig, & Dawson, 2005; Wise, 2005). See Table 2 for a description of the numbers and percentages of institutions in this study who are members of the three professional organizations, NCATE, AACTE, and The Holmes Partnership.

The result of this method for selecting participants was that institutions from 39 of the 50 states as well as the District of Columbia might be included. In addition, all regions of the United States were included with numerical representation as follows: Midwest - 26; Mid-Atlantic/Northeast - 17; Southwest/West/Northwest - 21; and, Southeast - 15. Initially six regions were designated, but the result was that some regions had as few as three institutions, so

Table 2

Membership in Professional Organization(s) for Teacher Preparation

Organization	Number	Percent
NCATE only	3	3.37%
AACTE only	15	16.85%
The Holmes Partnership only	2	2.25%
NCATE and AACTE	29	32.58%
The Holmes Partnership and NCATE	1	1.12%
Holmes Partner-ship and AACTE	3	3.37%
All Three Organizations	36	40.45%
Total	89	100.00%

the categories were collapsed to make it more likely that the assumptions required for possible statistical analysis could be met. For a breakdown of states categorized in each of these regions, see Appendix A, Table A2.

The researcher accessed the web sites of all 89 institutions who were potential participants in the study (see Appendix A, Table A3) to determine which individuals at each institution might be most knowledgeable about technology training for preservice teachers and to find e-mail contact information. In cases where it could not be determined specifically who would be most likely to know about technology (e.g. taught a technology course, coordinated technology training) at the institution, the initial e-mail message went to the dean or department chairperson of the SCDE. The initial message requested, "If you are not the person who can best answer questions about the ways in which your program teaches preservice teachers about technology, would you be kind enough to let me know or to forward this message to the right individual?" (see Appendix C1 for the complete message). As a result of replies to this message, the contact spreadsheet was edited to reflect the proper person for receipt of the survey link and code. All batch e-mails were sent using e-mail merge features of Microsoft Excel and Outlook.

Instrument Development

Technology Training for Preservice Teachers

No existing survey could be found that included items related to all of the research questions in this study. One instrument that addressed some of the items was created for a dissertation (Betrus, 2000) entitled *The Content and Emphasis of the Introductory Technology Course for Undergraduate Pre-Service Teachers.* However, although the Betrus survey instrument addressed credit hours and departmental responsibilities for teaching an introductory

technology course, it failed to address a number of areas of interest in the current study, such as: other means of teaching technology; whether any of the technology training for preservice teachers might be offered online; and, whether the teacher education program makes provisions for training in virtual, online instruction.

Another dissertation (Goudy, 2002) focused on the content of technology courses for preservice teachers. The dissertation by Goudy examined the syllabi of technology courses taken by elementary education preservice teachers. Like the study by Betrus (2000), the research done by Goudy focused on the content of preservice technology courses rather than on possible ways that technology training could be delivered.

Online and Distance Education Coursework in Preservice Teacher Education

Published reports have examined the proliferation of online education (Allen & Seaman, 2006; Honawar, 2006), but they looked at all types of courses offered online--they did not focus only on technology courses. Although one non-research-based article addressed an entire teacher education program offered online, the author simply described the program (Keller, 2006). Neither the reports nor the article included a copy of the survey instrument used to gather the information presented.

One dissertation study (Martin, 2003) addressed online teacher education courses, but was from a faculty perspective. This study by Martin focused on factors that either facilitated or impeded the adoption of web-based courses by faculty members. The instrument used in Martin's dissertation was a Likert scale asking faculty members the extent to which they agreed or disagreed with statements about online education and was not useful for the current study.

Teacher Education Programs Preparing Preservice Teachers for Virtual Education

Much of the available research about preparing preservice teachers to be instructors in a virtual education setting comes from Iowa State University. The majority of the Iowa State research has been presented as program evaluations at different stages of implementation (Davis, Demiraslan, & Compton, 2007; Davis & Roblyer, 2005; Davis et al., 2007). Although Iowa State's studies might be useful for an institution planning to implement training for future teachers to teach in an online environment, it is specific to the researchers' institution and does not examine the extent to which other institutions might be planning to incorporate such training in their own teacher education programs. In addition to program evaluation, at one point Iowa State University employed an online, qualitative measure using students' reflections to determine their perceptions about virtual education during a seminar course, which was not the focus of the current study.

In an overview of requirements for online teachers in various existing virtual schools Cavanaugh (2005) described the training required for certification to become an online teacher, but in the analysis she provided only information about teachers who were already certified and who had to take professional development courses to become certified as *online* teachers as well. Likewise, Norton & Smith (2007) presented research based on collaboration between George Mason University and a local school system to provide training in online education for inservice teachers. Preservice teachers were not included and the training consisted primarily of workshops provided during the summer months.

Generally, training to become an online teacher is offered in the form of professional development rather than full-blown, college level courses. In addition, although these studies described the research methodology that was used, they did not provide copies of the data

collection instruments.

Thus, although research has been done in areas relevant to the current study, no single instrument was been discovered that addressed the researcher's three questions:

1. How do teacher education programs differ in the ways in which they deliver technology training for preservice teachers?
2. To what degree is technology training for preservice teachers available partially online or completely online and/or as distance learning?
3. Have schools, colleges, or departments of education (SCDEs) made provisions for preparing preservice teachers to be online teachers in a virtual classroom or school?

In order to address the research questions, the researcher developed a survey instrument, see Appendix B, designed specifically to answer these questions. Since the survey instrument was designed to gather descriptive data rather than to measure a specific construct, instead of administering the survey to a pilot group, the researcher submitted it for evaluation and feedback by a panel of experts. This panel consisted of faculty at the researcher's institution who are experienced in survey development, instructors who teach preservice technology courses at several other institutions, and graduate students at the researcher's institution who teach technology courses for preservice teachers. No one on the panel of experts was included as a participant in the actual data collection for the study.

Feedback from Panel of Experts

Feedback from the panel included suggestions about wording. The question about whether the institution provided separate classes for elementary and secondary preservice teachers was changed because the first version left some doubt as to whether the question was asking about completely separate classes. The item that asked participants to rate how

technology training is delivered (stand-alone, incorporated in other education classes, during field experience, and/or during student teaching/internship, or "other") was problematic for several members of the panel. It was changed to accommodate the possibility of "not applicable." Unfortunately, the amended version was not the one that was ultimately deployed.

Several members of the panel did not like that many questions were forced-choice. Therefore, wherever possible, the survey was changed to allow participants to continue without having to answer a question. Forced-choice remained in effect in instances where not answering would have an impact on data analysis. For example answering "yes" or "no" to the question, "Do you require *any* form of technology training for students in your preservice teacher education program?" was critical to whether completing the remainder of the survey was necessary.

Another issue raised by the test group was whether participants could stop the survey and resume it later. The survey was amended to allow participants to stop and resume it. Directions for being able to stop and restart were added to the introductory information.

Members of the panel were asked to report how long it took to complete the survey. Reported completion times ranged from twelve minutes to sixteen minutes with most of the panel reporting it took approximately fifteen minutes to complete the survey.

Content and Focus of the Survey Instrument

The survey instrument focused on four major areas. The first section asked for demographic information about the participant and his/her institution. The second section consisted of questions that asked about the nature of technology training at the participant's institution (research question 1). The third set of questions asked about the degree to which, if any, technology training for preservice teachers is offered online (research question 2). Still

another area of inquiry was whether the participant's institution offers any training for preservice teachers to prepare them for becoming online, virtual teachers (research question 3). In addition, the survey included an open-ended question which asked whether the participant wishes his/her institution were doing things differently with regard to technology training for preservice teachers and, if so, why they are unable to do things differently. The researcher also asked for feedback on the survey instrument itself. In addition, the researcher asked participants whether they would be available for further contact and, if so, to provide a means of contact, such as a phone number or e-mail address.

The survey was created using mrInterview, a software program for developing, deploying, and downloading results of online surveys. SPSS is the parent company of mrInterview.

Data Collection Procedures

Organizational Procedures and Distribution of Survey Instrument

Names of prospective participants were entered into an Excel spreadsheet to facilitate the organization of data, including identification code, name of institution, e-mail address, and status of survey (i.e. completed or pending). Survey participants were told that their information was coded and identifying information would be deleted once data were collected. Upon conclusion of data collection, all information identifying individual institutions was deleted.

Having received Institutional Review Board permission from The University of Tennessee dated February 29, 2008, the researcher sent an e-mail message to the person at each institution responsible for teaching or coordinating technology for preservice teachers, or other contact person, notifying him/her of the upcoming e-mail message that would provide a link and

code to complete an online survey. There were two purposes to this initial contact. First, the researcher wished to see whether the e-mail message would be able to get through spam filters at the participants' institutions. Second, the researcher hoped to determine that the person receiving the message was the appropriate person to complete the survey.

The initial message notifying participants about the survey was sent March 31, 2008. On April 17, 2008, the first message containing the link to the survey and the code was sent. Six days later, a follow-up was sent to remind participants about the survey. It also included the link and code. A final reminder was sent on April 30, 2008. Data collection was cut-off on May 6, 2008. In all, participants may have been contacted as many as four times, depending on when they completed the survey: the initial notification, and three messages containing the link and code. Once a participant responded, he/she was removed from the spreadsheet contact list.

Timeline

Data were collected during the Spring Semester of 2008. The target date for distribution was the second week of April. Participants were asked to complete the survey at their earliest convenience. A follow-up for non-respondents was initiated during the third week of April. An additional follow-up was conducted in late April. The initial contact plus follow-ups for non-respondents was undertaken in an effort to get sufficient data to meet the assumptions of the proposed statistical analyses. The cut-off date for the completion of surveys was May 6, 2008. Data analysis began May 10, 2008 and was completed by June 27, 2008. For a complete timeline, see Appendix D.

Data Analysis

Analysis of the demographic data is descriptive and presented as frequency tables created using the Statistical Package for the Social Sciences (SPSS). For items addressing the nature of

technology training, data are presented in frequency tables showing the extent to which the participant's program uses various methodologies for delivering technology training. For items addressing the degree to which an institution has put technology training course(s) in an online format, the data are being presented in frequency tables using demographic categories showing: 1) whether institutions have content management systems and which ones they use; and, 2) whether institutions have put any portion or the entire content of technology courses online; and, 3) the percentage(s) of which any technology course is online. For items dealing with the extent to which an institution has made provisions for preparing future online, virtual teachers the results are presented in frequency tables. In addition, graphs and charts are presented where a pictorial representation of the data further illustrates the results.

Statistical Package for the Social Sciences (SPSS) was used as the file format for downloading the survey results and organizing the data into tables. Collapsing of rating categories was necessary regarding the item about how technology training is delivered because some of the categories did not aid in making distinctions about frequency of usage for a particular means of delivery (stand-alone, incorporated into non-technology-focused education courses, during field experience, during student teaching/internship). For example, there was no useful distinction between "almost always" and "frequently."

CHAPTER 4: FINDINGS

Introduction

This chapter presents the results from the researcher-created survey instrument. It is arranged using the following main topics: 1) response rate; 2) demographics; 3) data analysis regarding the delivery of technology training for preservice teachers at participants' institutions; 4) the use of online content delivery for preservice teachers at participants' institutions; 5) the degree to which, if any, participants' programs prepare preservice teachers to be online, virtual instructors; 6) responses to open-ended survey items; and, 7) summary of findings. In addition, each of these major topics is broken into smaller topics.

Response Rate

The researcher targeted 89 institutions, based on sampling described in Chapter 3, *Methodology*. Of the 89 institutions, three were excluded because they did not have teacher preparation programs resulting in graduates receiving teacher licensure. Forty-one participants responded and completed enough items to provide usable data. Two respondents who did not complete enough items failed to provide even demographic data. Two others completed the demographic data, but indicated that their programs do not provide technology training for preservice teachers. Ultimately, of the 86 potential participants, 41 (48%) provided data usable for answering items related to the three research questions:

1. How do teacher education programs differ in the ways in which they deliver technology training for preservice teachers?
2. To what degree is technology training for preservice teachers available partially online or completely online and/or as distance learning?

3. Have schools, colleges, or departments of education (SCDEs) made provisions for preparing preservice teachers to be online teachers in a virtual classroom or school?

Data analysis is based on the forty-one participants who answered both demographic survey items *and* items about technology training for preservice teachers at their institutions.

Demographics

The participants included in this study were drawn from institutions that are members of NCATE or AACTE and fall into one dimension (RU/VH, formerly R1) in the system of higher education classification provided by the Carnegie Foundation. In addition, the study includes all members of The Holmes Partnership. The survey items pertaining to demographics focused on the institution where the participant is employed, on the participant himself/herself, and on characteristics of the preservice teacher education program at the participant's institution.

Demographics of the Institutions and Participants in the Study

Public, private (non-profit), private (for profit), and credit system

Of the 41 participants who completed the online survey, 35 indicated that their institutions are public, four are private (non-profit), and two are private (for profit). Of the institutions participating in the study, 38 institutions are on the semester system and three are on the quarter system.

Responses by regions

Of the 41 participants included in the data analysis, the highest return rates were from institutions in the Southeastern and Midwest regions and the lowest return rate was from the Mid-Atlantic/Northeast region. For exact numbers and percentages of return rates by region, see Figure 1. Participants were from 25 different states in the U.S.

In addition to region, participants were asked about the size of their institutions. Figure 2 shows that most of those who completed the survey were from large institutions (more than 20,000 undergraduates). Due to the way sampling was conducted, based on high research universities using Carnegie classification, it was expected that there would be more participants from large institutions completing the survey. Also, although it might be predicted that the largest institutions would also have the largest number of graduates from their teacher education programs, Table 3 shows that two of the five participants from the smallest institutions reported having over 200 graduates annually from their teacher education programs.

Almost one-third (32%) of the participants reported that their teacher education programs are members of all three professional organizations: NCATE, AACTE, and The Holmes

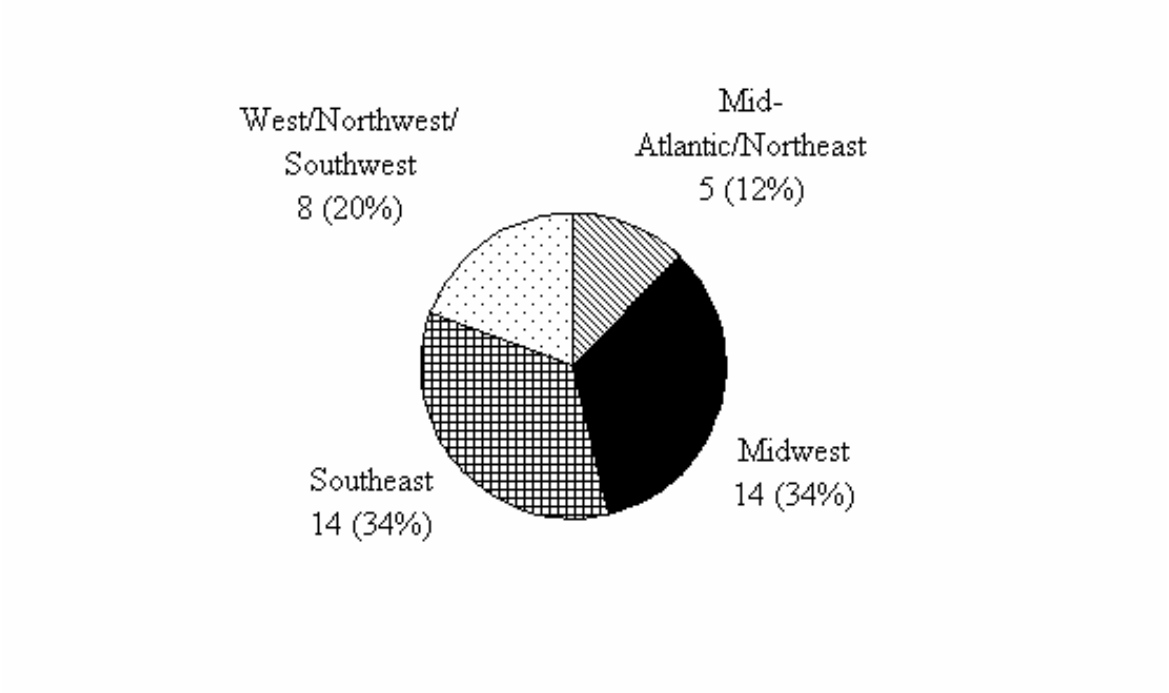


Figure 1. Numbers and percentages of participants (by region) included in the data analysis

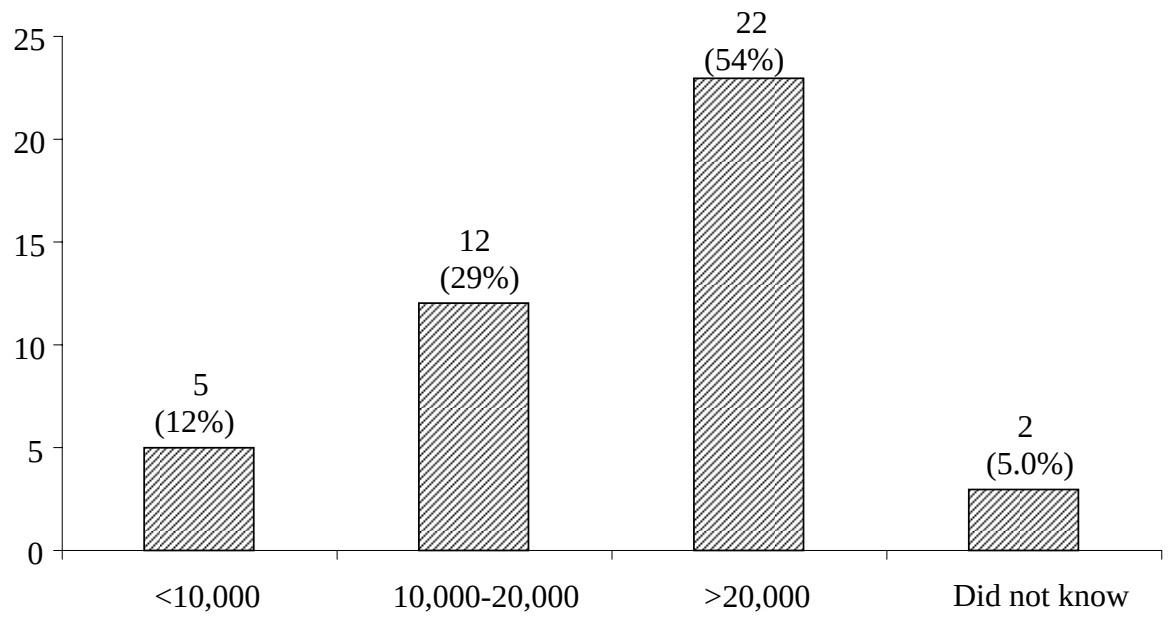


Figure 2. Size of undergraduate population (as of Fall 2007)

Table 3

Size of Undergraduate Population and Teacher Education Graduates Per Year

	Average number of graduates from teacher education program				
Undergraduate population	<50	51-100	101-200	More than 200	Total
<10,000	1	1	1	2	5
10,000-20,000	0	2	6	2	10
>20,000	0	1	6	12	19
Total	1	4	13	16	34*

*Total is less than 41 because some participants failed to answer *both* items (undergraduate population *and* number of teacher education graduates).

Partnership. For numbers and percentages of institutions belonging to each organization, see Table 4.

Teacher educations programs that offer technology training for preservice teachers were contacted via e-mail and asked to complete the survey or forward the message to the appropriate person. Thirty-five (85%) of the participants who completed the survey were instructors or administrators in their teacher education program, see Table 5. Other participants included a graduate teaching assistant, an assessment professional, a technology coordinator, and two program coordinators. Twenty-three (56%) of the participants said that they, personally, teach a stand-alone course in technology for preservice teachers. Eight participants said they teach technology for preservice teachers in a manner other than a stand- alone class. Of these eight participants, four of them teach technology for preservice teachers in *both* a stand-alone class

Table 4

*Membership in Professional Organizations**

Organizations in which institution is a member	Participants (frequency)	Participants (percent)
NCATE	34	83%
AACTE	27	66%
The Holmes Partnership	18	44%
Did not know	1	2%

*Institutions may be members of 1, 2, or all 3 organizations

Table 5

Job Titles/Positions of Participants

Job title	Number of participants	Average number of years in position
Adjunct/Instructor	5	4.8
Assistant Professor	5	4.5
Associate Professor	12	8.9
Professor	2	14.0
Associate Dean	4	6.3
Department Chair/Director	7	3.4
Other	6	4.5
Total	41	

and in some other manner (e.g. integrated into a non-technology focused education class).

Characteristics of Teacher Education Programs at the Participants' Institutions

All forty-one participants (100%) reported that their institutions have a course management system that is used by their teacher education programs, see Figure 3. The majority of participants indicate that they use Blackboard. "Other" course management systems used by teacher education programs include Angel - 2 (5%), LiveText - 2 (5%), an internal system - 2 (5%), First Class - 1 (2%), Sakai - 1 (2%), and TrueOutcomes - 1 (2%).

Textbooks required for technology training

Ten of the participants (24%) indicated that they use a textbook for technology training class(es). Of the 10, two did not know the name of the book that was used, one indicated that a book for computer science undergraduates was used (but did not give the name), and the

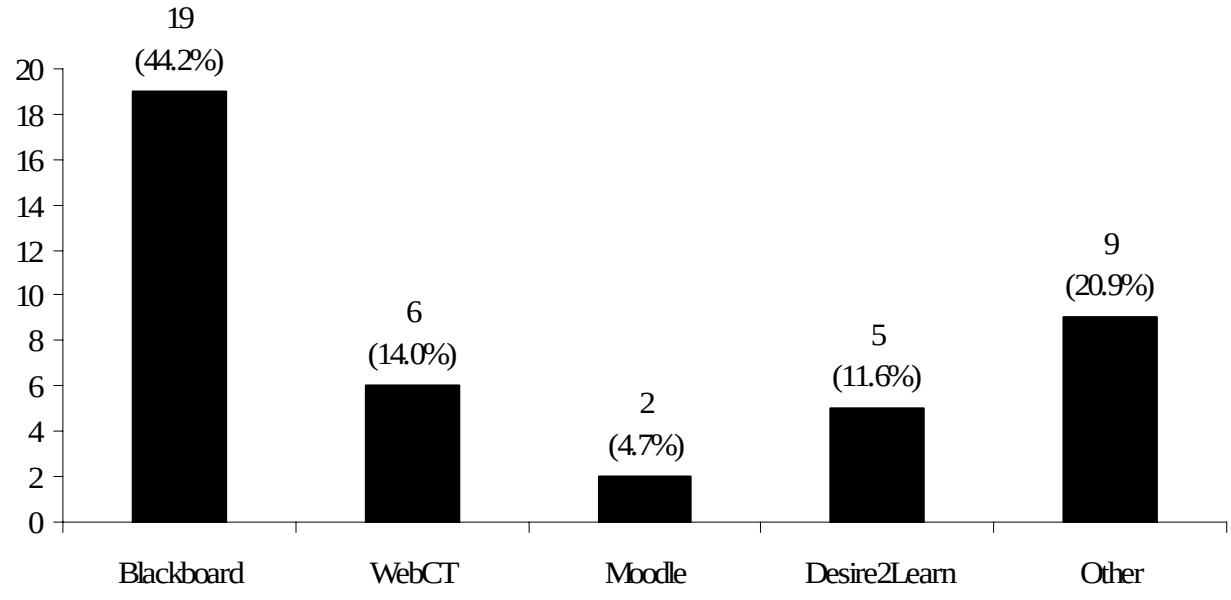


Figure 3. Course management systems used by participants' teacher education programs

other seven gave the responses listed in bulleted form below.

- *Preparing to Use Technology* by O'Bannon and Puckett
- *Intel* training materials
- *Using Technology in the Classroom* Bitter Legacy 7th Ed.
- For graduate licensure students, Roblyer, 4th ed.
- Shelly Cashman text and Johansen text are regularly used.
- Different programs are different...two textbooks are *Grabe and Grabe* and *Roblyer*
- Morrison, G.R. & Lowther, D.L. (2005). *Integrating Computer Technology into the Classroom.* 3rd edition. Upper Saddle River, NJ: Pearson (cited by 2 participants)

Students own computer

Only five of the forty-one participants indicated that teacher education students are required to have their own computer.

Who teaches technology course(s)

Of the 41 participants, 38 indicated that technology courses for preservice teachers are taught by the school/college/department of education. Two of the participants indicated that such technology courses are taught by a combination of several schools/colleges/departments (not necessarily education), and one said technology is taught by the Center for Technology in Education.

Test-out of required technology course

Only four of the 41 participants indicated that students are allowed to test-out of taking a technology class. One of the participants did not know.

Operating system primarily used in technology courses for preservice teachers

Twenty (49%) of the participants said that their preservice teacher education programs primarily use computers with *Windows* operating systems. Thirteen (32%) participants said their preservice teachers primarily use the *Mac* operating system. Eight participants (19%) responded that they use *Windows* and *Mac* equally. Of the eight participants who said they use *Windows* and *Mac* operating systems equally, one participant said students have a choice of which one they use and another participant said it was up to the instructor. One of the participants responded to a follow-up e-mail sent by the researcher in which she said that the *Mac* computers at her institution run parallel operating systems so that students may switch back and forth between *Windows* and *Mac* if they wish.

Required and elective credit hours for technology course(s) for preservice teachers

Twenty-one participants who answered the item about required technology classes indicated that their teacher education program requires three credit hours in technology. Two of the participants indicated that their program requires six credit hours. No participants indicated that their programs require *more than* six hours, and three did not answer or did not know.

Twenty-three participants indicated that their program offers elective courses in technology for preservice teachers. Fourteen participants said their program does not provide elective technology classes for preservice teachers and four did not know or did not answer. The number of hours available as elective credit ranged from one to more than six (six participants said their program offers more than six hours elective credit in technology courses for preservice teachers.)

Data Analysis

The Nature of Preservice Teacher Technology Training at Participants' Institutions

The survey instrument asked participants to answer a question about the frequency of use of each of the four defined ways of delivering technology training (stand-alone, incorporated into other education classes, during field experience, and during student teaching/internship) using the terms "Always", "Almost Always", "Frequently," "Sometimes", "Almost Never", and "Never." The question asked:

> Please rate the ways in which your institution provides technology training for preservice teachers. (Note: Stand-alone technology training course(s) means teacher education course(s) devoted entirely to instruction about using electronic technologies such as microcomputers and other microprocessor-based devices to enhance instruction.) See Appendix B.

In order to make the data more usable, terms have been collapsed into three categories rather than six to facilitate analysis. These categorical terms are "Often," "Sometimes," and "Rarely." Therefore, the term "Often" will include the participants who responded "Always," "Almost Always," and "Frequently." Those who responded "Sometimes" will remain in the category called "Sometimes." Participants who responded "Almost Never," and "Never" will be included in the term "Rarely," see Table 6. However, instances where participants indicated their institution "Always" or "Never" delivers technology instruction in one of the four ways listed above will be pointed-out.

Stand-alone technology classes

Participants were asked whether their teacher preparation programs use a stand-alone class or classes to teach preservice teachers about technology. Based on collapsed categories, 31

Table 6

Categories Collapsed for Purposes of Data Analysis

Original categories	Categories for data analysis
Always, almost always, frequently	Often
Sometimes	Sometimes
Almost never, never	Rarely

of 41 (76%), indicated that they often use a stand-alone technology class, five (12%) said they sometimes use such a class, and five (12%) said they rarely use a stand-alone class for technology training. Using the original categories, 27 (66%) said they "always" use a stand-alone technology class and only four (10%) said they "never" deliver technology training by means of a stand-alone class.

Class format in stand-alone technology classes for preservice teachers

To address Research Question 1, about the ways in which SCDEs deliver technology training for preservice teachers, participants who indicated that their teacher education programs provide stand-alone technology classes for preservice teachers were asked about the how the class time was allocated. The choices were "lecture," "hands-on," and "other." Participants were asked to estimate the percentage of class time that was devoted to each of the possible teaching methods and to comment on responses that included "other."

Of the 33 participants who completed the item, 30 (91%) said that their students participated in hands-on activities for at least half of the class period. Eight participants did not

answer the question. Many of the "other" activities described by participants were actually hands-on rather than lecture format. Some of the examples of formats described as "other" were: "project driven learning;" "group projects;" and, "Renzulli Learning." (Renzulli Learning, a development corporation of the University of Connecticut, is a web site for differentiated learning with sections for teachers, parents, and students.) One participant reported that they use different models for different programs, "some are lab only, some are lecture plus lab sections, and some are lecture/discussion/lab." For a more thorough breakdown on the percentages of time allocated to "lecture," "hands-on," and "other," see Appendix A, Table A4.

Different classes for different grade levels and subject areas

Sixteen (39%) of the 41 participants said their program has different technology classes for future elementary teachers and for future secondary teachers, while 23 (56%) said they did not offer separate classes, and two did not know or did not answer.

Regarding different technology classes for preservice teachers in various subject areas, nine (22%) said their teacher preparation programs have separate classes for specific subject areas. Of the 41 participants, 30 (73%) said they did *not* have separate classes for specific subject areas and two participants did not know or did not answer.

Technology in Non-Technology Focused Education Classes

Responses regarding the extent to which technology is incorporated in other, non-technology-focused classes were similar to the responses about the use of stand-alone classes. Based on the collapsed categories, 30 (73%) said they "often" incorporate technology into other education classes, nine (22%) said they "sometimes" do, and two (5%) said they "rarely" do. However, the certainty about whether technology is used in non-technology classes was less,

with only five (12%) saying they "always" incorporate technology in such classes. None said they "never" incorporate technology into other education classes.

Technology in Field Experience(s)

Sixteen participants (39%) indicated that they "often" incorporate technology into preservice teachers' field experiences, while 16 (39%) said they "sometimes" do, and nine (22%) said they "rarely" do. Using the uncollapsed categories, only two (5%) said they "always" incorporate technology into field experiences and only one (2%) said they "never" do.

Technology in Student Teaching/Internship

Most participants indicated that their program includes technology training during student teaching/internship. Eighteen (44%) said they "often" include such training and 14 (34%) said they "sometimes" include such training. Only nine (22%) said they "rarely" include training during student teaching/internship. Using the original categories, five (12%) said they "always" include technology training during student teaching/internship, while only one (2%) participant said they "never" include such training.

Other Ways Participants' Programs Teach Technology

Participants were asked to explain ways (other than a stand-alone class, integrating it into other non-technology classes, as a part of field experience, and as a part of student teaching/internship) that their programs deliver technology training for preservice teachers. One participant said that they hold "a technology fair where students can learn about and use specific software programs [and] hold workshops for students to learn specific technology skills." Another participant said their program offers summer workshops on the use of technology. Four of those who responded to this survey item said that their students are required to construct a web-based teaching portfolio. One institution has a "laptop lounge" available 24-hours a day for

students and faculty to get technology assistance. Another participant said they place "emphasis on technology use in presentations and in day-to-day coursework (blogging & facebook used in courses)." One participant indicated that their program uses one-on-one coaching. Another participant gave a thorough description of other technology training available to preservice teachers: "We have a Center for Technology in Learning and Teaching in our teacher education department. Some preservice teachers work there and gain valuable experiences with hands-on leadership and troubleshooting skills. In addition we offer a minor in educational computing so we have additional courses that our preservice teachers can take specifically about digital technologies and integration."

Summary of Preservice Teacher Technology Training

As indicated by prior research and corroborated by this study, the stand-alone technology class is still the most commonly used means of teaching preservice teachers about technology, with almost as many reporting that technology is incorporated into other education classes. Based on the results of this study, technology training during field experience and student teaching/internship are less commonly used for teaching technology. To see how participants indicated technology training for preservice teachers is delivered in their teacher education programs, see Table 7. To see specifically how participants answered, based on the answers given using the original categories from the survey, see Appendix B.

The Use of Online Content Delivery in Teacher Education at Participants' Institutions

For the first survey item about online delivery of technology course(s), although 15 (37%) of the 41 participants indicated that *no portion* of their stand-alone technology class was online, in a later question 30 (73%) indicated that at least some percentage of their technology

Table 7

Delivery of Technology Training for Preservice Teachers

Method of delivery	Numbers and percentages of participants*		
	Often	Sometimes	Rarely
Stand-alone	31 (76%)	5 (12%)	5 (12%)
Incorporated into other education classes	30 (73%)	9 (22%)	2 (5%)
Incorporated in field experience	16 (39%)	16 (39%)	9 (22%)
Incorporated in student teaching/internship	18 (44%)	14 (34%)	9 (22%)

*Based on 41 participants.

class(es) were online. There was no option to select 0%, in the survey item that asked about the extent to which technology training was offered online. The 20 participants who said 1-29% of their technology course was online included those 15 who said none of their course was online. The researcher had believed that those who said *none* of their technology course was online would not see the question about percentage of content delivered online. However, it turned out that if a participant indicated his/her institution had "no plans" to put the contents of their technology course(s) online, he/she was routed to a question that asked why they had no such plans. The question asking about reasons for having no plans to put technology online was "select all that apply." Such item-types are not routable, consequently participants who indicated "no plans" to put technology course(s) online were later asked for a response to the question that

followed, “To what extent is the content of your technology class(es) for preservice teachers online?” Table 8 shows the responses to the later item that gave a description of the possible categories into which online content might fall.

Only three (7%) of the participants indicated that their technology course was online, could be taken at-a-distance, and that students were given a choice to take the course online or face-to-face. Two of the participants said, based on enrollment, students preferred the face-to-face course and one participant said students at his/her institution preferred the online version.

Of the 15 participants who said they *did not have any* of the technology course content online, two indicated that their institution is planning to put the content online in the next year. One participant said they were going to put content online in the next two years. Seven said they had *no plans* for putting technology course content online, and five did not know.

Reasons participants gave for not putting technology course content online were: lack of student demand; perception that students lack the requisite skills; lack of student access to necessary software; perception that students need peer contact in a classroom; crowded curriculum; and, “we choose not to.”

Participants were asked whether their teacher education program offered any other teacher preparation classes (other than technology classes) online and capable of being taken at a distance. Fifteen (37%) of the respondents said that their program does offer such classes, 23 (56%) said their program does not offer such classes, and three (7%) did not know. The classes participants said were offered online include: classes for English language learners; general education classes; a post-graduate class on technology; middle school endorsement courses in curriculum, psychology, and policy; virtual learning; project-based learning;

Table 8

Online Delivery of Technology Course(s) for Preservice Teachers

Type of Course	Description	Percentage of Content Delivered Online	Number/Percentage of Participants Responding
Web Facilitated	Course that uses Web-based technology to facilitate what is basically a face-to-face course.	1-29%	20 (49%)
Blended/Hybrid	Course that blends online and face-to-face delivery. A substantial portion of the content is online, but has some face-to-face meetings.	30-79%	5 (12%)
Online	A course where most or all of the content is delivered on line. Few or no face-to-face meetings.	80-99%	2 (5%)
Completely Online	Course is taken at-a-distance	100%	3 (7%)
No answer or does not know			11 (27%)
Total			41 (100%)

leadership; methods classes in science and math; introduction to exceptional learners; teaching reading in the secondary grades; autism; courses for alternative certification; media for children; and, distance learning and support systems.

Summary of Online Delivery of Teacher Technology Training

Based on the responses of the participants in this study, few teacher education programs have put their courses for technology training for preservice teachers online. In fact, only 10 (24%) of the participants who completed the survey indicated using online delivery to a great extent (at least 30% of the course being online). Despite the lack of online delivery of technology classes for preservice teachers, over one-third of participants indicated that other education courses are being offered online.

The Degree to Which Participants' Teacher Education Programs Prepare Preservice Teachers to be Online, Virtual Instructors

Participants were asked whether their preservice teachers were provided instruction for becoming online instructors. The survey item went on to explain that this related to "any training that would prepare a teacher to deliver instruction in an online format such as is employed in 'virtual' or online P-12 educational settings." As shown in Table 9, few of the participants' teacher preparation programs are addressing this issue. Only 15% of the participants indicated that their teacher education programs directly address the training of preservice teachers to be online instructors.

Of the four participants who said they have an entire course devoted to preparation for online instruction, three indicated that the course is an elective and only one institution requires preservice teachers to take an entire class about online instruction.

Table 9

Preparing Preservice Teachers to be Instructors in an Online Environment

Extent or type of training	Number of responses	Percent of responses
We do not provide training for our preservice teachers to be "virtual"/online teachers	20	49%
We offer online classes that will give our preservice teachers a chance to experience online learning	14	34%
We include a unit in an education course that specifically addresses skills/competencies for online instruction	2	5%
We have an entire course devoted to "virtual"/online instruction	4	10%
No answer	1	2%
Total	41	100%

Summary of Preparing Preservice Teachers to be Online, Virtual Instructors

Participants from six teacher education programs (15%) that participated in this study indicated that they are directly addressing competencies that prepare preservice teachers to be online instructors. Four of those six offer an entire course on virtual instruction. Fourteen participants said their programs offer online courses which would give preservice teachers a chance for experiencing online education. This contrasts with only ten of the participants who indicate the technology course they offer preservice teachers is available at least partially online.

Responses to Open-Ended Survey Items

In addition to the quantitative questions on the survey, there were also two open-ended questions. One of the questions asked whether the participant wished his/her program were doing things differently in regard to technology training for preservice teachers and asked the participant to explain why their program was unable to do so. Twenty-seven (66%) of the 41 participants answered "yes" that they wish things would be done differently in regard to technology training for preservice teachers. Some of the participants described what it is that they wish could be done, while others explained why they are unable to do things differently. Things that they wanted done differently included:

- integrate technology more fully into coursework (two participants cited this)
- require students to have laptops
- provide more student observation of teachers using technology in real classrooms
- make online tutorials and classes available
- divide technology classes into ones specifically for primary, middle, and secondary teachers (three participants cited this)

- do a better job of coordinating technology classes with other courses in the program, especially methods classes (eight participants cited this)
- shorten the three-hour class

Reasons given as to why these things were not being accomplished, or were difficult to accomplish, included:

- academic politics
- limited faculty skills
- limited faculty leadership
- limited technology in schools where preservice teachers complete field experience
- lack of an adequate number of technology-literate mentoring teachers in P-12
- lack of money
- lack of time (demands of other courses and the curriculum)

Another open-ended item asked for comments about the survey instrument itself, "Comments about the survey or other information you would like to share with the researcher," and gave space for participants to make comments. Eleven participants made comments. Two participants indicated they were not comfortable with the forced-choices of some of the items and felt they were compelled to select a response that did not adequately represent the realities of their program. One of these participants mentioned that their program is geared toward graduate students rather than undergraduates. Another participant said he/she did not feel comfortable in trying to judge what might go on in methods classes and that such classes might vary widely in the degree to which they use technology. One participant indicated he/she would like to have

seen questions about the content of technology classes. Finally, two participants said they wish the survey had included a progress indicator so they could see how far along they were in completing the survey.

Summary of Findings

Research Question 1

Research Question 1 asked, "How do teacher education programs differ in the ways in which they deliver technology training for preservice teachers?"

Teacher education programs included in this study differed very little in the way they deliver technology training for preservice teachers. One difference among the institutions in the study was in which operating system is used in preservice teacher technology courses. Almost half use *Windows*, about one-third use *Mac*, and the rest use a combination of the two. No other operating system, e.g. *Linux/Unix*, was mentioned.

While the majority of participants (51%) said their program requires three credit hours of technology training for preservice teachers, 12% of the participants said their program does not *require* any technology training at all. Over half the participants said their program offers elective credit in technology for preservice teachers, with 15% indicating that their program offers more than six credit hours in technology electives.

Ten (25%) of those who completed the survey indicated that a textbook is required for their required technology class for preservice teachers. Of those ten who said a textbook is required, seven different titles were cited as being used.

Thirty-nine per cent of the participants said their program offers separate classes for future elementary and future secondary teachers and 56% said their program does not offer

separate classes. In responding to the question about whether they wish things were done differently with regard to technology training in their programs, three participants specifically said they wished they had different classes for teaching different grade-levels (elementary/secondary).

As far as the mode of delivery for technology training for preservice teachers (stand-alone course, incorporated into non-technology education classes, incorporated in field experience, or incorporated in student teaching/internship), there were few differences among the majority of participants' responses. A stand-alone class (or classes) and incorporating technology into other education classes are the most common ways currently being used by teacher education programs. However, four participants (10%) said their program *never* uses a stand-alone class for technology training for preservice teachers and two participants (5%) said they *never* incorporate technology in other education classes.

Research Question 2

Research Question 2 asked, "To what degree is technology training for preservice teachers available partially online or completely online and/or as distance learning?"

Based on this study, little of the content of technology courses for preservice teachers is delivered online. Only ten (24%) of those who took the survey indicated that at least 30% of the content of their technology course is online. Even fewer (7%) indicated that such courses are offered online and capable of being taken at-a-distance.

Research Question 3

Research Question 3 asked, "Have schools, colleges, or departments of education (SCDEs) made provisions for preparing preservice teachers to be online teachers in a virtual classroom or school?"

Twenty participants in this study (49%) said that they do not provide any training for their preservice teachers to be “online” teachers. Six (15%) of those who participated in the study said they directly address skills for online instruction. Of those six participants, four (10%) indicated that they have an entire class devoted to skills/competencies necessary for an online teaching, but only one of them said the class is required.

CHAPTER 5: CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

Introduction

As indicated in Chapter 1, this study had a number of limitations. Some of these limitations dealt with the selection of the participants and the researcher-created survey instrument. Eighty-nine possible institutions were in the original sample, and of those 89, 86 have teacher preparation programs that result in the licensure/certification of teachers. Forty-one of the 86 institutions contacted completed survey questions adequately. Two institutions responded, but indicated that their program does not provide technology training for preservice teachers, so they were not included in the data analysis. It was also assumed that those who completed the survey were knowledgeable about how technology training for preservice teachers occurred in their teacher education programs.

The survey instrument was researcher-created and was not tested on a large group prior to deployment. However, it was reviewed by individuals who taught technology courses for preservice teachers and by individuals skilled in survey development. As a result of feedback from both preservice technology instructors and survey development experts, the survey instrument was revised several times to ensure clarity in the wording of the items and to design questions that would yield pertinent data.

The results of this study cannot be generalized to other teacher preparation programs. However, data obtained from the study may be helpful to teacher preparation programs in evaluating how they go about teaching technology for their own preservice teachers. Of the 41 participants who completed enough survey questions to be included in the study, 34 of them requested a copy of the results.

Conclusions

Technology Training for Preservice Teachers

One of the gaps in the literature was the lack of research about whether abandoning the stand-alone course for delivery of technology instruction for preservice teachers was being adopted on a wide-scale basis. This gap in the literature was part of the basis for research question one, which sought to determine whether there were differences in the ways in which teacher preparation programs went about delivering technology training for preservice teachers. The results of the current study show, as stated in Chapter 4, *Findings*, that teacher education programs, like those in this study, still rely on a stand-alone technology course (or courses) in training teacher education students about the use of technology. Thirty-one (76%) of the institutions in the study indicated that they still "often" employ a stand-alone technology class (or classes) for teaching preservice teachers about technology while only five (12%) indicate that they "rarely" do, and five (12%), and said they "sometimes" do. Thirty participants (73%) also indicated their programs "often" incorporate technology in other education classes. Far fewer said that they "often" incorporate technology into field experience (39%) or student teaching/internship (44%). However, when added to those who said technology was "sometimes" incorporated into field experience and student teaching/internship, the number increases to 78% for both field experience and student teaching/internship.

The results of the current study are comparable to a report published by the National Center for Education Statistics (NCES) in late 2007. The NCES study (Kleiner, Thomas, & Lewis, 2007) was based on data collected from 2,512 institutions with teacher preparation programs. Although the NCES study included items not covered in the current study, and did not include items that *were* part of the current study, the results were comparable with regard to the ways in

which teacher preparation programs provide technology training, see Table 10. In the NCES study, participants were simply asked "yes" or "no" about whether their technology training used the various delivery methods, whereas the current study asked whether they provided training in a particular format "always," "almost always," "frequently," "sometimes," "almost never," or "never."

Perhaps the reason fewer participants indicated their programs incorporate technology in field experience and student teaching/internship is because it is much more difficult to track or observe what occurs in P-12 schools than what takes place on the college campus. The problem may stem from the lack of consensus on the meaning of "field experience." It may be that some institutions do not have students formally visit schools to observe prior to student teaching/internship, or it may be so common as to be difficult to discern exactly what takes place during such experiences. Including a "not applicable" or "I don't know" response may have been useful in the current study

.

Table 10

Comparison of Results of NCES Study and Current Study

How technology is taught	NCES study	Current study*
Stand-alone course	85%	88%
Education classes	93%**	95%
Field experience	79%	78%
Student teaching/internship	_	78%

*Participants responded "often" or "sometimes"
**93% in methods courses, 71% in content courses

Online and Distance Education Coursework in Preservice Teacher Education

A gap in the literature, which led to the second research question in the current study, was the degree to which the trend toward online delivery of coursework was taking place in the delivery of technology courses for preservice teachers. In the current study, 41 participants (100%) indicated their institutions have a course management system available. Yet, only five (12%) participants indicated their technology course was "Online" or "Completely Online" ("completely online" indicated the course could be taken at-a-distance). Despite the technology resources available for delivery of content online (i.e. content management systems), based on this study, few institutions are using a CMS for delivery of technology course content for preservice teachers. On the other hand, 15 participants (37%) said that their programs offer non-technology-focused education courses online. Based on these findings, it appears teacher preparation programs are not putting technology courses for preservice teachers online, yet other education courses *are* being delivered online.

Teacher Education Programs Preparing Preservice Teachers for Virtual Education

One other gap in the literature, and the basis for research question three, centered on whether teacher education programs prepare their graduates to be online instructors. Of the participants in this study, 20 (49%) indicated their teacher education programs do not address such preparation. Only six participants said their programs specifically address such training. Of those six, two indicated they cover online instruction in another course and four have an entire course devoted to the topic. Of the four who have an entire course, only one indicated it is required. Thus, data indicate that *few programs in the current study formally address teaching the skills necessary to become an online instructor.*

Implications

Technology Training for Preservice Teachers

Despite research suggesting that the more settings in which preservice teachers use technology, the more likely they are to use it in their own classrooms (Moursund & Bielefeldt, 1999), based on the current study, teacher education programs still rely primarily on a stand-alone technology class, or classes, for teaching preservice teachers about technology. Almost as often as a stand-alone class, participants in this study indicated some degree of integration of technology into other education classes. Many participants recognized the need to more thorough technology integration in all areas of teacher education. When asked how they wish things were being done differently in their teacher education programs, several participants in the current study said they wished technology were *better* incorporated into *all* education courses and experiences. One participant said:

> [We should] better articulate what happens in the required technology course with other courses in the program - especially the methods blocks. In addition, I wish we had better connections to more teachers who actually use and integrate technology in PreK-12 classrooms for our students to have practicums and student teacher placements.

Reasons often given for not being able to provide this additional technology training were: lack of faculty expertise; lack of motivation; academic politics; and, lack of time, money, and resources. Two of the ways teacher education programs have tried to better integrate technology for preservice teachers include requiring an electronic portfolio that includes artifacts from *all* teacher education classes, and using technology-based performance assessments. Electronic portfolios that encompass all education courses necessitate students and faculty interaction with technology in all classes, not just those with a technology focus. Technology-

based performance assessments might require students to interact with technology, but evidence is needed to demonstrate that it would have a positive effect on future behavior as far as enticing the preservice teacher to use technology with his/her own students.

Online and Distance Education Coursework in Preservice Teacher Education

Although all of the participants said they have a course management system, very few are using it fully in putting education courses online. Fifteen (37%) said that they had *some* education courses online; however only 10 participants indicated that at least 30% of their technology course is online. The most common reason given for not having technology courses online was the lack of student demand for such courses. Four participants gave "other" reasons for not putting their technology course(s) online. One participant said that students need face-to-face peer interaction, while another one said the curriculum was too crowded. One participant was "not sure" why the course was not offered online and another said "we choose not to."

In the past, lack of the technology infrastructure necessary for putting courses online might have been a good reason for not making course content available online, but it apparently is no longer a problem. It may be possible that online course delivery in teacher education is facing the same second order barriers that became evident when veteran classroom teachers faced having to implement technology in P-12 classrooms (Ertmer, 1999). It is not so much the online courses themselves that are the problem, but what such courses might represent for faculty on a personal level.

Teacher Education Programs Preparing Preservice Teachers for Virtual Education

Despite research that shows only 1% of teachers are prepared to teach online (Smith, Clark, & Blomeyer, 2005), based on the results of this study, few teacher education programs offer training for online instruction. In the current study, only four participants said their

program offers an entire course in online instruction, and of those four, only one said the course is required. It may be that professional development, which is the most common way for practicing teachers to become certified as online instructors, is sufficient to provide the numbers of online instructors to meet current needs. On the other hand, since online instruction in the P-12 environment takes place primarily at the secondary level, there is not a perceived need for a course that many students would not need to take.

Recommendations for Further Research

Technology Training for Preservice Teachers

Although this study addressed how technology training for preservice teachers is delivered--stand-alone class, in other education classes, via field experience, and in student teaching/internship--research needs to be done to determine which way, or ways, is the most beneficial in helping preservice teachers implement technology in their own classrooms once they graduate. Moursund and Bielefeldt (1999) indicated that the more exposure preservice teachers have to technology, the greater the likelihood that they will use it as professional teachers. However, if it is not possible to use many ways to teach technology, which delivery methods, or combinations of methods, work best?

Another area that warrants further investigation is determining to what degree preservice teachers use technology in their classrooms after graduation, and what differences might exist between those who use technology for teaching and those who do not. For those teachers who do not use technology, what barriers do they cite that keep them from using technology? Are they truly prohibitive, or do they fall under the category of “second order barriers”? Are there

differences in technology training methodologies for preservice teachers that increase or decrease the likelihood that graduates will use technology in their own classrooms?

Online and Distance Education Coursework in Preservice Teacher Education

One of the items on the survey instrument used in the current study asked about whether technology courses for preservice teachers are offered online. Very few participants indicated that such classes are online through their teacher education programs. Most participants said they have a course management system available, yet few of them seem to be using it for delivering the content of technology courses *in lieu* of meeting face-to-face. Lack of student demand was one of the reasons cited for lack of an online course, but the basis of this assertion is unclear. Research needs to be done to determine whether preservice teacher education students are indeed *not* interested in taking a technology course (or other courses) online, or whether this is a misconception held by faculty.

Additional research needs to be done about course management systems, how they are being used, and by whom. On university campuses, are certain schools, colleges, or departments more likely to use course management systems than others? In instances where classes use course management systems, are they being used primarily by the instructor, the students, or an equal combination of both? Are course management systems worth the expense? To what extent are courses, for teacher preparation and otherwise, being delivered online and at-a-distance because of the availability of a course management system?

Teacher Education Programs Preparing Preservice Teachers for Virtual Education

Further research should investigate whether there is a real need for teacher education programs to prepare preservice teachers to become online instructors. Popular media seem to

indicate that online education is widely available. Is there a shortage of instructors? Or, is there a shortage of instructors for higher education online programs, but not P-12 online education, or vice versa?

Additional research needs to examine the effectiveness of online instructors who received training in their teacher education programs compared to those who became online instructors via professional development or other types of training. The first challenge in such research would be in defining "effectiveness."

Summary

Based on this study, most teacher education programs continue to teach technology for preservice teachers by means of a stand-alone class and by integrating technology into other education courses. Many SCDEs also incorporate technology into field experiences and student teaching/internship. It seems that teacher education programs are dedicated to exposing their preservice teachers to the use of technology; however, control over the role of technology for teaching and learning in the classroom is limited once the preservice teacher goes out into the schools. Further research should address the relationship between technology courses and in-the-field factors in determining the effectiveness of various models of technology training for preservice teachers.

Although most SCDEs have access to content management systems that enable delivery of content online, few teacher education programs appear to be using such CMSs to deliver content for technology training for preservice teachers other than as a supplement to traditional teaching. In this study, a variety of reasons were given for lack of online delivery of preservice

technology training and further research needs to be done to determine whether the reasons cited are widespread and well-founded.

Virtual courses and virtual schools have become increasing popular in higher education and in P-12 schools. Nevertheless, teacher education programs do not seem to be addressing the training of their graduates in the competencies for becoming online instructors. Further research should address whether training to prepare preservice teachers to be online, virtual instructors is warranted based on needs in the P-12 environment. If such preparation is warranted, how could it best be done?

REFERENCES

REFERENCES

Allen, I., & Seaman, J. (2006). *Making the grade: Online education in the United States, 2006.* Retrieved July 7, 2007, from http://www.sloan-c.org/publications/survey/pdf/making_the_grade.pdf.

Anderson, C. L., & Borthwick, A. (2002). *Results of separate and integrated technology instruction in preservice training.* Paper presented at the National Educational Computing Conference (NECC), San Antonio, TX.

Aust, R., Newberry, B., O'Brien, J., & Thomas, J. (2005). Learning generation: Fostering innovation with tomorrow's teachers and technology. *Journal of Technology and Teacher Education, 13*(2), 167-195.

Bakia, M., Mitchell, K., & Yang, E. (2007). State strategies and practices for educational technology: Volume I: Examining the enhancing education through technology programs. Retrieved January 26, 2008, from http://www.ed.gov/rschstat/eval/tech/netts/netts-vol1.pdf

Basham, J., Palla, A., & Pianfetti, E. (2005). An integrated framework used to increase preservice teacher NETS-T ability. *Journal of Technology and Teacher Education, 13*(2), 257-276.

Betrus, A. (2000). *The content and emphasis of the introductory technology course for undergraduate pre-service teachers.* Indiana University.

Beyerbach, B., Walsh, C., & Vannatta, R. (2001). From teaching technology to using technology to enhance student learning: Preservice teachers' changing perceptions of technology infusion. *Journal of Technology and Teacher Education, 9*(1).

Bielefeldt, T. (2001). Technology in teacher education: A closer look. *Journal of Computing in Teacher Education, 17*(4), 4-15.

Blair, J. (2001, February 14, 2001). Teacher training programs turn to cyberspace. *Education Week*, pp. 1, 14.

Brown, D. (2003). *Developing faculty to use technology: Programs and strategies to enhance teaching,* . Bolton, MA: Anker.

Brush, T., Glazewski, K., & Rutowski, K. (2003). Integrating technology in a field-based teacher training program: The PT3@asu project. *Educational Technology Research and Development, 51*(1), 57-72.

Carliner, S. (2005). Course management systems versus learning management systems. *Learning Circuits* Retrieved October 13, 2007, from http://www.learningcircuits.org/2005/nov2005/carliner.htm

Cavanagh, S. (2004, February 18, 2004). Online teacher-training classes win converts. *Education Week*, p. 20.

Cavanaugh, C. (2005). *Virtual schooling: Effectiveness for students and implications for teachers.* Paper presented at the Society for Information Technology and Teacher Education, Phoenix, AZ.

Collier, S., Weinburgh, M. H., & Rivera, M. (2004). Infusing technology skills into a teacher education program: Change in students' knowledge about and use of technology. *Journal of Technology and Teacher Education, 12*(3), 447-469.

Compton, L., Follett, J., & Demiraslan, Y. (2007). *Challenging preservice teachers' preconceptions, misconceptions, and concerns of virtual schooling: A preliminary analysis.* Paper presented at the Society for Information Technology and Teacher Education, San Antonio, TX.

Counts, E. (2004). *Multimedia design and production for students and teachers.* Boston: Pearson.

Crawford, C., & Willis, J. (2002, March 18-23, 2002). *Can standards be met and evaluated through an online teacher education technology course? A case study.* Paper presented at the International Conference of the Society for Information Technology & Teacher Education, Nashville, TN.

Davis, N., Demiraslan, Y., & Compton, L. (2007). *Creating real tools & curriculum to prepare virtual teachers.* Paper presented at the Society for Information Technology and Teacher Education International Conference 2007, San Antonio, TX.

Davis, N., & Niederhauser, D. (2007). Virtual schooling. *Learning & Leading with Technology, 34*(7), 10-15.

Davis, N., & Roblyer, M. (2005). Preparing teachers for the" Schools that technology built": Evaluation of a program to train teachers for virtual schooling. *Journal of Research on Technology in Education, 37*(4), 399-410.

Davis, N., Roblyer, M., Charania, A., Ferdig, R., Harms, C., Compton, L., et al. (2007). Illustrating the "Virtual" In virtual schooling: Challenges and strategies for creating real tools to prepare virtual teachers. *The Internet and Higher Education, 10*(1), 27-39.

Doering, A., Hughes, J., & Huffman, D. (2003). Preservice teachers: Are we thinking with technology? *Journal of Research on Technology in Education, 35*(3), 342-362.

Doyle, W. R. (2006). What's in a name? *Change: The Magazine of Higher Learning, 38*(6), 51-54.

Duggleby, J. (2000). *How to be an online tutor*: Gower Publishing, Ltd.

Duhaney, D. (2001). Teacher education: Preparing teachers to integrate technology. *International Journal of Instructional Media, 28*(1), 23-30.

Eifler, K., Greene, T., & Carroll, J. (2001). Walking the talk is tough: From a single technology course to infusion. *The Educational Forum, 65*, 366-375.

Ertmer, P. A. (1999). Addressing first-and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47-61.

Furger, R. (2007). Online learning: Virtual valedictory [Electronic Version]. *Edutopia Online*. Retrieved September 6, 2007 from http://www.glef.org/edutopianews_ti.html.

Goodyear, P., Salmon, G., Spector, M., Steeples, C., & Tickner, S. (2001). Competencies for online teaching. *Educational Technology Research& Development, 49*(1), 65-72.

Goudy, L. (2002). *An examination of required technology course syllabi in elementary teacher preparation programs.*

Gunter, G. (2001). Making a difference: Using emerging technologies and teaching strategies to restructure an undergraduate technology course for pre-service teachers. *Educational Media International, 38*(1), 13-20.

Hammond, T. (2007). A task-oriented framework for stand-alone technology integration classes. *Journal of Computing in Teacher Education, 23*(4), 153-158.

Hargrave, C., & Hsu, Y. (2000). Survey of instructional technology courses for preservice teachers. *Journal of Technology and Teacher Education, 8*(4).

Harrell, P., & Harris, M. (2006). Teacher preparation without boundaries: A two-year study of an online teacher certification program. *Journal of Technology and Teacher Education, 14*(4), 755-774.

Hartshorne, R., Ferdig, R. E., & Dawson, K. (2005). Preparing current and future teachers to teach with technology: An examination of school-university collaborations. *Journal of Computing in Teacher Education, 21*(3), 109-117.

Hofer, M. (2005). Technology and teacher preparation in exemplary institutions: 1994 to 2003. *Journal of Computing in Teacher Education, 22*(1), 5.

Holmes Partnership. (2008). The Holmes Partnership - member list. Retrieved July 4, 2008, from http://www.holmespartnership.org/contacts.html

Honawar, V. (2006, March 9, 2005). Education department tracks growth of distance learning. *Education Week*, p. 6.

Hussar, W. (1999). Predicting the need for newly hired teachers in the United States to 2008-2009. *National Center for Education Statistics*.

Kajder, S. (2005). "Not quite teaching for real:" Preservice secondary English teachers' use of technology in the field following the completion of an instructional technology methods course. *Journal of Computing in Teacher Education, 22*(1), 15.

Kariuki, M., & Duran, M. (2004). Using anchored instruction to teach preservice teachers to integrate technology in the curriculum. *Journal of Technology and Teacher Education, 12*(3), 431-446.

Kay, R. (2006). Evaluating strategies used to incorporate technology into preservice education: A review of the literature. *Journal of Research on Technology in Education, 38*(4), 383-408.

Kayne Chaplock, S., Whipp, J., & Schweizer, H. (2004). *Sustaining PT3 initiatives: It's more than money.* Paper presented at the Society for Information Technology and Teacher Education International Conference (SITE), Atlanta, GA.

Keller, B. (2006, November 8, 2006). NCATE accredits first online teacher-training program. *Education Week*, p. 12.

Kleiner, B., Thomas, N., & Lewis, L. (2007). *Educational technology in teacher education programs for initial licensure (NCES 2008–040)*. Washington, D.C.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Lamb, A., & Callison, D. (2005). Online learning and virtual schools. *School Library Media Activities Monthly, 21*, 32–33.

Leydon, B. (2001). The e-everything revolution: What's a university to do. *Educause Review, 36*(1), 62-63.

Lohr, L., Javeri, M., Mahoney, C., Gall, J., Li, K., & Strongin, D. (2003). Using rapid application development to improve the usability of a preservice teacher technology course. *Educational Technology Research and Development, 51*(2), 41-55.

Marra, R. (2004). An online course to help teachers "Use technology to enhance learning": Successes and limitations. *Journal of Technology and Teacher Education, 12*(3), 411-430.

Martin, M. (2003). *Factors influencing faculty adoption of web-based courses in teacher education programs within the State University of New York (Doctoral Dissertation, Virginia Polytechnic Institute and State University, 2001).*

McCutcheon, J. W. (1984). *Factors influencing the content of introductory educational media courses.* Indiana University.

Mehlinger, H., & Powers, S. (2002). *Technology & teacher education: A guide for educators and policymakers*. Boston: Houghton Mifflin.

Moursund, D., & Bielefeldt, T. (1999). Will new teachers be prepared to teach in a digital age? A national survey on information technology in teacher education *Milken Exchange on Education Technology* Retrieved July 20, 2007, from http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/17/65/de.pdf

National Center for Education Statistics. (2000). *Teachers' tools for the 21st century: A report on teachers' use of technology (NCES 2000–102). U.S. Department of education*.

National Council for the Accreditation of Teacher Education. (2007). NCATE institutions accreditation. Retrieved September 2, 2007, from http://ncate.org/institutions/accreditation.asp?ch=9

National Education Association (NEA). (2006). *Guide to teaching online courses*. Washington, DC: National Education Association (NEA).

Norton, P., & Smith, R. (2007). *Preparing virtual teachers: Who is on the other end?* Paper presented at the Society for Information Technology and Teacher Education International Conference (SITE) 2007, San Antonio, TX.

Parsad, B., & Jones, J. (2005). Internet access in U.S. Public schools and classrooms: 1994–2003 (NCES 2005–015). [Electronic Version] from http://nces.ed.gov/pubs2005/2005015.pdf.

Peterson, C., & Bond, N. (2004). Online compared to face-to-face teacher preparation for learning standards-based planning skills. *Journal of Research on Technology in Education, 36*(4), 345-361.

Pierson, M., & Thompson, M. (2005). The re-envisioned educational technology course: If addition isn't possible, try division. *Journal of Computing in Teacher Education, 22*(1), 31.

Pope, M., Hare, D., & Howard, E. (2002). Technology integration: Closing the gap between what preservice teachers are taught to do and what they can do. *Journal of Technology and Teacher Education, 10*(2), 191-204.

Roblyer, M. (2003). *Integrating educational technology into teaching* (3rd ed.). Columbus, OH: Pearson.

Ross, T., & Wissman, J. (2001). Redesigning undergraduate technology instruction one college of education's experience. *Journal of Technology and Teacher Education, 9*(2).

Russell, M., Bebell, D., O'Dwyer, L., & O'Connor, K. (2003). Examining teacher technology use: Implications for preservice and inservice teacher preparation. *Journal of Teacher Education, 54*(4), 297.

Saettler, L. (1990). *The evolution of American educational technology*. Englewood, CO: Libraries Unlimited.

Setzer, J., Lewis, L., & Greene, B. (2005). *Distance education courses for public elementary and secondary school students: 2002–03 (NCES 2005-010).*

Shoffner, M., Dias, L., & Thomas, C. (2001). A model for collaborative relationships between instructional technology and teacher education programs. *Contemporary Issues in Technology and Teacher Education, 1*(3), 395-411.

Smith, R., Clark, T., & Blomeyer, R. (2005). A synthesis of new research on k-12 online learning. Retrieved September 16, 2007, from http://www.ncrel.org/tech/synthesis/synthesis.pdf

Snider, S. (2002). Exploring technology integration in a field-based teacher education program: Implementation efforts and findings. *Journal of Research on Technology in Education, 34*(3), 230-250.

Spector, J., & de la Teja I. (2001). Competencies for online teaching. Retrieved September 4, 2007, from http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/19/37/f4.pdf

Sprague, D., Maddux, C., Ferdig, R., & Albion, P. (2007). Online education: Issues and research questions. *Journal of Technology and Teacher Education, 15*(2), 157-166.

Strudler, N., & Wetzel, K. (1999). Lessons from exemplary colleges of education: Factors affecting technology integration in preservice programs. *Educational Technology Research and Development, 47*(4), 63-81.

Swain, C. (2006). Preservice teachers self-assessment using technology: Determining what is worthwhile and looking for changes in daily teaching and learning practices. *Journal of Technology and Teacher Education, v14*(n1), p29.

The Carnegie Foundation for the Advancement of Teaching. (2006). Classifications. Retrieved September 1, 2007, from http://www.carnegiefoundation.org/classifications/index.asp?key=791

Thurman, A. (n.d.). About the Holmes Partnership. Retrieved November 30, 2007, from http://www.holmespartnership.org/about.html

U.S. Department of Education. (2005). PT3 - preparing tomorrow's teachers to use technology. Retrieved July 18, 2007, from http://www.ed.gov/programs/teachtech/index.html

Unal, Z. (2005). *Comparing learning outcomes and course satisfaction of web-based vs. Classroom-based instruction.* The Florida State University, Tallahassee, FL.

University of Texas at Dallas. (2007). Syllabus-ED4372-0t1,. Retrieved August 7, 2007, from http://www.utdallas.edu/~rnix/syl_ED4372_0T1_Fa07.pdf

Wang, Y., & Chen, V. (2006). Untangling the confounding perceptions regarding the stand alone it course. *Journal of Educational Technology Systems, 35*(2), 133-150.

Watson, J., & Ryan, J. (2006). *Keeping pace with k-12 online learning: A review of state-level policy and practice*: North American Council for Online Learning.

Wepner, S., Bowes, K., & Serotkin, R. (2005). Lessons learned from implementing technology in an undergraduate elementary education program. *Journal of Computing in Teacher Education, 21*(4), 111-119.

Whetstone, L., & Carr-Chellman, A. (2001). Preparing preservice teachers to use technology: Survey results. *TechTrends, 45*(4), 11-17.

Wiencke, W. (2002). Exemption exam for an introductory education technology course: Findings from two years of use. *Journal of Technology and Teacher Education, 10*(1), 119-131.

Willis, E., & Sujo de Montes, L. (2002). Does requiring a technology course in preservice teacher education affect student teacher's technology use in the classroom. *Journal of Computing in Teacher Education, 18*(3), 76-80.

Wise, A. (2005). Establishing teaching as a profession: The essential role of professional accreditation. *Journal of Teacher Education, 56*(4), 318.

Wright, V., & Wilson, E. (2005). From preservice to inservice teaching: A study of technology integration. *Journal of Computing in Teacher Education, 22*(2), 2006.

Zheng, D., & Young, M. (2006). Comparing instructional methods for teaching technology in education to preservice teachers using logistic regression. *Proceedings of the 7th international conference on Learning sciences*, 873-879.

APPENDICES

APPENDIX A - Additional Tables

Table A1

The Holmes Partnership Membership List

Region	State	Institution(s)
Far West	California	California State University, Sacramento California State University, Dominguez Hills
	Colorado	University of Colorado Denver
	Nevada	University of Nevada, Las Vegas
South Central	Missouri	University of Missouri, St. Louis
	Oklahoma	University of Oklahoma Oklahoma State University
	Texas	Baylor University University of North Texas University of Texas, Arlington
Midwest	Illinois	Illinois State University Southern Illinois University, Carbondale
	Indiana	Ball State University Purdue University
	Iowa	University of Iowa
	Minnesota	University of Minnesota-Twin Cities
	Ohio	Ohio State University University of Cincinnati Cleveland State University Kent State University Ohio University
	Wisconsin	University of Wisconsin, Milwaukee
Northeast	Connecticut	University of Connecticut
	New Jersey	Rowan University

Table A1 (continued)

The Holmes Partnership Membership List

Region	State	Institution(s)
Northeast (continued)	Pennsylvania	Penn State University Temple University
	Rhode Island	University of Rhode Island
Southeast	Alabama	University of Alabama, Tuscaloosa Auburn University University of Alabama, Birmingham
	District of Columbia	George Washington University
	Florida	Florida State University University of Central Florida University of Florida
	Kentucky	University of Louisville The University of Kentucky
	Maryland	Towson University
	North Carolina	The University of North Carolina, Greensboro
	Tennessee	University of Memphis University of Tennessee, Knoxville University of Tennessee, Chattanooga
	Virginia	George Mason University Virginia Commonwealth University
	West Virginia	West Liberty State College

Table A2

States Included in Each Region in This Study

Regions	Number of Institutions Included
Mid-Atlantic/Northeast (Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, Vermont.)	17
Midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)	26
Southeast (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia)	25
West/Northwest/Southwest - including Alaska & Hawaii (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington, Wyoming)	21
Total	89

Table A3

Potential Participants in Current Study

Institution	City	State
The University of Alabama	Tuscaloosa	AL
Auburn University	Auburn	AL
University of Alabama - Birmingham	Birmingham	AL
The University of Arizona	Tucson	AZ
Sacramento State University	Sacramento	CA
University of Southern California	Los Angeles	CA
California State University – Dominguez Hills	Carson City	CA
Stanford University	Stanford	CA
Colorado State University	Fort Collins	CO
University of Colorado at Boulder	Boulder	CO
University of Colorado at Denver	Denver	CO
University of Connecticut	Storrs	CT
George Washington University	Washington	DC
University of Delaware	Newark	DE
University of Miami	Coral Gables	FL
University of South Florida	Tampa	FL
University of Central Florida	Orlando	FL
Florida State University	Tallahassee	FL
University of Florida	Gainesville	FL
Emory University	Atlanta	GA
The University of Georgia	Athens	GA
University of Hawaii - Manoa	Honolulu	HI
Iowa State University	Ames	IA
The University of Iowa	Iowa City	IA
University of Illinois - Chicago	Chicago	IL
University of Illinois - Urbana Champaign	Champaign	IL
Illinois State University	Normal	IL
Southern Illinois University	Carbondale	IL
University of Notre Dame	Notre Dame	IN
Indiana University	Bloomington	IN
Ball State University	Muncie	IN
Purdue University	West Lafayette	IN
Kansas State University	Manhattan	KS
The University of Kansas	Lawrence	KS
University of Louisville	Louisville	KY
University of Kentucky	Lexington	KY
Louisiana State University and A&M College	Baton Rouge	LA
Harvard Graduate School of Education	Cambridge	MA
University of Massachusetts - Amherst	Amherst	MA
The Johns Hopkins University	Baltimore	MD

Table A3 (continued)

Potential Participants in Current Study

Institution	City	State
University of Maryland	College Park	MD
Michigan State University	East Lansing	MI
University of Michigan - Ann Arbor	Ann Arbor	MI
Wayne State University	Detroit	MI
University of Minnesota - Twin Cities	Minneapolis	MN
Washington University - St. Louis	St. Louis	MO
University of Missouri - Columbia	Columbia	MO
University of Missouri – St. Louis	St. Louis	MO
Montana State University – Bozeman	Bozeman	MT
Duke University	Durham	NC
North Carolina State University	Raleigh	NC
University of North Carolina - Chapel Hill	Chapel Hill	NC
University of Nebraska - Lincoln	Lincoln	NE
Princeton University	Princeton	NJ
Rutgers University	New Brunswick	NJ
Rowan University	Glassboro	NJ
University of New Mexico	Albuquerque	NM
Columbia University	New York	NY
New York University	New York	NY
University of Rochester	Rochester	NY
Fordham University	New York	NY
Cleveland State University	Cleveland	OH
Kent State University	Kent	OH
Ohio University	Athens	OH
The Ohio State University	Columbus	OH
University of Cincinnati	Cincinnati	OH
Oklahoma State University	Stillwater	OK
University of Oklahoma	Norman	OK
Oregon State University	Corvalis	OR
Temple University	Philadelphia	PA
The Pennsylvania State University	University Park	PA
University of Rhode Island	Kingston	RI
University of South Carolina	Columbia	SC
Vanderbilt University	Nashville	TN
University of Memphis	Memphis	TN
The University of Tennessee-Chattanooga	Chattanooga	TN
The University of Tennessee	Knoxville	TN
Texas A & M University	College Station	TX
Baylor University	Waco	TX
Prairie View A&M University	Prairie View	TX

Table A3 (continued)

Potential Participants in Current Study

Institution	City	State
University of North Texas	Denton	TX
University of Texas – Arlington	Arlington	TX
University of Utah	Salt Lake City	UT
Virginia Polytechnic Institute & State University	Blacksburg	VA
George Mason University	Fairfax	VA
Washington State University	Pullman	WA
University of Wisconsin-Milwaukee	Milwaukee	WI
West Liberty State College	West Liberty	WV

Table A4

Class Format - Hands-on, Lecture, Other

Number of institutions	Hands-on	Lecture	Other
3	90	10	0
1	90	5	5
1	85	15	0
5	80	20	0
1	80	15	5
1	80	10	10
3	75	25	0
1	70	30	0
1	65	35	0
4	60	40	0
1	60	30	10
1	60	20	20
4	50	50	0
1	50	0	50
2	50	25	25
1	40	50	10
1	40	30	30
1	30	70	0
No Answer 8			
Total 41			

APPENDIX B1 - Survey Instrument
(NOTE: This is a print version of a survey created for delivery in electronic format, thus the questions do not necessarily appear in the order that they were seen by participants.)

This survey is part of my research for receiving a PhD in Education with a concentration in Instructional Technology at The University of Tennessee. For my dissertation entitled *Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008*, I have created an online survey. It should take 15 minutes or less to complete the survey. Participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time without penalty. Participants who complete the survey and provide an e-mail address will be included in a drawing for a $100 gift certificate from Amazon.com. There are approximately 90 participants, so your chances of winning are good. The survey is coded in order to contact institutions for follow-up in cases where the survey has not been completed. Once data collection has been completed (approximately May 2008), the identifying information will be deleted. Thus, the survey is confidential but not anonymous. If you have any questions, please contact me by e-mail, smccoy4@utk.edu, or cell phone, 865-XXX-XXXX.

By selecting "yes" you agree to participate in the following survey. By selecting "no" the survey will end.

Yes, I consent to participate

No, I do not wish to participate

Job title or position of person completing this survey

In whole numbers, how many years have you held this position?

Does your institution have a program to prepare future teachers resulting in graduates of the program being eligible for licensure by your state Department of Education or other licensing body?

Yes

No

I don't know

For which grade level(s) does your program prepare students for licensure? (Please select all that apply.)

PreK (Early Childhood)

Elementary

Secondary

Other (please explain) :

Is your institution

Public

Private (non-profit)

Private (for-profit)

Is your institution a member of (you may select all that apply):

National Council of Accreditation for Teacher Education (NCATE)

American Association of Colleges for Teacher Education (AACTE)

The Holmes Partnership

I don't know

What is the physical location of your institution?

Mid-Atlantic/Northeast (Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont)

Midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)

Southeast (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia)

West/Southwest/Northwest - including Alaska & Hawaii (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington, Wyoming)

What system of credit do you use?

Semester hours

Quarter hours

Other :

Size of undergraduate population at your institution as of Fall 2007 (estimate as closely as you can).

<10,000

10,000-20,000

>20,000

I don't know

Average number of graduates from your teacher education program (per year)

<50

51-100

101-200

More than 200

I don't know

Do you require *any* form of technology training for students in your preservice teacher education program?

Yes

No

Please answer the following questions about technology training for preservice teachers at your institution selecting the option provided that best describes your program or institution. "Technology training" in this instance means training in the use of computers and other electronic media for use in a classroom setting with Pre-Kindergarten through 12th grade students and personal productivity. "Preservice teachers" means students preparing to become certified or licensed teachers, but who have not yet completed all the requirements.

Is the technology training for preservice teacher which is provided by your institution based on standards? (If you do use standards, please indicate the standards you use. You may select more than one.)

Our technology training is not based on any specific standards.

We use National Educational Technology Standards (NETS) provided by the International Society for Technology in Education (ISTE).

We use standards provided by our state or governing body.

We use standards other than those listed here.

Please describe the standards you use for preservice teacher technology training. (For example, the body mandating the standards you use and how you assess whether they are being implemented.)

RANK_METHODS_TNG

Please rate the ways in which your institution provides technology training for preservice teachers. (Note: Stand-alone technology training course(s) means teacher education course(s) devoted entirely to instruction about using electronic technologies such as microcomputers and other microprocessor-based devices to enhance instruction.)

	Always	Almost Always	Frequently	Sometimes	Almost never	Never
A stand-alone course or courses in technology usage for instruction and personal productivity	❍	❍	❍	❍	❍	❍
Technology training is incorporated into other education courses	❍	❍	❍	❍	❍	❍
Technology training is included in field experience (in a school setting, but not as part of student teaching/internship)	❍	❍	❍	❍	❍	❍
Technology training is included as a part of student teaching/internship	❍	❍	❍	❍	❍	❍

In teaching preservice teachers about technology, do you use a method/methods *other than* the following: a stand alone class, integrating into other education classes, integrating into non-student teaching field experiences, or integrating into student teaching/internship?

Yes

No

I don't know.

Please describe the method/methods (other than a stand alone class, integrating into other education classes, integrating into non-student teaching field experiences, or integrating into student teaching/internship) that your program uses to teach preservice teachers how to use technology.

Is technology integration for preservice teachers taught primarily by:

The School/College/Department of Education

The School/College/Department of Computer Science

The School/College/Department of Library Science or Information Science

A combination of several Schools/Colleges/Departments

Other School/College/Department, please specify :

Do your preservice teacher education students have the option to take a test to opt-out of taking a technology course?

Yes

No

I dont know.

In using computers when teaching technology for preservice teachers, what operating system do you primarily use?

Windows

Mac

Unix/Linux

Other, please specify :

I don't know.

Are preservice teachers in your program required to have their own computers?

Yes

No

I don't know.

Does your teacher education program require textbook(s) for technology training for preservice teachers?

Yes

No

I don't know.

To the best of your recollection, please list the title/author(s) of any required textbooks your program requires for technology training for preservice teachers:

Does your institution endorse and support a course management system (e.g. Blackboard, Moodle, WebCT)?

Yes

No

I don't know.

Which one of the following course management systems does your program *primarily* use in preservice teacher education?

Blackboard

WebCT

Moodle

Desire2Learn

Other, please specify :

To what extent, if any, are your preservice teachers given instruction on how to be online instructors? (This relates to any training that would prepare a teacher to deliver instruction in an online format such as is employed in "virtual" or online P-12 educational settings.)

We do not provide training for our preservice teachers to be "virtual"/online teachers

We offer online classes in our school/department/college that will give our preservice teachers a chance to experience "virtual"/online learning

We include a unit in an education course that specifically addresses skills and competencies for online instruction

We have an entire course devoted to "virtual"/online instruction

Is the entire course provided by your teacher education program for teaching preservice teachers about "virtual"/online instruction:

An elective

Required

I don't know

Does your school/college/department offer a stand-alone technology course or courses? (Stand-alone technology education courses are devoted entirely to instruction about using electronic technologies such as microcomputers and other microprocessor-based devices to enhance instruction.)

Yes

No

I don't know.

Do you, personally, teach a stand-alone technology class for preservice teachers?

Yes

No

How many credit hours of technology training does your program *require* for preservice teachers?

0

1

2

3

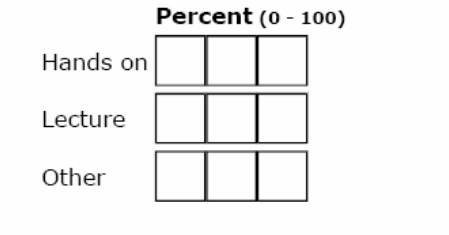
4

5

6

More than 6

If your teacher education program requires a stand-alone technology course, is it primarily lecture, primarily hands-on, or other format? Using only whole numbers, please estimate the percentage of time the course(s) devotes to each (the total should add up to 100%):



Please describe the format of the technology course(s) your program uses to teach preservice teachers about technology.

Do you, personally, teach technology for preservice teachers in a manner other than a stand-alone technology class?

Yes

No

Does your program offer separate technology classes for future elementary teachers and for future secondary teachers?

Yes, our program offers technology class(es) specifically for future elementary teachers and class(es) specifically for future secondary teachers.

No, all our teacher candidates take basically the same technology class and are not grouped by grade-level.

I don't know whether our elementary and secondary teachers take different technology classes.

Does your program offer separate technology classes for future teachers based on their anticipated subject area (i.e. Language Arts, Math, Science, Social Studies)?

Yes, our program offers technology class(es) specifically for future teachers based on their anticipated subject area.

No, all our teacher candidates take basically the same technology class(es) and are not grouped by subject area.

I don't know whether our teachers take different technology class(es) based on subject area.

Not applicable.

In addition to required technology class(es) for preservice teachers, *if any*, does your institution offer elective technology classes for preservice teachers?

Yes

No

I don't know.

How many credit hours in technology courses *may* a student take as elective credit that will apply to his/her certification program?

1

2

3

4

5

6

More than 6

I don't know.

Does your institution offer any portion of the stand-alone technology class(es) for preservice teachers online?

Yes

No

We do not offer stand-alone technology class(es).

Our institution is planning to put at least part of the content of our technology course(s) for preservice teachers online within:

The next six months

The next year

The next two years

We have no plans for putting any of the course content online.

I don't know.

If your institution has no plans to put at least part of your technology course(s) for preservice teachers online, please indicate any of the following reasons for making that decision (you may select all that apply):

Lack of student demand

Perception that students lack requisite skills

Perception that students lack off-campus access to technology

Lack of funding

Lack of technology infrastructure

Lack of faculty interest

Lack of faculty time to create/implement online content

Lack of faculty expertise with technology

Lack of support from administration

Lack of technology support personnel

Lack of course management system

Issues over who holds copyright on content

Other (please specify) :

To what extent is the content of your technology class(es) for preservice teachers online?

1-29% - uses Web-based technology to facilitate what is basically a face-to-face course.

30-79% - blends online and face-to-face delivery. A substantial portion of the content is online, but has some face-to-face meetings.

80-99% - most or all of the content is delivered online with few (or no) face-to-face meetings.

100% - the content is delivered completely online.

I don't know.

At least one of any required technology class(es) may be taken online, at a distance, with little, or no, face-to-face contact required.

Yes

No

Do you offer students the choice of taking technology class(es) for preservice teachers in their choice of face-to-face (traditional) format
or online format?

Yes

No

I don't know.

Based on the enrollment in technology classes for preservice teachers, do your students prefer taking the technology class(es) face-to-face or online?

Face-to-face

Online

I don't know

Does your program offer *any* teacher preparation classes (other than the technology class or classes) that can be taken at a distance with no face-to-face contact?

Yes

No

I don't know

Please describe the class(es) offered online, capable of being taken at a distance with no face-to-face contact required. (Please give the title or a brief description of the class or classes rather than course numbers).

Is there anything you wish your program would do differently in regard to teaching preservice teachers about technology?

Yes

No

If you indicated that you wish your program were doing things differently in regard to technology training for preservice teachers, what is preventing your program from being able to do things differently?

Would you like to be contacted to elaborate further about technology training for preservice teachers or other issues related to this survey?

Yes

No

To follow up with further discussion about technology training for preservice teachers or issues related to this survey, I can be contacted by: (Note: Any contact information given will be deleted at the conclusion of data collection.)

Would you like to be entered into the drawing for a $100 gift certificate at Amazon.com?

Yes

No

Comments about the survey or other information you would like to share with the researcher: (Optional)

Would you would like a copy of the compiled results of this survey?

Yes

No

You have answered "yes" to a question that requires an e-mail address to complete your request. Please provide your email address: (It will only be used in any of the preceding ways which you have authorized and will be deleted immediately thereafter.)

APPENDIX B2 - Survey Instrument with Results

NOTE 1: This is a print version of a survey created for delivery in electronic format, thus the questions do not necessarily appear in the order that they were seen by participants.
NOTE 2: Numbers of participants, percentages, and open-ended comments (presented verbatim other than information that would reveal the identity of the participant) are shown in 12-point, Times New Roman bold italics.

This survey is part of my research for receiving a PhD in Education with a concentration in Instructional Technology at The University of Tennessee. For my dissertation entitled *Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008*, I have created an online survey. It should take 15 minutes or less to complete the survey. Participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time without penalty. Participants who complete the survey and provide an e-mail address will be included in a drawing for a $100 gift certificate from Amazon.com. There are approximately 90 participants, so your chances of winning are good. The survey is coded in order to contact institutions for follow-up in cases where the survey has not been completed. Once data collection has been completed (approximately May 2008), the identifying information will be deleted. Thus, the survey is confidential but not anonymous. If you have any questions, please contact me by e-mail, smccoy4@utk.edu, or cell phone, 865-XXX-XXXX.

PARTICIPATE_YES_NO

By selecting "yes" you agree to participate in the following survey. By selecting "no" the survey will end.

Yes, I consent to participate ***41 (100%)***
No, I do not wish to participate ***0***

JOBTITLE

Job title or position of person completing this survey

Adjunct/Instructor ***5 (12%)***
Assistant Professor ***5 (16%)***
Associate Professor ***12 (28%)***
Professor ***2 (5%)***
Associate Dean ***4 (9%)***
Department Chair/Director ***7 (16%)***
Other ***6 (14%)***

YEARS_POSITION

In whole numbers, how many years have you held this position?

Job title	*Average number of years in position*
Adjunct/Instructor	***4.8***
Assistant Professor	***5.0***
Associate Professor	***8.9***
Professor	***14.0***
Associate Dean	***6.3***
Department Chair/Director	***3.4***
Other	***4.5***

LICENSING

Does your institution have a program to prepare future teachers resulting in graduates of the program being eligible for licensure by your state Department of Education or other licensing body?

Yes ***41 (100%)***
No ***0***
I don't know ***0***

PREK_ELEM_SEC_LICENSURE

For which grade level(s) does your program prepare students for licensure? (Please select all that apply.)

PreK (Early Childhood) ***36 (84%)***
Elementary ***40 (93%)***
Secondary ***43 (100%)***
Other (please explain) ***9 (21%)***

7th-12th (we have multiple but I am most familiar with this one)
Adult ed. fields/Special. ed
Arts / Music
Doctoral students
Exceptional Education
K-12
K-12 in Art, Music, Spec Education
Middle grades (4-8)
Special education

PUBLIC_PRIVATE

Is your institution

Public ***34 (83%)***
Private (non-profit) ***5 (12%)***
Private (for-profit) ***2 (5%)***

MEMBERSHIP

Is your institution a member of (you may select all that apply):

National Council of Accreditation for Teacher Education (NCATE) ***34 (83%)***
American Association of Colleges for Teacher Education (AACTE) ***27 (66%)***
The Holmes Partnership ***18 (44%)***
I don't know ***1 (2%)***

REGION

What is the physical location of your institution?

Mid-Atlantic/Northeast (Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont) ***5 (12%)***

Midwest (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin) ***14 (34%)***

Southeast (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia) ***14 (34%)***

West/Southwest/Northwest - including Alaska & Hawaii (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington, Wyoming) ***8 (19%)***

CREDIT_SYSTEM

What system of credit do you use?

Semester hours ***38 (93%)***
Quarter hours ***3 (7%)***
Other : ***0***

UNDERGRAD

Size of undergraduate population at your institution as of Fall 2007 (estimate as closely as you can).

<10,000 ***5 (12%)***
10,000-20,000 ***12 (29%)***
>20,000 ***22 (54%)***
I don't know ***2 (5%)***

TCHR_ED_GRADS

Average number of graduates from your teacher education program (per year)

<50 ***1 (2%)***
51-100 ***4 (10%)***
101-200 ***13 (32%***)
More than 200 ***16 (39%)***
I don't know ***7 (17%)***

ANY_TECH_TNG

Do you require *any* form of technology training for students in your preservice teacher education program?

Yes ***41 (100%)***
No ***0***

Please answer the following questions about technology training for preservice teachers at your institution selecting the option provided that best describes your program or institution. "Technology training" in this instance means training in the use of computers and other electronic media for use in a classroom setting with Pre-Kindergarten through 12th grade students and personal productivity. "Preservice teachers" means students preparing to become certified or licensed teachers, but who have not yet completed all the requirements.

STANDARDS

Is the technology training for preservice teacher which is provided by your institution based on standards? (If you do use standards, please indicate the standards you use. You may select more than one.)

Our technology training is not based on any specific standards. ***1 (2%)***

We use National Educational Technology Standards (NETS) provided by the International Society for Technology in Education (ISTE). ***35 (85%)***

We use standards provided by our state or governing body. ***28 (68%)***

We use standards other than those listed here. ***5 (12%)***

STANDARDS_OTHER

Please describe the standards you use for preservice teacher technology training. (For example, the body mandating the standards you use and how you assess whether they are being implemented.)
[Only one participant provided information about "other" standards.]

We used the INTASC-based teacher education standards that are not exclusive to technology but do contain references to using technology in education.

RANK_METHODS_TNG

Please rate the ways in which your institution provides technology training for preservice teachers. (Note: Stand-alone technology training course(s) means teacher education course(s) devoted entirely to instruction about using electronic technologies such as microcomputers and other microprocessor-based devices to enhance instruction.

	Always	Almost Always	Frequently	Sometimes	Almost Never	Never
A stand-alone course or courses in technology for instruction and personal productivity	***27 (66%)***	***3 (7%)***	***1 (2%)***	***5 (12%)***	***1 (2%)***	***4 (10%)***
Technology training is incorporated into other education courses	***5 (12%)***	***11 (27%)***	***14 (34%)***	***9 (22%)***	***2 (5%)***	***0 (0%)***
Technology training is included in field experience (in a school setting, but not as part of student teaching/ internship	***2 (5%)***	***4 (10%)***	***10 (24%)***	***16 (39%)***	***8 (20%)***	***1 (2%)***
Technology training is included as part of student teaching/ internship	***5 (12%)***	***4 (10%)***	***9 (22%)***	***14 (34%)***	***8 (20%)***	***1 (2%)***

Total percentages that do not add up to 100% are due to rounding.

OTHER_METHODS

In teaching preservice teachers about technology, do you use a method/methods *other than* the following: a stand alone class, integrating into other education classes, integrating into non-student

teaching field experiences, or integrating into student teaching/internship?

Yes *13 (32%)*
No *27 (66%)*
I don't know. *1 (2%)*

DESCRIBE_OTHER_METHOD

Please describe the method/methods (other than a stand alone class, integrating into other education classes, integrating into non-student teaching field experiences, or integrating into student teaching/internship) that your program uses to teach preservice teachers how to use technology.

All methods courses are required to use technology to enhance the content in that particular area. This may include a variety of online tools, handheld devices, software, etc specific to that discipline.

Integration into writing tasks for both students and teachers focus on new media literacies in literacy based courses emphasis on technology use in presentations and in day-to-day coursework (blogging & facebook used in courses)

One on one coaching

Practicum experience for students choosing educational technology as a major.

Preservice teachers must build and defend, in lieu of a master's thesis, a digital portfolio in which they create electronic exhibits to demonstrate understanding of the INTASC and ISTE technology standards

Requirement that students develop and complete a web-based professional teaching portfolio

Students lacking basic technology operations skills are encouraged to take technology workshops conducted by university information services staff (not college of education faculty)

Summer workshops

Technology based performance/assessment - Database required for graduation - I tunes public domain resources and password protected resources for preservice teachers - Electronic portfolios - "Laptop lounge" with 24 hour guidance for students/faculty using technology in teaching

There are reading assignments that students can do using KidPix. Writing also has students use HyperStudio to create eBooks. Math Methods using Geometer's Sketchpad. Science Methods: Students use DreamWeaver to create Webquests.

We have a Center for Technology in Learning and Teaching in our teacher education department. Some preservice teachers work there and gain valuable experiences with hands-on leadership and troubleshooting skills. In addition we offer a minor in educational computing so we have additional courses that our preservice teachers can take specifically about digital technologies and integration. The College of Engineering even offers a course called Toying with Technology.

We have a technology fair where students can learn about and use specific software programs. We hold workshops for students to learn specific technology skills.

We require the development of electronic portfolio, which is a program level outcome, not tied to any particular course.

WHO_TEACHES

Is technology integration for preservice teachers taught primarily by:

The School/College/Department of Education ***38 (93%)***
The School/College/Department of Computer Science ***0***
The School/College/Department of Library Science or Information Science ***0***
A combination of several Schools/Colleges/Departments ***2 (5%)***
Other School/College/Department, please specify : ***1 (2%)***
(Center for Technology in Education)

TEST_OUT

Do your preservice teacher education students have the option to take a test to opt-out of taking a technology course?

Yes ***4 (10%)***
No ***36 (88%)***
I dont know. ***1 (2%)***

PLATFORM

In using computers when teaching technology for preservice teachers, what operating system do you primarily use?

Windows ***20 (49%)***
Mac ***13 (32%)***
Unix/Linux ***0***
Other, please specify : ***8 (19%)***

Windows and Mac equally - 6 (15%), Depends on the teacher - 1 (2%), they have a choice between Mac and PC - 1 (2%)

I don't know. ***0***

OWN_COMPUTER

Are preservice teachers in your program required to have their own computers?

Yes ***5 (12%)***

No ***36 (88%)***

I don't know. ***0***

TEXTBOOK

Does your teacher education program require textbook(s) for technology training for preservice teachers?

Yes ***10 (24%)***

No ***24 (59%)***

I don't know. ***7 (17%)***

TEXTBOOK_NAME

To the best of your recollection, please list the title/author(s) of any required textbooks your program requires for technology training for preservice teachers:

Different programs are different... two textbooks are Grabe and Grabe and Roblyer

For graduate licensure students, Roblyer, 4th ed. Don't know the book used by Computer Science for undergraduates.

Intel training materials

It has recently changed, so I do not know.

Lowther and Morrison

Morrison, G.R. & Lowther, D.L. (2005). Integrating Computer Technology into the Classroom. 3rd edition. Upper Saddle River, NJ: Pearson.

Preparing to Use Technology by O'Bannon and Puckett

Shelly Cashman text and Johansen text are regularly used.

Using Technology in the Classroom Bitter Legacy 7th Ed.

COURSE_MGMT

Does your institution endorse and support a course management system (e.g. Blackboard, Moodle, WebCT)?

Yes ***41 (100%)***

No ***0***

I don't know. ***0***

NAME_COURSE_MGMT

Which one of the following course management systems does your program *primarily* use in preservice teacher education?

Blackboard ***19 (46%)***

WebCT ***6 (15%)***

Moodle ***2 (5%)***

Desire2Learn ***5 (12%)***

Other, please specify : ***9 (22%)***

Angel - 2 (5%), FirstClass - 1 (2%), LiveText - 2 (5%), An internal system - 2 (5%), Sakai - 1 (2%), TrueOutcomes - 1 (2%)

VIRTUAL

To what extent, if any, are your preservice teachers given instruction on how to be online instructors? (This relates to any training that would prepare a teacher to deliver instruction in an online format such as is employed in "virtual" or online P-12 educational settings.)

We do not provide training for our preservice teachers to be "virtual"/online teachers ***21 (51%)***

We offer online classes in our school/department/college that will give our preservice teachers a chance to experience "virtual"/online learning ***14 (35%)***

We include a unit in an education course that specifically addresses skills and competencies for online instruction ***2 (5%)***

We have an entire course devoted to "virtual"/online instruction ***4 (10%)***

VIRTUAL_ELECT_REQ

Is the entire course provided by your teacher education program for teaching preservice teachers about "virtual"/online instruction:
[Only participants who indicated they have an entire course dedicated to "virtual"/online instruction were asked this question.]

An elective ***3 (7%)***

Required ***1 (2%)***

I don't know ***0***

ANY_STAND_ALONE4

Does your school/college/department offer a stand-alone technology course or courses? (Stand-alone technology education courses are devoted entirely to instruction about using electronic technologies such as microcomputers and other microprocessor-based devices to enhance instruction.)

Yes ***38 (93%)***
No ***2 (5%)***
I don't know. ***1 (2%)***

TEACH_STAND_ALONE

Do you, personally, teach a stand-alone technology class for preservice teachers?

Yes ***24 (59%)***
No ***14 (34%)***
[Three participants did not answer this question.]

HOURS_REQRD

How many credit hours of technology training does your program *require* for preservice teachers?

0 ***5 (12%)***
1 ***1 (2%)***
2 ***4 (10%)***
3 ***21 (51%)***
4 ***5 (12%)***
5 ***0***
6 ***2 (5%)***
More than 6 ***0***
[3 participants did not answer this question]

CLASSFORMAT

If your teacher education program requires a stand-alone technology course, is it primarily lecture, primarily hands-on, or other format? Using only whole numbers, please estimate the percentage of time the course(s) devotes to each (the total should add up to 100%):

[These are the averages for each format. See table A4 in the Appendix for the complete results.]

Hands on: ***66%***
Lecture ***28%***
Other ***6%***

WHAT_FORMAT

Please describe the format of the technology course(s) your program uses to teach preservice teachers about technology.

[Only participants who indicated "other" in the preceding question were asked to complete this item.]

Demonstration mostly and then hands on practice

Different models for different programs... some are lab only some are large lecture plus lab sections some are lecture/discussion/lab

Hybrid of face-to-face and online

It depends on the course and who is teaching it. Our program has a new media literacy focus so that is incorporated in all of our coursework in a wide variety of ways. The stand alone tech course students take is separate from our coursework.

It is a stand-alone course that is face-to-face. I use a mixture or lecture, hands-on, and discussion.

Primarily face-to-face -- some days students will have online assignments only

Project driven learning

The course is taught in a computer lab. The course content is developed with the NETS standards in mind. Students learn both the software and are introduced to the integration of technology in instruction.

There are many active learning opportunities with hands-on projects, group projects, lecture, and field experience using Renzulli Learning in a virtual environment as well as a bricks and mortar setting.

We use multiple formats (e.g. online tutorials, digital videos, course management systems, face-to-face)and depending upon program, some do not take the stand-along course, but rather take TEP courses with technology integrated (these courses have Computer designate at university).

TEACH_NON_STAND_ALONE

Do you, personally, teach technology for preservice teachers in a manner other than a stand-alone technology class?

Yes ***8 (20%)***

No ***10 (24%)***

[23 participants did not answer this question]

ELEM_SEC

Does your program offer separate technology classes for future elementary teachers and for future secondary teachers?

Yes, our program offers technology class(es) specifically for future elementary teachers and class(es) specifically for future secondary teachers. ***16 (39%)***

No, all our teacher candidates take basically the same technology class and are not grouped by grade-level. ***23 (56%)***

I don't know whether our elementary and secondary teachers take different technology classes. ***2 (5%)***

TECH_SUBJ_AREA

Does your program offer separate technology classes for future teachers based on their anticipated subject area (i.e. Language Arts, Math, Science, Social Studies)?

Yes, our program offers technology class(es) specifically for future teachers based on their anticipated subject area. ***9 (22%)***

No, all our teacher candidates take basically the same technology class(es) and are not grouped by subject area. ***29 (71%)***

I don't know whether our teachers take different technology class(es) based on subject area. ***1 (2%)***

Not applicable. ***2 (5%)***

ELECTIVE

In addition to required technology class(es) for preservice teachers, *ifany*, does your institution offer elective technology classes for preservice teachers?

Yes ***23 (56%)***

No ***14 (34%)***

I don't know. ***4 (10%)***

ELECTIVE_CREDIT

How many credit hours in technology courses *may* a student take as elective credit that will apply to his/her certification program?

1 ***2 (5%)***
2 ***0***
3 ***5 (12%)***
4 ***1 (2%)***
5 ***0***
6 ***2 (5%)***
More than 6 ***6 (15%)***
I don't know. ***7 (17%)***

[Eighteen participants did not answer this question.]

STAND_ALONE_ONLINE

Does your institution offer any portion of the stand-alone technology class(es) for preservice teachers online?

Yes ***24 (59%)***
No ***15 (37%)***
We do not offer stand-alone technology class(es). ***2 (5%)***

ONLINE_PLANS

Our institution is planning to put at least part of the content of our technology course(s) for preservice teachers online within:

[Only participants who responded "no" to "Does your institution offer any portion of the stand-alone technology class(es) for preservice teachers online?" were asked this question.]

The next six months ***0***
The next year ***2 (5%)***
The next two years ***1 (2%)***
We have no plans for putting any of the course content online. ***7 (17%)***
I don't know. ***5 (12%)***

NO_ONLINE_RSNS

If your institution has no plans to put at least part of your technology course(s) for preservice teachers online, please indicate any of the following reasons for making that decision (you may select all that apply):

[Only participants who indicated, "We have no plans for putting any of the course content online" were asked to complete this item.]

Lack of student demand ***3 (7%)***
Perception that students lack requisite skills ***1 (2%)***
Perception that students lack off-campus access to technology ***1 (2%)***
Lack of funding ***0***
Lack of technology infrastructure ***0***
Lack of faculty interest ***0***
Lack of faculty time to create/implement online content ***0***
Lack of faculty expertise with technology ***0***
Lack of support from administration ***0***
Lack of technology support personnel ***0***
Lack of course management system ***0***
Issues over who holds copyright on content ***0***
Other (please specify) : ***4 (10%)***

Crowded curriculum
Lack of access of students to software required and I believe that students gain a lot from peers and being in a classroom environment.
Not sure
We choose not to

ONLINE_EXTENT

To what extent is the content of your technology class(es) for preservice teachers online?

1-29% - uses Web-based technology to facilitate what is basically a face-to-face course. ***20 (49%)***
30-79% - blends online and face-to-face delivery. A substantial portion of the content is online, but has some face-to-face meetings. ***5 (12%)***
80-99% - most or all of the content is delivered online with few (or no) face-to-face meetings. ***2 (5%)***
100% - the content is delivered completely online. ***3 (7%)***
I don't know.1 ***(2%)***
[Ten participants did not answer this question.]

ONLINE_AT_A_DISTANCE

At least one of any required technology class(es) may be taken online, at a distance, with little, or no, face-to-face contact required.

[Only participants who indicated, "100% - the content is delivered completely online" were asked to complete this item.]

Yes ***3 (7%)***
No

ONLINE_CHOICE

Do you offer students the choice of taking technology class(es) for preservice teachers in their choice of face-to-face (traditional) format or online format?

[Only participants indicated that "At least one of any required technology class(es) may be taken online, at a distance, with little, or no, face-to-face contact required" were asked to complete this item.]

Yes ***3 (7%)***
No ***0***
I don't know. ***0***

ONLINE_F2F_PREFERENCE

Based on the enrollment in technology classes for preservice teachers, do your students prefer taking the technology class(es) face-to-face or online?

[Only participants who responded "yes" to the question "Do you offer students the choice of taking technology class(es) for preservice teachers in their choice of face-to-face (traditional) format or online format?" were asked to complete this question.]

Face-to-face ***2 (5%)***
Online ***1 (2%)***
I don't know ***0***

ONLINE_OTHER_THAN_TECH

Does your program offer *any* teacher preparation classes (other than the technology class or classes) that can be taken at a distance with no face-to-face contact?

Yes ***15 (37%)***
No ***23 (56%)***
I don't know ***3 (7%)***

DESCRIBE_ONLINE_OTHER

Please describe the class(es) offered online, capable of being taken at a distance with no face-to-face contact required. (Please give the

title or a brief description of the class or classes rather than course numbers).

3 middle school endorsement courses in curriculum, psychology, and policy

A survey course is offered at the graduate level for post-bac students. This course is offered completely online.

Don't know just know that they are offered

Foundations of special education, required of all preservice teachers K-12 can be taken through viewing tape recorded lectures and participating in written assignments and exams

Intro to exceptional education, teaching reading in secondary grades, autism

Leadership class

Media for children, integrating technology into the classroom, distance learning and support systems

Methods of technology integration The is an instructional technology course with one section offered online and one section offered face-to-face.

Our institution provides courses for endorsements in an alternative certificaiton program called the [deleted by researcher]. This is a two-year certification program for individuals who already have a degree in an area in which they can get an endorsement.

Post grad initial licensure students can take a 2 credit technology class online. Technology Operations -Introduces students to the basic concepts and skills of computer technologies useful for educational settings and graduate study. An overview of user interfaces, file handling and WebCT on both Macintosh and Windows operating systems is presented. The use of the Internet for information retrieval is discussed and practiced. Communication via electronic mail and attachments is introduced. Concepts and standard procedures in the use of common word processors, presentation software, spreadsheets are addressed. Once mastery is achieved among the technology operation topics, students are expected to combine their skills to produce a comprehensive final project demonstrating the use of their skills in an educational context.

Some general education classes can be taken through the World Campus system. Some special topics courses can be taken through world campus as well.

Some of the methods courses are delivered online this summer. Science methods and Math methods as the Elementary level.

Structured English Immersion (teaching English language learners)

This varies, again, by program and content field.

We have a course on virtual learning. Students also have an option to take a field experience in virtual learning. We also have a online course on project-based learning that students can take.

DO_DIFFERENTLY_EDITED

Is there anything you wish your program would do differently in regard to teaching preservice teachers about technology?

Yes 27 (66%)
No 14 (34%)

WHYNOT_DIFFERENT

If you indicated that you wish your program were doing things differently in regard to technology training for preservice teachers, what is preventing your program from being able to do things differently?

1) Amount of time available in a students program and 2) the reliance on a wide range of instructors and practicum and internship placements to provide application of concepts.

Academic politics

Better articulate what happens in the required technology course with other courses in the program - especially the methods blocks. In addition, I wish we had better connections to more teachers who actually use and integrate technology in PreK-12 classrooms for our students to have practicums and student teacher placements.

Faculty

I am not the person to answer this question. It would come from a much higher level.

I think technology and its uses need to be integrated more fully into coursework for all students and especially for student who are education majors

I would like our stand-alone technology course to be more grade level specific (elem, middle, sec). Right now this is difficult to do some of the things we want because of

our size and because we offer the course at many regional- we offer about 20 sections a semester of probably 20 -30 students each including all regional sections. Regionals usually offer one section a semester and it will include students of all area elem, middle, sec, special ed, PE, foreign lang, etc. We wouldn't be able to have specific sections anywhere but on the main campus.

I would like to break the core classes into sections that focus on Early Childhood/Elementary and Middle School/Secondary. There is serious concern from Administration about scheduling conflicts with this method and faculty in the licensure areas have voiced that they want to keep the training as is so that their students can experience what goes on at different grade levels with technology. I will continue to work towards the separation for training. However, we are not a huge program.....graduating approximately 300 per year.....ultimately administration makes the decision on this.

I would like to see the technology course actually team taught and divided by primary, middle school and secondary levels rather than how we presently do this.

I would rather have shorter classes - a 3 hour class is too long

Integrate it more into courses as well as requiring a separate courses

Integrate the uses of technology more into every teacher preparation class

It would be best if more faculty members integrated technology more meaningfully and authentically into the college curriculum to better exemplify the practice.
Leadership and lack of faculty

Limited faculty skills; lack of faculty leadership in the technology area; limited technology in school settings where teacher candidates complete field experiences

Money, resources and motivation by others

Offer more!

Online tutorials and classes, more hands on instruction with technology in their urban setting. I am in the process of making this happen.

Resources -- primarily in faculty needed to meet the demand and variation in offerings we could do!

Tech course

The ability of faculty who teach methods courses to model excellence in teaching with technology

We are instituting a change to have students in a corequisite field experience. We are implementing that starting in fall. In that capacity students will be asked to observe and interact with teachers about their use of technology and the resources available in the schools.

We are moving towards requiring laptops - presently we recommend only. Approx 75% appear to have laptops now.

We are working on integrating technology use into more courses and are adding new technology (interactive whiteboards) to courses next year. This takes time to plan.

We need a new technology course specific for the needs of 21st century learners. It is being developed this summer.

We need to integrate technology in more classes, especially the methods classes. The Elementary block classes that are offered need more technology integrated into them.

We need to keep working on the thorough integration of technology into all of our courses

FOLLOWUP

Would you like to be contacted to elaborate further about technology training for preservice teachers or other issues related to this survey?

Yes ***13 (32%)***
No ***28 (68%)***

CONTACT_INFO_FOR_FOLLOWUP

To follow up with further discussion about technology training for preservice teachers or issues related to this survey, I can be contacted by: (Note: Any contact information given will be deleted at the conclusion of data collection.)

DRAWING

Would you like to be entered into the drawing for a $100 gift certificate at Amazon.com?

Yes ***33 (80%)***
No ***8 (20%)***

COMMENTS

Comments about the survey or other information you would like to share with the researcher: (Optional)

A discussion of content of the tech courses would be interesting.

As a result of PT3 funding the faculty in our college integrate technology into their day-to-day teaching. We are very proud of this modeling of technology integration, especially the work conducted by our content methods faculty. The faculty who teach our undergraduate technology course work hand-in-hand with the method's faculty to insure that the instructional methods and technology presented in that course reinforce the methods and technology presented in content methods.

I am interested in learning of the results.

I am not comfortable with the word training used in the educational setting. Surely there are terms that would be more applicable to the learning process than training, which I envision as rote learning of mindless task requiring no critical or abstract thought.

I think the focus needs to be on technology integration and problem based learning rather than basic computer skills.

Please include a progress indicator, if possible. :) Also your questions forced me to characterize our tech preparation as a stand alone course when often what I do is guest lecture in a curriculum and instruction course. I teach an elective in the Spring which covers much more both in breadth and depth.

Please share any information on this topic as I am very interested in this as well. Thanks for including me in your study.

Some of the forced choices were inappropriate and did not allow for the respondent to accurately represent practice at an institution

Some of your questions are too limited.. For example, we have two technology courses – one that is basic skills that they can test out of. It is a prerequisite for a much richer course that focuses on lesson planning, objectives etc. They cannot test out of the second course. Also we use State Standards that are the old version of the ISTE standards. best of luck to you!!!!

There were several questions that I did not find clearly stated so that I understood what you really wanted. For instance, you asked if our students have tech training in field study.....it's not a planned part but some might.....also, in the internship, the students have to create a tech-enhanced lesson plan but depending on who they are with depends on the additional training that they get. Also, the training that they get in other methods courses in education depends on who teaches it and the faculty expertise.

Well constructed survey. I did find it hard to answer ONE way with some of the questions as I was trying to answer the survey from a global perspective with all our programs in mind -- and, they do vary in some ways.

You should show how far along you are in tasking the survey.

Your survey doesn't provide for the differentiation of post-bac programs that lead to initial teacher licensure which may have different requirements than undergraduate programs that lead to initial licensure.

COPY_OF_RESULTS

Would you would like a copy of the compiled results of this survey?
[Based on 43 participants, including two that completed only demographic information.]

Yes ***32 (74%)***
No ***11 (26%)***

EMAIL

You have answered "yes" to a question that requires an e-mail address to complete your request. Please provide your email address: (It will only be used in any of the preceding ways which you have authorized and will be deleted immediately thereafter.)

APPENDIX C - Contact with Participants

C1 First Contact with Participants - E-mail Message

Dear :

I am a graduate student in the Instructional Technology Department in the College of Education, Health, and Human Sciences at The University of Tennessee. For my dissertation, I'm conducting a survey of Teacher Education programs to find out about the ways in which they teach preservice teachers about using technology. Within the next 10 days, you should get an e-mail message from me that contains a link and code to access the survey. The subject line of the e-mail will be "U of TN student's dissertation."

The primary purpose of this initial e-mail is to try and determine whether spam filters will block out my message. An additional purpose is to make sure the proper person is receiving the link to the survey (which takes 15 minutes or less to complete). If you are not the person who can best answer questions about the ways in which your program teaches preservice teachers about technology, would you be kind enough to let me know or to forward this message to the right individual? Thanking you in advance,

C2 - Contact with Informed Consent, Link, and Code - E-mail Message

Dear

As indicated in my previous e-mail, I am sending you a link to my online survey about technology training in your preservice teacher education program. Further details about my research appear below the link and code.

[Link to survey here]

Your code is:

I am a doctoral student in the College of Education, Health, and Human Sciences at The University of Tennessee with a concentration in Instructional Technology. For my dissertation entitled *Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008*, I am conducting a study about the ways in which teacher preparation programs teach preservice teachers about using technology in the classroom and for personal productivity. I am also hoping to find out whether any of the technology training is online and whether the program makes provisions for teaching preservice teachers the skills to become online instructors. The information I gain from this study will be useful for teacher preparation institutions in examining their own programs and the ways in which they prepare teacher candidates to use technology. I am aware of a recent NCES report dealing with same topic, but the NCES survey is similar to my survey to only to a small degree and NCES used a different means to obtain its sample than the method used for the current study.

For the data collection, I have prepared a survey instrument consisting of 48 questions. The survey is online and not all participants will necessarily answer all the questions. It should take 15 minutes or less to complete. Participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time without penalty. **Participants who complete the survey and provide an e-mail address will be included in a drawing for a $100 gift certificate from Amazon.com.** There are approximately 90 participants, so your chances of winning are good.

Your institution was chosen based on membership in one or more of the following organizations: the National Council of Accreditation for Teacher Education (NCATE), the American Association of Colleges for Teacher Education (AACTE), and/or The Holmes Partnership. In reporting the results of the survey, institutions will be identified only by demographic criteria. Neither individuals nor institutions will be identified in the data presentation. The survey is coded in order to contact participants for follow-up in cases where the survey has not been completed, to be able to re-set the survey in the event that a participant encounters a problem, and to avoid the possibility of receiving more than one response from a participant. Once data collection has been completed (approximately May 6, 2008), the identifying information will be deleted. Thus, the survey is confidential but not anonymous. If you have any questions, please contact me by e-mail, smccoy4@utk.edu, or cell phone, 865-XXX-XXXX. If you are willing to participate in this study, please click on the link to begin the survey.

C3 - Follow-up with Informed Consent, Link, and Code - E-mail Message

Dear

As a reminder, I am sending you a link to my online survey about technology training in your preservice teacher education program. Further details about my research appear below the link and code. I know you are a very busy person, but you would be doing a huge favor to a doctoral candidate by participating in my survey. It only takes 15 minutes--or less.

[Link to survey here]

Your code is:

I am a doctoral student in the College of Education, Health, and Human Sciences at The University of Tennessee with a concentration in Instructional Technology. For my dissertation entitled *Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008,* I am conducting a study about the ways in which teacher preparation programs teach preservice teachers about using technology in the classroom and for personal productivity. I am also hoping to find out whether any of the technology training is online and whether the program makes provisions for teaching preservice teachers the skills to become online instructors. The information I gain from this study will be useful for teacher preparation institutions in examining their own programs and the ways in which they prepare teacher candidates to use technology. I am aware of a recent NCES report dealing with same topic, but the NCES survey is similar to my survey to only to a small degree and NCES used a different means to obtain its sample than the method used for the current study.

For the data collection, I have prepared a survey instrument consisting of 48 questions. The survey is online and not all participants will necessarily answer all the questions. It should take 15 minutes or less to complete. Participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time without penalty. **Participants who complete the survey and provide an e-mail address will be included in a drawing for a $100 gift certificate from Amazon.com.** There are approximately 90 participants, so your chances of winning are good.

Your institution was chosen based on membership in one or more of the following organizations: the National Council of Accreditation for Teacher Education (NCATE), the American Association of Colleges for Teacher Education (AACTE), and/or The Holmes Partnership. In reporting the results of the survey, institutions will be identified only by demographic criteria. Neither individuals nor institutions will be identified in the data presentation. The survey is coded in order to contact participants for follow-up in cases where the survey has not been completed, to be able to re-set the survey in the event that a participant encounters a problem, and to avoid the possibility of receiving more than one response from a participant. Once data collection has been completed (approximately May 6, 2008), the identifying information will be deleted. Thus, the survey is confidential but not anonymous. If you have any questions, please contact me by e-mail, smccoy4@utk.edu, or cell phone, 865-XXX-XXXX. If you are willing to participate in this study, please click on the link to begin the survey.

C4 - Final Reminder with Informed Consent, Link, and Code - E-mail message

Dear

In order to meet the criteria set forth by my dissertation committee, I desperately need 5 more participants for my study. If you are not the proper person to complete my survey about technology training for preservice teachers, would you please reply to this e-mail and let me know? I am sending you a link to my online survey. Further details about my research appear below the link and code. I know you are a very busy person, but you would be doing a huge favor to a doctoral candidate by participating in my survey. It only takes 15 minutes--or less.

[Link to survey here]

Your code is:

I am a doctoral student in the College of Education, Health, and Human Sciences at The University of Tennessee with a concentration in Instructional Technology. For my dissertation entitled *Technology-Training for Preservice Teachers in Schools, Colleges, and Departments of Education Affiliated with Selected Teacher Education Professional Organizations: The State of Practice in 2008*, I am conducting a study about the ways in which teacher preparation programs teach preservice teachers about using technology in the classroom and for personal productivity. I am also hoping to find out whether any of the technology training is online and whether the program makes provisions for teaching preservice teachers the skills to become online instructors. The information I gain from this study will be useful for teacher preparation institutions in examining their own programs and the ways in which they prepare teacher candidates to use technology. I am aware of a recent NCES report dealing with same topic, but the NCES survey is similar to my survey to only to a small degree and NCES used a different means to obtain its sample than the method used for the current study.

For the data collection, I have prepared a survey instrument consisting of 48 questions. The survey is online and not all participants will necessarily answer all the questions. It should take 15 minutes or less to complete. Participation is voluntary, refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled, and you may discontinue participation at any time without penalty. **Participants who complete the survey and provide an e-mail address will be included in a drawing for a $100 gift certificate from Amazon.com.** There are approximately 90 participants, so your chances of winning are good.

Your institution was chosen based on membership in one or more of the following organizations: the National Council of Accreditation for Teacher Education (NCATE), the American Association of Colleges for Teacher Education (AACTE), and/or The Holmes Partnership. In reporting the results of the survey, institutions will be identified only by demographic criteria. Neither individuals nor institutions will be identified in the data presentation. The survey is coded in order to contact participants for follow-up in cases where the survey has not been completed, to be able to re-set the survey in the event that a participant encounters a problem, and to avoid the possibility of receiving more than one response from a

participant. Once data collection has been completed (approximately May 6, 2008), the identifying information will be deleted. Thus, the survey is confidential but not anonymous. If you have any questions, please contact me by e-mail, smccoy4@utk.edu, or cell phone, 865-XXX-XXXX.

If you are willing to participate in this study, please click on the link to begin the survey.

APPENDIX D - Timeline

October 2007

Meet with committee chair for feedback on prospectus

Ask for expert panel to review survey instrument

November 2007

Meet with entire committee to present prospectus

Submit IRB

December 2007

Dec. 4 Submit Graduation Application to the Registrar's Office, Room 209 SSB.

February 2008

Receipt of IRB approval

March 2008

Mar. 7 Pay graduation fee ($75) at Bursar's Office, 211 SSB or 128 UC.

April 2008

April 4 - Initial e-mail contact with participants

April 17 - Distribute link to survey instrument

April 23 - First follow-up request to complete survey

April 28 - Final request for follow-up

May 2008

Tabulate data from completed surveys

Begin data analysis May 16, 2008

June 2008

June 4 - Meet with Thesis/Dissertation Consultant for preliminary review

of dissertation in P-105 Andy Holt Tower. Appointments: (865) 974-1337

Submit Scheduling of Defense of Dissertation form

Complete data analysis and Chapters 4 & 5

June 12 - Give copy of dissertation to committee members

June 27 - Defend dissertation (June 27, 2008, 10 a.m., Room - Claxton 451

July 2008

July 22 Submit final copy of dissertation, which must be approved and accepted by Thesis/Dissertation Consultant by 5:00 pm in P-105 Andy Holt Tower. Doctoral forms (ProQuest form; Survey, 1/2 sheet abstract form) must be submitted with dissertation

July 22 Submit Report of Final Examination (Pass/Fail) form by 5:00pm to the Registrar's Office, Room 209 SSB

July 23 Verify removal of incompletes for graduation in Room 209 SSB

VITA

Although she was born in Syracuse, New York, Shelley McCoy spent most of her formative years in Panama City, Florida. She received the Bachelor of Arts degree from the University of Montevallo with a major in Psychology and minors in Latin and English. She later earned a Master's of Library Science degree from The University of Tennessee. Subsequently, she was a public school librarian for ten years. In 2008, Shelley received her Doctor of Philosophy degree in Education from the University of Tennessee. Her academic interests include technology education, online learning, and children's literature.

Shelley has been married to her husband, David, for over thirty years. They have two children and currently reside in Knoxville, TN.