

The Content and Emphasis of the Introductory Technology Course
for Undergraduate Pre-service Teachers

A Ten Year Update of Dr. Anthony K. Betrus' Doctoral Dissertation

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Abstract

This study is longitudinal in nature as it builds upon an existing study of the content and emphasis of the introductory technology course taught to pre-service teachers by Anthony Betrus in 2000. Our study, however, seeks to examine how the content and emphasis of the introductory technology course taught to pre-service teachers has changed within the last ten years since 2000. Following a method similar to Dr. Betrus we developed and distributed a survey to colleges and universities across the country, which had teacher education programs. Unlike the previous survey, ours sought to address non-accredited institutions in addition to accredited institutions. Our data suggests that there has been a slight increase in the emphasis placed on teaching pre-service teachers to involve their future students in using technology since 2000. The data also suggests that more institutions are integrating the use of technology into methods courses, as opposed to offering stand-alone introductory technology courses. Additionally, the content of the courses have shifted to include topics that teach pre-service teachers to how to develop and manage materials on the Internet rather than teach basic skills. By understanding the process of development and changes in the content and emphasis of the introductory technology course taught to pre-service teachers, we will be able to better anticipate future changes and the directions of teaching technology and its integration into education.

Chapter One – Introduction

Purpose of the Study

The primary purpose of this study was to determine whether or not there has been a change in the focus and content of the undergraduate introductory technology course taught to pre-service teachers in schools of education in the United States within the last ten years. A second purpose of this study was to document the degree to which instructors of the introductory technology course taught pre-service teachers pedagogical approaches that emphasize involving their students in using technology. To gain an understanding of the content covered, the instructional approaches taught to students and the factors that influence both of these, a national survey of introductory technology courses taught to undergraduate pre-service teachers was conducted. This study builds upon the 2000 doctoral dissertation study conducted by Anthony Betrus, in an effort to create a longitudinal study of the introductory technology course offered to undergraduate pre-service teachers.

Statement of the Problem

Betrus notes in his 2000 doctoral dissertation that there has been documentation of the content and emphasis of introductory technology courses taught to pre-service teachers throughout the history of such courses (Betrus, 2000, p.6). (Stracke, 1932; Starnes, 1937; DeKieffer, 1947; DeKieffer, 1957; DeKieffer, 1967; DeKieffer, 1977; McCutcheon, 1984; Betrus, 2000; Hargrave, 2000). The earliest may have occurred in the 1920s when Anna V. Dorris conducted a survey of universities regarding their teaching of visual instruction. In the 1930s, there were two studies conducted of visual instruction. Another study was conducted in 1932 by Stracke, in which he documented the number and content of visual instruction courses.

In 1937, a similar study conducted by Starnes, also documented visual instruction (Betrus&Molenda, 2002, p.18). Beginning in 1947, DeKieffer began documenting introductory technology courses that had expanded to include audio materials;he conducted four such studies (Betrus&Molenda, 2002, p.19). In 1984, McCutcheon conducted a survey in the Mid-west to determine the factors that affect the content of introductory media courses just as computer technology was becoming more prevalent (Betrus&Molenda, 2002, p.20).

Betrus and Hargrave's studies were the most recent, having been conducted since the proliferation of the computer in education. Since these surveys were conducted, several new computer technologies that are web based were added to the content of introductory technology courses, sparked by new computer technologies and competencies.

Other studies of the introductory technology course in schools of education have been largely idiosyncratic in nature, consisting of individual case studies reporting on the content or approaches used in a particular course. Recent national surveys of the introductory technology course have focused more on the integration of technology with education, and have not focused on revealing the content emphasis of the introductory technology course since the introduction of new technologies and pedagogical approaches. Thus, there is a gap in knowledge about the content and emphasis of the introductory technology course since 2000.

This study attempts to ascertain the status of the shift in focus of this course by documenting its content, while including the relative emphasis placed on computer-based content. Further, this study focuses on determining the relative emphasis that instructors placed on teaching technology for use by the teachers themselves, as well as the emphasis placed on teaching pre-service teachers approaches that emphasize involving their students in using technology.

Understanding the introductory technology course is important because a better understanding helps educators in a few key areas; the factors that influence the content covered in introductory courses for pre-service teachers; the factors that influence the instructional approaches taught to students; and to help instructors of the introductory technology course develop reasonable expectations for the content and emphasis of their course, especially the content and topics taught that place emphasis on involving students using technology.

Definition of Terms

1. Introductory Technology Course - The first technology course that a student takes in an undergraduate teacher preparation program.
2. Course Content - The topics covered in the introductory technology course.
3. Course Emphasis - The relative emphasis of the course in two areas: 1) computer-based topics, and 2) non-computer-based topics.
4. Involving students in using technology - Efforts by instructors of the introductory technology course to teach pre-service teachers pedagogical approaches that emphasize involving their students in using technology.

Limitations of the Study

Generalizations based on the current study are limited in that they are based on a sample of the population of institutions offering introductory technology courses. The results of this study represent a sampling of American Association of Colleges for Teacher Education (AACTE) member institutions, National Council for Accreditation of Teacher Education (NCATE), and EducationProgramsintheUSA.com. AACTE was chosen because it was the largest national organization of teacher education institutions, with its membership representing the most comprehensive sample of all institutions of higher education. NCATE was chosen to supplement

the AACTE. EducationProgramsintheUSA.com was chosen because we did not want to limit the study by including only accredited schools in our sample.

This study is also limited in the type of data gathered, as no direct observational data were taken. Thus, the data generated are based on self-reports from the instructors of the course and may not be fully reflective of what actually takes place in the classroom setting. It is also worth noting that there was a discrepancy in what was reported by the Deans of some institutions and what the instructors of the same institution reported in terms of courses offered.

Contributions of the Study

It is hoped that this study, with its focus on casting light on the changes or shifts in the content and emphasis of the introductory technology course within the last ten years, will contribute to the understanding of the historical evolution of such courses. By understanding this process of change and evolution, we will be able to better anticipate future changes and directions of technology and its integration into education. A second contribution of this study is that it documents the degree to which instructors of the introductory technology course taught pre-service teachers pedagogical approaches which emphasized involving students in using technology since 2000.

Chapter Two – Review of Related Research and Research Questions

Since 2000 there have been strident leaps in the technology available to educators in primary, secondary, and higher education. The computer has become more prolific than ever before, and new software and multimedia tools are increasingly available to teachers. The genesis of this study lies in a study conducted in 2000 by Dr. Anthony Betrus on the content and

emphasis of introductory technology courses for undergraduate pre-service teachers. Our study seeks to measure the changes, if any, in the content and emphasis of introductory technology courses for undergraduate pre-service teachers over the last ten years.

Betrus' 2000 study is of the content and emphasis of introductory technology courses taught to undergraduate pre-service teachers, making our study longitudinal in nature. Therefore, it is important to briefly review his 2000 study.

The purpose of Betrus' 2000 study was two-fold. First, to determine whether or not there had been a change in the focus and content of the undergraduate introductory technology course taught to pre-service teachers in schools of education in the United States. Secondly, to document the degree to which instructors of the introductory technology course taught pre-service teachers pedagogical approaches that emphasize involving their students in using technology. Betrus indicates that there have been attempts to document the content and emphasis of introductory technology courses taught to pre-service teachers since the 1920s (Betrus, 2000). The most recent attempts have Betrus' own study and a study conducted by Hargrave and Shu, also in 2000.

Betrus' method was the employment of a single survey instrument given to 275 member institutions of the American Association of Colleges for Teacher Education (AACTE). Of the 275 instructors who were contacted, 119 responded. Respondents were then broken into strata based on size (number of graduates). The smallest included 1-71 graduates, while the largest stratum included 219-1159 graduates. Additionally, there was a stratum of unknown size. Betrus also conducted a small number of interviews to establish a clearer understanding of the content that instructors were teaching in introductory technology courses (Betrus, 2000).

Betrus concluded from his 2000 study that introductory technology courses taught to pre-service teachers nationwide focused on computer-based technologies. This focus also indicated a decreased emphasis on audiovisual technologies. Perhaps of most interest, the study also indicated that there was more of an emphasis on teacher use, with less of an emphasis on teaching pre-service teachers to involve their future students in using technology (Betrus, 2000).

As the technology available to educators has advanced, it is reasonable to assume that the content and emphasis of introductory technology courses offered to pre-service teachers has also changed to keep pace with the advancements in technology. "The content of these courses has evolved over time as new technologies have been introduced to schools, and as social expectations of student outcomes has changed," (Betrus and Molenda, 2002, p. 21). Younger generations are exposed to technologies much earlier than previous generations, and come to institutions of higher learning with higher expectations about the use of technology in their education. These younger students demand the same quality of service as they would elsewhere with regards to technologies: lower costs, better quality, better variety, and better service (Owen, 2004). In a similar study also conducted in 2000 by Hargrave and Shu, it is suggested that a shift was occurring in the content and emphasis of instructional technology courses offered to pre-service teachers. They indicated in 2000 that the focus of instructional technology was on computer technology and personal use, the shift in content and emphasis they point out is towards curriculum integration of technology (Hargrave and Shu, 2000).

Glenda Gunter discussed the strategies used to redesign a technology course for undergraduate pre-service teachers. The course was taught in a lecture and lab environment, while integrating the use of a textbook and website. The main purpose of the redesign was not only to get pre-service teachers to be more comfortable using technology, but it also focused on

getting these future teachers to integrate technology in their classroom and curriculum (Gunter, 2001).

The course addressed the issue of varying levels of computer skills, by reinforcing basic skills while modeling and practicing more advanced techniques. The basic computer skills most emphasized were file management and Internet use, or as it was referred to in the course, World Wide Web skills. Central to students learning basic Internet skills was the emphasis on information access and search strategies. Students were also instructed in evaluation of electronic resources using the Internet as a tool and the appropriate use of information found. Additionally, telecommunication skills were also emphasized. It is explained as a constructivist approach, where the instructor models how to do something, and then students are given "authentic hands-on activities" to practice. Students in this course also completed projects that focused on using technology in an instructional setting (Gunter, 2001).

Gunter concludes that the restructuring of the education technology course significantly improved pre-service teachers comfort with technology and its use, particularly computer technology and the Internet. She argues that, "providing pre-service teachers with skills that will enhance their abilities to not only use technology, but also teach their students with technology is imperative," (Gunter, 2001).

In a three year study, James Laffey examined the allocation, mastery, and resistance of pre-service teachers to technology. His paper serves to explain the use of technology now, against future use of technology by examining pre-service teachers and their professional development with interactive computer tools. Laffey approaches this study by examining the relationships between the actions of pre-service teachers, where they stand, and their expected positions and use of technologies in schools. He employs a series of surveys, given to about 300

pre-service teachers. These surveys addressed demographics, current technology use, and attitudes towards teaching with technology. Additionally, he employed observations, semi-structured interviews and focus groups. Laffey highlights that there is a lot of resistance starting in early childhood education for exposure to too much technology; he also suggests that, "current in-service teachers are not well prepared to use technology, nor does it appear that the next generation is being adequately prepared to enter the profession as technology-using teachers" (Laffey, 2004, p. 361).

However, Laffey's study showed that early childhood education pre-service teachers appropriate technology as students. They used technology to communicate with peers and professors, prepare lesson plans and teaching materials, prepare multimedia presentations for their college classes, and to meet college technology requirements. The study also showed that the pre-service teachers plan on using technology as teachers outside of the classroom. The pre-service teachers indicated that they would use technology to conduct research, communicate with other teachers and administrators, and prepare teaching materials, however, they indicated that they would resist using technology in their relationship with children (Laffey 2004).

"*State* education departments are paying new heed to what some call 21st-century or contemporary literacies because of a goal in the *federal* education law of ensuring that every 8th grader is proficient in the use of *technology* by 2005," (Trotter, 2003). This demonstrates the Department of Educations' acknowledgment that technology is needed in the classroom, and a federal initiative to put technology standards into place. There is a widely used set of technology education standards, led by a professional group of educators called NETS, the National Education Technology Standards. These standards had been adopted, adapted, or aligned by 32 states in 2003. Furthermore, Trotter goes on to describe goals for federal grants that will support

improving academic achievement through integrating technology into teacher training and curriculum development (Trotter, 2003).

It is hoped, that through the use of technology in the classroom, that skills such as evaluating the quality of web pages, and being able to decipher appropriate online content for assignments and research will be attained by students. These new literacies have become a focal point for school districts, and it has become evident that the ability to demonstrate proper use of technology by students is becoming more and more important. In an effort to keep up with the changes in technology, many districts have required professional development among teachers, in order to keep students current (Trotter, 2003).

NCAT, the National Center for Academic Transformation works to promote the use of technology to increase student learning as well. In this study, NCAT works with multiple universities to redesign introductory courses to incorporate technology. At Virginia Polytechnic Institute, the traditional lecture format was redesigned so that students could access instructional software and work on their own, or attend regular lectures. Most students chose to work on their own, not attending regular lectures, and the student success rate in the class went up dramatically. Robert Olin, chair of the math department at Virginia Tech explains that "...computerized math instruction works: because students spend time actually doing problems, and they can do them at their own pace. They can choose to learn either from an online textbook or by watching a short video clip..." (Witkowsky, 2008, p. 34).

One drawback to adopting this style of teaching was its lack of popularity with parents of students. It had to be explained to parents that there actually was a teacher, giving regular lectures, and that students chose not to go, opting instead to work online. After the

implementation of this style of teaching, the percentage of students earning a C- or above went up nearly 10 percentage points (Witkowsky, 2008).

The incorporation of technology into introductory courses went on to include language classes as well. The implementation of the redesign reduced the number of in class meetings from five days a week to three or four. Students would simply be required to log in to a virtual classroom, at a time that was convenient for them, and complete various different assignments. Completion rates for these courses went up from 75 percent to 90 percent (Witkowsky, 2008).

This study offers evidence that the integration of technologies into introductory courses helps students to succeed. Students can work at their own pace and at their own convenience. As this way of teaching and learning becomes more and more popular, undergraduate pre-service teachers, being exposed to this sort of learning environment, could take what they learned and implement it into their own classrooms (Witkowsky, 2008).

Hargrave and Shu indicate the major theme of the related literature is *integration*. "University faculty, educational researchers, experienced K-12 teachers, and professional organizations call for the integration of technology into the educational curriculum of pre-service teachers to foster the ability of future teachers to use technology to expand the learning of K-12 students," (Hargrave and Shu, 2000, p. 304).

A 2004 study by Popham and Rocque offers an interesting and original approach to professional development by having faculty members act as students. Faculty of the teacher preparation program at Brigham Young University took the technology course required for pre-service teachers. This stemmed from faculty communicating that they wanted to share the same technology skills as their students, and integrate more technology into their respective courses. The technology course was offered two different ways, one more traditionally structured and one

open ended. Qualitative data was gathered on this study primarily through focus group interviews. The conclusions drawn from the study demonstrate that the faculty viewed this approach to professional development as effective (Popham and Roque, 2004).

The Faculty-as-Students model is interesting because it can be related to how pre-service teachers involve their students in using technology. Some of the faculty who took this course then integrated technology into their courses, and even made an effort to integrate it into assignments for their students in the other pre-service courses they taught. It would be interesting to know whether or not this influenced the pre-service teachers in the BYU teacher education program to involve their students in technology in turn.

The perspectives pre-service teachers held of Asynchronous Discussion Boards (ADB) as an instrument used in teaching was examined in a study by Ajayi. The participants of the study included a total of 33 pre-service teachers, 21 of whom were in the elementary education program and 12 of whom were in the secondary education program. ADB were integrated into two literacy courses over the course of a 16-week semester. The main research questions addressed in this study were:

1. What are the pre-service teachers' views of ADB as a tool for learning to teach?
2. What are the participants' perceptions of the kinds of learning opportunities afforded by asynchronous discussion board instruction?
3. What are the participants' views of using ADB for independent learning needs?
4. What are the participants' views of the contribution of other students to the learning process in ADB? (Ajayi, 2009).

"These are important questions because how students perceive their learning experiences and how they conceptualize their roles in teaching and learning (from students' perspectives) are

important for designing pedagogies and tasks that meet the learning needs and interests of learners" (Ajayi, 2009, p. 87).

This article compares the integration of technology, by the use of Asynchronous Discussion Board Instruction, to Traditional Lecture-based Instruction. The author discusses how lecture-based instruction is teacher dominated, linear, authoritative, hierarchical, and passive, whereas ADB learning is self-directed, self-motivated, analytical, power sharing, creative, and requires social interaction. The article presents evidence-supporting ADB learning as the more beneficial instructional strategy as far as providing inquisitive and self-directed learning. Furthermore, it helps protect students from prejudice and promotes equality. However, although learning through Asynchronous discussion boards offers many benefits, at the same time, the adoption of this form of knowledge transference offers less face-to-face interaction between student and teacher.

Ajayi discusses the importance of technology in pre-service teaching, as it enhances learning that is interactive. Furthermore, it is stated "...that when people learn with human and technological resources, such individuals extend their knowledge and social connections" (Ajayi, 2009, p. 89). The author suggests that learning is inherently social, and that learning to teach is social as well. If this is the case, than the use of ADB learning, as a form of technological instruction, in its ability to extend social connections, will in turn help pre-service teachers better learn to teach. This correlates with our own research, directly addressing one of our main questions, which is to find out the emphasis that is placed on pre-service teachers involving their students in the use of technology themselves. This article discusses how pre-service teachers might involve their own students in using technologies, through the use of technologies in their undergraduate experiences. It is expected that these pre-service teachers will take what they have learned about

how they learned, using the ADB instructional strategies, and bring it back to their own classrooms.

It was discovered at the end of this study that the use of ADB in the classroom allowed participants to create different types of knowledge and participate in discussions that covered different topics. This is unlike what typically happened in the traditional lecture based classroom (Ajayi, 2009). In fact, 82% of the participants thought that "...using the discussion board pushed them to read of over their lecture notes, textbooks and reflect on class discussions before posting their questions and answers" (Ajayi, 2009, p. 93). 70% of students reported that the use of ADB compelled them to think of how to use technology when they become teachers themselves, in their own classrooms. It was observed throughout the course of this study that "students' perceptions of the value of their interaction with others in ADB significantly influenced their interests in using the technology as a learning tool" (Ajayi, 2009, p. 95).

It is important that technology and its implementation in the classroom are taught to pre-service teachers. Robin Kay discusses the efforts of teacher education programs to effectively and meaningfully introduce technology to pre-service teachers. She conducted a comprehensive review of the literature and evaluated 68 studies. The criterion for selecting the studies was that they had to be presented in articles that were from referenced print or on-line journals. Second, the focus of the studies had to be incorporating technology into pre-service education (Kay, 2006).

Kay identifies at least ten strategies used to teach technology, including: delivering a single technology course; offering mini-workshops; integrating technology in all courses; modeling how to use technology; using multimedia; collaboration among pre-service teachers, mentor

teachers and faculty; practicing technology in the field; focusing on education faculty; focusing on mentor teachers; and improving access to software, hardware, and/or support (Kay, 2006).

Kay notes that while being able to identify ten common strategies there is not enough data to support any recommendation of which strategies work best and how. However, she does indicate that increases in the number of strategies used leads to increased use of computer technology in the classroom (Kay, 2006).

Research Questions

We are studying introductory technology courses for undergraduate pre-service teachers because we want to determine:

- What content is currently covered and what emphasis is placed on certain topics?
- What emphasis do instructors place on pre-service teachers involving their students in using technology?
- How the course has changed over the last ten years?

In order to:

- Understand the factors that influence the content covered in introductory courses for pre-service teachers.
- Understand the factors that influence the technology emphasis taught to pre-service teachers.
- Help instructors of the pre-service technology course to develop reasonable expectations for the content and emphasis of their course, especially including an increased emphasis on content and topics that lead to involving their students in using technology.

Chapter Three – Methods

Population and Sample

The population of this study consisted of 247 teacher education institutions. Using a list of 224 colleges with teacher education programs from the website EducationProgramsintheUSA.com, a list of 150 institutions was compiled. An additional list of 97 schools was acquired from the National Council for Accreditation of Teacher Education's (NCATE) website. Using information from both of these websites, a spreadsheet was created with a list of school names, and their institutional representative's contact information.

Institutional representatives from each school were sent an e-mail message that requested contact information for the most senior instructor of the undergraduate introductory technology courses at their institution. This person would likely have the most knowledge about the course, and could most accurately represent the course at that institution. The sample in this study consisted of the 41 introductory technology courses for which instructor contact information was obtained from institutional representatives. The remainder of our sample consisted of instructors of introductory technology courses who responded to Betrus' 2000 study. His study sample of 100 instructors from AACTE member institutions yielded 71 instructors with current e-mail addresses in their institution's directory. Therefore, the total sample in this study consisted of 116 instructors for which contact information was obtained.

Survey Instrument Development

A survey instrument was developed to collect information to address the research questions. The development of the survey instrument closely followed the survey instrument

used in Betrus' 2000 study. Being that our research questions seek to address what changes in the content and emphasis of introductory technology courses have occurred in the last ten years, it was appropriate for the areas addressed in both surveys to remain consistent. Additional questions were added to the survey to address the emphasis that is placed on state and national technology standards in the introductory technology courses, as the literature review indicated that the NETS standards have been adopted by 32 states as of 2003.

Pretest

The pretest addressed the clarity and length of the survey instrument, as well as face validity, and was conducted with four members of the population. These four instructors were contacted via e-mail on November 2, 2010 to complete a pretest of the survey instrument. Of the four instructors contacted, three completed an online (web-based) survey. The information gathered from the pretest pertained to the ease of use of the survey, and the time needed to complete the survey. Final modifications to the survey instrument were made based on the feedback provided by the survey pretest participants.

Included in these modifications was the addition of comment fields after items 15 – 21, which addressed the access to computer hardware, software, and other non-computer based equipment for both the instructors of and students in the introductory technology course. Video-conferencing, a topic that was previously included in item 28 which addressed non-computer based topics, was moved to item 27. This was due to the fact that video conferencing is now considered a computer-based technology.

Data Collection Procedures

In order to obtain contact information for potential respondents, and then to distribute the survey instrument to them, several steps were necessary.

Contact Information

To find instructors of the introductory technology course taught to undergraduate pre-service teachers, institutional representatives--usually the Deans or Chairs of the teacher education programs--were contacted using their e-mail addresses. This message requested the name, e-mail address, and mailing address of the most senior person teaching the introductory technology course. Web searches were conducted to obtain an e-mail address for the institutional representatives. These 247 institutional representatives were all sent an e-mail message that requested instructor contact information(Appendix A).

Two follow-up messages (Appendix B) were sent one week apart to those representatives who did not respond to the initial mailing. In total, 70of the 247 institutional representatives who were contacted, or 28.3%, responded with basic information regarding the undergraduate technology course taught at their institution. Of these 70 responses, 25 indicated that no introductory technology course was offered to undergraduate pre-service teachers. The remaining 45 institutional representatives indicated that an introductory technology course was offered at their institution, and provided contact information for the instructor of the course.

Additional web searches were conducted to obtain current e-mail addresses for those instructors who responded to Betrus' 2000 survey. Of the 247 institutional representatives for whom an e-mail address was obtained, 236 of those were correct e-mail addresses. Of the list of 71 respondents to the 2000 survey with current e-mail addresses in their institution's directory, 69 of the e-mail addresses acquired were valid.

Invitation to Participate

Using the information provided by the institutional representatives and the current e-mail addresses of respondents to the 2000 survey, the 116 instructors of the introductory technology course were then sent an e-mail letter of transmittal (Appendix C& D) on November 17, 2010, inviting them to participate in a voluntary survey. Two weeks later, on December 1, 2010, a follow-up e-mail letter of transmittal (Appendix E) was sent. This letter updated the instructors about changes made to the survey since the initial invitation was sent out. It was noticed that the question logic of item three of the survey instrument would skip participants to the end of the survey if they answered that their institution offered more than one technology course for undergraduate education majors. A final follow-up e-mail letter of transmittal (Appendix E) was sent one week later on December 8, 2010. Both the original letter of transmittal and follow-ups included directions for accessing the online survey instrument. The survey instrument (Appendix F) was then made available on the World Wide Web at the following address:

<http://www.surveymonkey.com/s/P5SZV8H>

Upon clicking the link to the survey instrument, the first thing that the respondent saw was the letter of informed consent presented as a two option question in which information about the study and confidentiality information was provided. To access the survey instrument, the survey respondent selected "I have read the above information and wish to participate in the survey." If the survey respondent selected "I do not want to participate," it would skip the respondent to the last question of the survey instrument, where respondents could leave comments. Once the respondents completed the survey, they pressed the "done" button.

Response Rate

Completed surveys were collected over a period of approximately four weeks, from November 1, 2010 through December 16, 2010. Of the 116 instructors contacted, 58 returned surveys, which represents 50% of the 116 instructors contacted, and 23.5% of the 247 institutions contacted. Of those who responded, 36 indicated that one introductory technology course was offered at their institution, 8 indicated that their institution offered no course, and 14 indicated that their institution offered multiple introductory courses. The 8 respondents who indicated that their institution offered no course were skipped to the last item of the survey instrument and submitted the survey without completing it. 35 of the remaining instructors completed and returned the survey instrument. Additionally, the invitation to participate in the survey instructed the respondents to reply to the invitation e-mail to request a summary of the study. In total, there were four requests for summaries of the study.

Chapter Four- Results

The data used in this study were collected in two main phases. First, the data were gathered initially from the responses from institutional representatives, and later from the instructors' survey submissions. Data from both of these sets of responses are reported below.

General Course Information

Information gathered from the institutional representatives helped to reveal the fundamental approach used by the institution to address the teaching of technology to pre-service teachers. The data collected from the 247 institutional representatives responding with instructor contact information and information regarding how undergraduate technology use and

integration is approached is included as general course information. Of the 247 who responded, 45, or 18.2%, indicated that their institution offered an introductory technology course for undergraduate pre-service teachers. Additionally, 15, or 6.1%, indicated that at their institution technology use and integration were integrated into methods courses and other coursework. Four institutional representatives indicated that coursework was integrated, but still provided the name of an instructor. These responses were counted as both “coursework integration” and “introductory course offered,” and the survey invitation was sent to those instructors. Another 9, or 3.6%, indicated that their institution had no undergraduate program and 1, or 0.4%, indicated that technology use and integration was not addressed (Table 4.2).

Table 4.2
 Number and Percentage of Institutions Offering an Undergraduate Technology Course to Pre-Service Teachers as Reported by Institutional Representatives

	Total
Intro course offered	45
Coursework integration	15
Grad. program only	9
Technology use not addressed	1
Total responses	70

As Table 4.2 indicates, there are many different ways that an institution can address the teaching of technology. The most popular method of addressing technology was through offering a stand-alone course. The second most popular method of addressing technology was through methods classes and other coursework. Only one representative indicated that technology integration was not addressed at their institution.

As indicated earlier, the 116 instructors for whom contact information was acquired were then contacted. From these 116 instructors, 58 total surveys were returned (50%). Of those surveys returned, 8 instructors indicated that the institution at which they taught did not offer an introductory technology course to undergraduate pre-service teachers. Additionally,

14 instructors indicated that their institution offered multiple introductory technology courses. Question logic in the survey instrument forced these 8 respondents to submit the survey without completing it. 36 of the remaining respondents indicated that their institution offered one introductory technology course, and completed the survey (Table 4.3). As indicated earlier, the survey instrument was updated after the initial invitation was sent, and a follow-up e-mail was sent to the 116 instructors of the course alerting them of those changes.

Changes to the survey allowed for instructors whose institution offered multiple courses to complete the survey. This differs from Betrus' 2000 study in that if the respondent indicated that either no course was offered or multiple courses were offered, those respondents were instructed to submit the survey without completing it. Given that this change occurred after several surveys were submitted, this accounts for a differing total numbers of responses on some items of the survey instrument. Additionally, answers were not required for items in the survey instrument other than the first item, which indicated informed consent. This allowed for respondents to skip questions at will, also accounting for the different total numbers of responses to certain questions.

Table 4.3
 Number of Institutions Offering an Undergraduate Technology Course to Pre-Service Teachers as Reported by Instructors of the Course

	Total
No course	8
Multiple courses	14
One course	36
Total	58

One contrast between tables 4.2 and 4.3 is especially notable. Specifically, table 4.3 should represent only instructors who teach an introductory technology course, as only those

instructors listed as teaching an introductory technology course by the institutional representative were contacted. Yet, as is shown in Table 4.3, 8 of the 116 instructors who responded indicated that they did not in fact teach an introductory technology course. This indicates that the number of institutions offering an introductory technology course listed in table 4.2 might be somewhat inflated. This reflects a slight discord between the institutional representatives and the instructors of the course.

In regard to the audience of the introductory technology course, 46.9% of the students were elementary education majors, 31.7% were secondary education majors, 11% were special education majors, and 2.5% were non-education majors (Table 4.4).

Table 4.4
Audience of the Introductory Technology Course

Audience	Percent of total students
Elementary education	46.9%
Secondary education	31.7%
Special education	11.0%
Non-education	2.5%
Other	7.9%

Section Size

Unlike Betrus' 2000 study, the sizes of the teacher education programs were not taken into account. His study showed that not only did the size of the teacher education program play a factor in whether or not the institution offered an introductory technology course, but also in the average enrollment per section, or section size. However, comparing his data to the average number of sections, students, and section size of introductory technology courses in 2010 illustrates that they have remained relatively constant over the last decade (Table 4.5).

Table 4.5

Average Sections, Students, and Section Size of the Introductory Technology Course

	Average no. sections	Average no. students	Average section size
Overall 2010	4.43	101.6	22.9
Overall 2000	3.8	88	22.9

Course Categories

To determine what patterns exist in terms of emphasis in the topics taught in the course, instructors self-rated the relative emphasis placed on computer-based topics, non-computer-based topics, instructional design, or other topics. Based on the results of this question, three course types were defined. A low computer emphasis was defined for instructors who self-rated less than one-third of the overall course emphasis on computer-based topics and over two-thirds of the course emphasis on other topics (which could include instructional design topics, non-computer-based topics, or other topics). A moderate computer emphasis was defined for instructors who rated between one-third and two-thirds of the course emphasis on computer-based topics. A high computer emphasis was defined for instructors who rated over two-thirds of the course emphasis on computer-based topics. Thus, three categories were defined: "low computer emphasis," "moderate computer emphasis," and "high computer emphasis." The actual and desired content as reported by the survey respondents is illustrated in Table 4.6.

Table 4.6

Categorical Changes Between Actual and Desired Course Emphasis by Course Type

	Actual course emphasis	Desired course emphasis	Difference
Low comp. emphasis (0-32%)	5.8%	6.1%	-0.3%
Moderate comp. emphasis (33%-66%)	32.4%	39.4%	-7%
High comp. emphasis (67%-100%)	61.8%	54.5%	-7.3%

As shown in table 4.6, 61.8% of the courses had a high computer emphasis, 32.4% had a moderate computer emphasis, and 5.8% had a low computer emphasis. In comparing the actual

course emphasis with the desired course emphasis, 7.3% of instructors wanted to move from high to moderate. No instructors wished to move from a moderate emphasis to another category. Overall, this table indicates that 1% of instructors wished to change their current course emphasis on computers to a more moderate emphasis on computers in their course.

While table 4.6 indicates categorical changes between actual and desired course emphasis, instructors whose desired course emphasis differed from their actual course emphasis, yet remained within the same category, are not represented. Table 4.7 indicates the overall number of instructors whose actual course emphasis differed from their desired course emphasis.

Table 4.7
Instructors' Desired Course Emphasis

	% of instructors
<i>Higher</i> emphasis on computer-based topics desired	3.03
<i>The same</i> emphasis on computer-based topics desired	87.88
<i>Less</i> emphasis on computer-based topics desired	9.09

As table 4.7 illustrates, 87.88% of instructors, placed the amount of emphasis on computer-based topics that they desired, while the remaining 12.12% placed an emphasis on computer-based topics different from their desired emphasis. Of the 12.12% who wished to change their emphasis, 9.09% indicated that they desired to place less of an emphasis on computer-based topics. Only 3.03% of the instructors indicated they desired to place a higher emphasis on computer-based topics. Overall, the average actual computer emphasis among all instructors was 70.24%, while the average desired computer emphasis was 69.64%. This closely parallels the data from Betrus' 2000 study, where the average actual computer emphasis among all instructors was 72.5%, while the average desired computer emphasis was 68.3%.

Class Setting

An increased emphasis in the course on computer-based topics was reflected in more time spent in a computer lab/classroom (Table 4.8).

Table 4.8
Class Setting by Course Type

Course type (actual)	No.	% Standard classroom	% Computer lab	% Smart Classroom
Low comp. emphasis	2	0	50.0	50.0
Moderate comp. emphasis	10	3.3	75.7	21.0
High comp. emphasis	22	0	74.5	25.5
Total	34	1.1	66.7	32.2

Courses with a high computer emphasis spent 100% of class time in a computer lab/Smart classroom. Surprisingly, in the 10 moderate computer emphasis courses 96.7% of class time was spent in a computer lab/classroom, and even in the 2 low computer emphasis courses, 100% of class time was spent in a computer lab/Smart classroom. The high percentages may be due to many institutions scheduling all courses of this type in a computer lab or smart classroom, regardless of the focus of a particular section, although there may be other factors as well. Overall, for all of the introductory technology courses, the average class time spent in a computer lab/Smart classroom was 98.9%. This average is consistent with the high emphasis that most instructors placed on computer-based topics in the course.

Involving Students in Using Technology

In item 30 of the survey instrument, the instructors were asked to self-rate the relative emphasis they placed on teaching pre-service teachers to use technology themselves, as well as the relative emphasis they placed on teaching pre-service teachers to involve their students in using technology. They were given a 4-point scale that included no emphasis, low emphasis,

moderate emphasis, and strong emphasis. A score of zero was assigned to no emphasis, one to low emphasis, two to moderate emphasis, and three to strong emphasis. Table 4.9 shows the instructors' responses, as well as the total for using technology themselves and the total for helping their students to use technology.

Table 4.9a
Self-Rated Emphasis on Teaching Pre-Service Teachers to use Technology Themselves and to Involve Their Students' in Using Technology in 2010

Pre-service teachers are instructed to:	No emphasis (0)	Low emphasis (1)	Moderate emphasis (2)	Strong emphasis (3)	Mean (0-3)
Use <i>computer-based technology</i> themselves	0.0% (0)	2.9% (1)	20.6% (7)	76.5% (26)	2.74
Use <i>non-computer-based technology</i> themselves	15.2% (5)	33.3% (11)	21.2% (7)	30.3% (10)	1.67
Average: use technology themselves					2.21
Help their students use <i>computer-based technology</i>	0.0% (0)	8.8% (3)	38.2% (13)	52.9% (18)	2.44
Help their students use <i>non-computer-based technology</i>	24.2% (8)	30.3% (10)	30.3% (10)	15.2% (5)	1.36
Average: help their students use technology					1.90

The highest emphasis placed across all courses was on instructing pre-service teachers to use computer-based technology themselves (2.74), followed by instructing teachers to help their students use computer-based technology (2.44). Teaching teachers to use non-computer-based equipment, either for themselves (1.67), or for their future students (1.36), was rated lower than the emphasis on computer-based equipment. Overall, most instructors placed a high emphasis on computer-based technology, both for use by the pre-service teachers themselves, and in helping them to involve their future students in using computer-based technology. Most instructors placed a low emphasis on teaching non-computer-based technology in

general. Interestingly, this closely parallels the data from Betrus' 2000 study, as seen in Table 4.9b below.

Table 4.9b
Self-Rated Emphasis on Teaching Pre-Service Teachers to use Technology Themselves and to Involve Their Students' in Using Technology in 2000

Pre-service teachers are instructed to:	No emphasis (0)	Low emphasis (1)	Moderate emphasis (2)	Strong emphasis (3)	Mean (0-3)
Use <i>computer-based technology</i> themselves	1	3	20	76	2.74
Use <i>non-computer-based technology</i> themselves	27	26	32	15	1.38
Average: use technology themselves					2.06
Help their students use <i>computer-based technology</i>	3	13	34	50	2.31
Help their students use <i>non-computer-based technology</i>	28	31	26	15	1.29
Average: help their students use technology					1.80

Notice that the average emphasis on instructing pre-service teachers to use computer-based technology themselves is exactly the same (2.74). This was followed by instructing teachers to help their students use computer-based technology (2.31). Teaching teachers to use non-computer-based equipment, either for themselves (1.38), or for their future students (1.29), was rated lower than the emphasis on computer-based equipment. The order of highest to lowest amount of emphasis remains the same, but the current data suggests that there is a slightly higher emphasis on instructing pre-service teachers to help their students with computer and non-computer based technology, over instructing them to use both themselves.

Access to Resources

As much of the course time was spent in a computer lab/Smart classroom, the access to adequate resources for use by both the instructors and the students is important. Instructors were

asked to rate how well the access to resources met the instructional needs of the course they taught. Specifically, they were asked to rate the adequacy of computer hardware access, computer software access, and non-computer equipment access. They were given a 5-point Likert scale that included strongly disagree, disagree, neutral, agree, and strongly agree. A score of one was assigned to strongly disagree, two to disagree, three to neutral, four to agree, and five to strongly agree. The average scores are listed in table 4.10.

Table 4.10
Access to Resources Needed to Meet the Instructional Needs of Introductory Technology Course

Adequate:	Total
Instructor hardware access	3.05
Student hardware access	3.09
Total hardware access	3.07
Instructor software access	3.00
Student software access	2.71
Total software access	2.86
Instructor non-computer equipment access	2.97
Student non-computer equipment access	2.91
Total non-computer equipment access	2.94
Total instructor access	3.00
Total student access	2.90
Total access to resources	2.96

Note: All scores in this table were based on a scale with a range from strongly disagree (1) to strongly agree (5)

What is shown in table 4.10 is that in total, computer hardware access was rated slightly higher (3.07) than computer software access (2.86). However, only computer hardware access was rated higher than access to non-computer-based equipment (2.90). The overall picture shows that the majority of introductory technology courses had satisfactory access to resources to meet the instructional needs of the course. However, there is a rather large difference between the

total access to resources in introductory technology courses in 2000 (4.1) when compared to 2010 (2.96).

Experience of the Instructor

It was stated in Betrus’ 2000 study that there was little or no correlation between the years of experience of the instructor and course emphasis. His review of literature found that the instructors' experience teaching the introductory technology course could influence the course emphasis and topics taught. This was based on the premise that a shift in emphasis in the introductory technology course occurred from 1990 to 2000, and that instructors with less than 10 years of experience would have started teaching after this shift was already complete. The thought was that teachers with more experience teach more traditional, or non-computer-based topics, and had an overall emphasis in the course that did not emphasize computers to the degree that might be emphasized by instructors with less experience. Betrus’ study showed that such was not the case, and it is likely that the emphasis on computer-based topics has remained the same with the proliferation of computer technologies since 2000.

Table 4.11
Years of Experience of the Instructor

Years of experience	Number	Cumulative %
0	2	5.7
1	0	5.7
2	1	8.6
3	4	20.0
4	3	28.6
5	2	34.3
6	2	40.0
7	0	40.0
8	1	42.9
9	0	42.9
10	7	62.9
11	1	65.7
12	1	68.6

13	0	68.6
14	0	68.6
15	5	82.9
16	1	85.7
18	1	86.6
19	1	91.4
20	2	97.1
22	1	100.0

Note: Median = 10 years of experience

Table 4.11 illustrates that out of the 35 instructors who responded to this question, only 13 had more than 10 years of experience, while the remaining 22 had 10 or less years of experience. In fact, 34.3% of the instructors had five or fewer years of experience and 20% had three or fewer years of experience. For the most part then, the instructors of the introductory technology course began teaching after the computer proliferated in society and education, paralleling Betrus' conclusion in 2000. In 2000 the median years of experience was five, and has now increased to ten. It was expected that this trend would continue, since computer technologies have only continued to advance, and it is likely that those with only five years of experience in 2000 are still teaching today. Those instructors with five or fewer years of experience have entered the field since the drastic proliferation of computer technologies, especially Web 2.0, which is likely to affect the content of the introductory technology course when compared to Betrus' 2000 study.

Credit Hours

The number of credit hours in the introductory technology course was asked in item #5 on the survey instrument. The lowest number of credit hours offered in any course was one, and the highest was four. Out of 38 responses to this question, the most frequent number of credit

hours was three (52.6%), followed by two (28.9%), one (15.8%), and four (2.6%). The median number of credit hours in the introductory technology course was two (Table 4.12).

This shows a shift from the number of credit hours of the introductory technology course since 2000, as there were no instances of .5 or 5 credit classes, and the median number of credit hours decreased from three to two, and the mean from 2.57 to 2.42 credit hours.

Table 4.12
Number of Credit Hours of the Introductory Technology Course

Credit hours	Number of courses
1	6
2	11
3	20
4	1
Total	38

Note: Mean = 2.42, Median = 2.0, Mode = 3.0

Academic Affiliation

Table 4.13
Academic Affiliation of Instructor

	Total
Instructional/Educational Technology	42.1%
Education - other	52.6%
Non-education	5.3%
Total	100%

Note: The number of instructors represented in this table is 38.

Of the 38 instructors who answered this question, 20 instructors listed themselves as being affiliated with education in general. 16 instructors listed their primary academic affiliation as instructional/educational technology, and two were listed as non-education. Overall, the majority of instructors of the introductory technology course were affiliated with education.

Textbook and Course Materials

In regards to course materials, the wide variety of materials used in the introductory technology course was the most notable finding. Many instructors used textbooks, many used locally compiled print materials, and many used locally compiled electronic materials. As shown in table 4.14, 14 of the 35 respondents used at least one textbook, and 10 used locally compiled print materials. Surprisingly, all 35 respondents indicated that they used locally compiled electronic materials.

Table 4.14
Materials Used in the Introductory Technology Course

Course material	No. required	No. recommended	Total
Textbook	12	2	14
Locally compiled print materials	7	3	10
Locally compiled electronic materials	24	11	35

While a textbook was required in 12 courses and recommended in 2 more, the actual textbook used was far from consistent. In total, for the 14 courses that used textbooks, there were 10 different textbooks required. Surprisingly, only two instructors used the same textbook, while the other 12 instructors all used different textbooks in their courses. This illustrates that the textbooks used by instructors of introductory technology courses are even less consistent than they were in 2000. All thirteen of the textbooks survey respondents reported using are listed table 4.15.

Table 4.15
What Textbooks were used in the Introductory Technology Course?

Rank	Textbook adopted (or used)	Author(s)	n
1-tie	Integrating Educational Technology into Teaching	Roblyer, M.D., Doering, A.H.	2
1-tie	Supporting Learning with Technology	Egbert, J. (2009)	2
3-tie	Instructional Media and Technologies for learning	Heinich et al	1
3-tie	Transforming Learning with New Technologies	Maloy	1

3-tie	Educational Technology for Teaching and Learning	Newby, Stepich, Lehman, Russell, Leftwich	1
3-tie	Teachers Discovering Computers	Sherman, et al	1
3-tie	Integrating Computer Technology into the Classroom	Morrison and Lowther	1
3-tie	Web 2.0: New Schools, New Tools	Schrum and Solomon	1
3-tie	Microsoft Office 2007, a Visual Quickstart (Peachpit Press)	Schwartz, Steve	1
3-tie	Meaningful Learning with Technology	Johnassen et al	1
3-tie	Teaching and Learning with Technology 4th Ed.	Judy Lever-Duffy and Jean B. McDonald	1
3-tie	Media Notes and Exercises	Nkemnji	1
3-tie	Teaching and learning with Microsoft Office 2007	Newby, Lewandowski	1

One possible explanation for the lack of consistency in terms of what textbooks are used in the course could be answered by the review of literature on the introductory technology courses for pre-service teachers since 2000. Both Ajayi's study and the NCAT study conducted at Virginia Polytechnic Institute suggest a shift away from traditional courses, which may account for why textbooks are being used differently and with little consistency from course to course. Respondents who left comments on this survey item also seemed to suggest that textbooks do not cover the depth or breadth of skills and information addressed in the course. Being that table 4.14 shows that the majority of course materials are locally compiled electronic materials, it seems that instructors opt to create electronically compiled materials themselves over the use of a textbook in order to best supplement their courses.

Alignment with Technology Standards

In items 31 and 32 of the survey instrument, the instructors were asked to self-rate the relative emphasis they placed on teaching pre-service teachers to use technology themselves, as well as the relative emphasis they placed on to technology standards in the introductory technology course for undergraduate pre-service teachers. They were given a 4-point scale that included no emphasis, low emphasis, moderate emphasis, and strong emphasis. A score of zero was assigned to no emphasis, one to low emphasis, two to moderate emphasis, and three to strong emphasis. Table 4.16a addresses the emphasis given to the ISTE/NETS performance indicators for teachers, while table 4.16b asked respondents to rate the emphasis given to their respective state’s technology standards in their courses.

Table 4.16a
Self-Rated Emphasis given to the ISTE National Educational Technology Standards (NETS) and Performance Indicators for Teachers in introductory technology courses.

Emphasis given to ISTE/ NETS Performance Indicators	No emphasis (0)	Low emphasis (1)	Moderate emphasis (2)	Strong emphasis (3)	Mean (0-3)
#1: Facilitate and Inspire Student Learning and Creativity	0.0% (0)	0.0% (0)	29.4% (10)	70.6% (24)	2.71
#2: Design and Develop Digital-Age Learning Experiences and Assessments	0.0% (0)	0.0% (0)	32.4% (11)	67.6% (23)	2.68
#3: Model Digital-Age Work and Learning	0.0% (0)	3.0% (1)	33.3% (11)	63.6% (21)	2.61
#4: Promote and Model Digital Citizenship and Responsibility	0.0% (0)	3.0% (1)	51.5% (17)	45.5% (15)	2.42
#5: Engage in Professional Growth and Leadership	0.0% (0)	3.0% (1)	54.5% (18)	39.4% (13)	2.33

The highest emphasis placed across all courses was on performance indicator #1, which is to “facilitate and inspire student learning and creativity”(2.71), 24 respondents indicated that they gave a strong emphasis to this indicator, while the remaining 10 indicated a moderate

emphasis. Performance indicator #2, which focuses on designing and developing digital-age learning experiences and assessments (2.68) followed.

Each of the remaining three NETS performance indicators rated lower than the one before it, with #3 having a mean of 2.61, and #5 as the lowest with a mean of 2.33. However, most respondents rated the emphasis given to each of the five performance indicators to be strong or moderate. No respondents answered that there was no emphasis given to standards, and only one indicated that they placed a low emphasis on the NETS performance indicators for teachers in their course.

Table 4.16b
Self-Rated Emphasis given to state technology standards in introductory technology courses

Emphasis given to state technology standards	No emphasis (0)	Low emphasis (1)	Moderate emphasis (2)	Strong emphasis (3)	Mean (0-3)
	0.0% (0)	14.7% (5)	38.2% (13)	47.1% (16)	2.32

Respondents to this item rated the emphasis that they give to their respective state's technology standards. 16 out of 34 respondents to this question, or 47.1%, indicated that they gave a strong emphasis to state technology standards in their courses. 13 respondents, or 38.2%, indicated that they gave a moderate emphasis to state standards. Only 5, or 14.7%, indicated that they gave a low emphasis to state standards, and none answered that they gave no emphasis.

Course Content

Like Dr. Betrus' 2000 survey, and other previous surveys of the introductory technology course, this survey sought to ascertain the most popular topics taught in the introductory technology course. The 12 most frequently taught topics in 2010 are listed in Table 4.17a, while table 4.17b lists the most frequently taught topics in 2000.

Table 4.17a

The 12 Most Frequently Taught Topics in **2010**

Rank	Topic	Number of courses ^a	Percentage
1	Presentation software	28	93.33
2-tie	Technology Integration	27	90
2-tie	Trends/Ethics/Issues	27	90
4-tie	Creating/Editing Web Pages	25	83.33
4-tie	Spreadsheets	25	83.33
6	Instructional Design	24	80
7-tie	Word Processing/Desktop Publishing	23	76.67
7-tie	SMART Boards/technologies	23	76.67
8	Multimedia Authoring	22	73.33
9	Wikis	22	73.33
10	Blogs	21	70
11-tie	Video Production	20	66.67
11-tie	Software Review or Evaluation	20	66.67
11-tie	Professional Networking Sites	20	66.67

^a The maximum number of possible courses is 30, as that is the number of total responses

Bold = new in 2010

Table 4.17b

The 12 Most Frequently Taught Topics in **2000**

Rank	Topic	Number of courses ^a
1	Internet / world wide web	95
2	Presentation software	90
3	Word processing / desktop publishing	87
4	E-mail / discussion groups / newsgroups	84
5	Spreadsheets	83
6	Software evaluation	80
7	Databases	76
8	Trends / ethics / issues	74
9	Technology integration	72
10	Multimedia authoring	66
11	Instructional design	60
12	Hardware installation and troubleshooting	46

^a The maximum number of possible courses is 100, as that is the number of total responses

Of these 12 topics, 11 were computer-based topics, with three of the top five all being computer-based topics. The remaining three topics were instructional design, technology

integration, and trends/ethics/issues. Of note is that technology integration, and trends/ethics/issues moved from ranks 8 and 9 in 2000, to being tied for second in 2010. Like Hargrave’s 1997 and Betrus’ 2000 studies, this study continues to show that the majority of topics taught at the undergraduate level are also computer-based. Another significant change in the most frequently taught topics is the inclusion of Web 2.0 applications. In 2000, learning to use the Internet/world wide web was the top ranked topic, but the “new version” of the web, or “Web 2.0” and its interactive applications have become mainstream technologies since 2004. Therefore, it is not surprising to see several Web 2.0 inspired applications as high-ranking topics in 2010.

A comprehensive list of topics taught reported in this study is illustrated in Table 4.17, which lists the most frequently taught topics, as well as the average number of in-class hours spent on the topic when that topic was taught.

Table 4.18
Topics Taught in the Introductory Technology Course (max – 30)

	No. of courses	Rank	Average in-class hours (when taught)	Rank
Computer-based topics				
Presentation Software (PowerPoint)	28	1	4.8	3
Internet Safety	26	2	3.1	8
Creating / Editing Web Pages	25	3	6.2	1
Spreadsheets	25	3	3.7	5
Word processing / desktop publishing	23	5	5.6	2
SMART Boards/ technologies	23	5	2.7	9
Multimedia authoring	22	7	4.2	4
Wikis	22	7	3.5	6
Blogs	21	9	2.4	13
Video Production	20	10	2.6	10
Software Review or Evaluation	20	10	2.5	11
Professional Networking Sites	20	10	2.0	16
Social Networking Sites	17	13	2.0	16
File Management	16	14	3.4	7
Creating Podcasts	16	14	2.1	15

Instructional Games	15	16	1.9	18
Databases	14	17	2.5	11
Hardware installation and trouble shooting	12	18	1.6	19
Video Conferencing	12	18	1.2	20
E-mail	9	20	2.3	14
Twitter	8	21	0.8	21
Copyright	2	22	5.3	*
Collaboration Authoring	2	22	2.45	*
Livetext	1	23	20	*
Course Management Systems (Blackboard, Angel, Moddle, etc)	1	23	5.6	*
Integration of Technology	1	23	6	*
Web 2.0 tools (Tagul, Wordle, Storybird, screencasting etc.)	1	23	5	*
Computer Operating System OSX vs. Windows	1	23	4	*
Photoshop	1	23	4	*
Concept Mapping	1	23	4	*
Resources for keeping up to date on apps and software	1	23	2	*
Software	1	23	2	*
Drawing Skills	1	23	2	*
Gadgets	1	23	1.9	*
Online Collaboration/ Personal Learning Networks	1	23	1.9	*
Web site review & evaluation	1	23	1.3	*
Digital Photos	1	23	1.25	*
Assistive Technology	1	23	1	*
Reflection on Standards	1	23	...	*
Information Literacy	1	23	...	*
RefWorks	1	23	...	*
Scanning	1	23	...	*
Non-computer-based topics				
Video and/or film (VHS/DVD/Blueray)	9	1	3.6	1
Overhead projectors	4	2	2.0	2
Gadets (ipods, cell phones, mobile tech)	4	2	2.5	3
Document Camera	4	2	1.5	4
Speaker System	1	5	1	*
Online vs. Face to Face communication	1	5	1	*
Translators	1	5	1	*
Laserdiscs	0	...	0	*
Instructional design/theory/history topics				
Technology integration	27	1	7.1	1

Trends/ethics/issues	27	1	4.7	2
Instructional design	24	3	4.6	3
Psychological/learning theory	18	4	4.0	4
Copyright	2	5	2	*
TPACK	1	6	2.5	*
Personal Learning Networking	1	6	2	*
Creative Commons	1	6	1	*
Web Resources	1	6	1	*

* Average time spent on topics listed in less than four courses is not shown. With the topic taught in such a small number of courses, the average time might be artificially high or low.

Betrus stated in his 2000 study “the shift to computer-based topics, it seems, is complete.” Although eight of the most frequently taught topics have carried over since 2000, prominent shifts have still occurred. The emphasis of the introductory technology course for undergraduate pre-service teachers continues to focus on computer-based technology. However, table 4.18 highlights the fact that the number of computer-based technologies has grown exponentially since 2000. The changes that have occurred in terms of topics taught in the introductory courses before Betrus’ study, and since, illustrate the efforts of teacher education programs to keep up with the rapid pace of technology development.

Chapter Five – Summary and Conclusions

Summary

Both related literature and the data from this study suggests that there have been significant changes in both the content and emphasis of the introductory technology course for undergraduate pre-service teachers. As concluded in Betrus’ 2000 study, data suggests that the content and emphasis remains to be focused on pre-service teachers learning about computer-

based technologies. However, it seems that the emphasis placed on teaching pre-service teachers to involve their students in learning with technology has increased some in the last ten years.

This study has highlighted some of the changes that have occurred in the content of the introductory technology course with the proliferation of computer technologies, especially the features of Web 2.0, since Betrus' 2000 study. Most notably is the shift away from learning about the internet towards learning how to create and manage aspects of the internet. However, some aspects of the course which have remained relatively constant over the last decade are its audience (what types of education majors), class setting (computer lab), and section size. It is interesting to note that the difference between the actual and desired course emphasis on computer and non-computer based topics has changed very little since 2000 as well. But, the experience of the instructor has increased since 2000, with the average years of experience rising by five years. This was expected given that those who had 5 years of experience in 2000 are likely to still be in the field. Lastly, the relatively high emphasis given to state and national technology standards in the introductory technology course for undergraduate pre-service teachers, was a noted difference in the courses of 2010, as it was not addressed by the 2000 study.

Conclusions

As discussed in the review of literature, since 1998, the International Society for Technology in Education (ISTE) has produced the National Educational Technology Standards (NETS) for both students and teachers. With Trotter's 2003 study addressing how a federal act increased student standards for technology, it seemed that asking instructors about the emphasis given to technology standards would be a necessary component to consider. He found that the

NETS were being widely used throughout the United States, with 32 states having adopted the standards by 2003. He suggested that there were significant implications for teacher preparation programs as a result of the NETS standards being adopted by state departments of education.

The data showed that a majority of respondents indicated that they place a strong or moderate emphasis to ITSE/NETS and state technology standards. Therefore, it seems as though these standards have become prominent features within the content and emphasis of the introductory technology course for pre-service teachers. This could account for the slight increase in the emphasis place on teaching pre-service teachers to involve their future students in using technology since 2000.

Another conclusion can be drawn from this study to support this. Both data collected from institutional representatives and the survey instrument suggested that more institutions are integrating the use of technology into methods courses, as opposed to offering stand-alone introductory technology courses. Perhaps this is one way in which teacher education programs are trying to address technology integration with their education majors. Since it is likely that different education majors would address the integration of technology differently, that is why institutions favor integrating technology into coursework or by offering multiple courses based on the type of major. This is supported by Laffey's 2004 study which reported the resistance of early childhood education majors to integrate technology into the classrooms, and focused instead on technology for the personal and professional use by pre-service teachers.

These conclusions help to illustrate that there has been significant movement away from the teaching of basic applications and skills in the course towards technology integration both outside of the course (integration into methods) and within the course in terms of emphasis on involving their future students in using technology. The changes that have occurred in terms of

the content of the introductory technology course are made clear by this study. For example, the course no longer teaches pre-service teachers about how to use the Internet (searching, e-mail, etc.). Instead, the content of the course focuses on topics that teach pre-service teachers to how to develop and manage materials on the Internet (blogs, wikis, Twitter, professional networking, etc.) The proliferation of the internet and mainstreaming of Web 2.0 since 2004 shows the shift in computer-based content in the course. The pre-service teachers of 2010 enter teacher education programs with knowledge of the basic applications and computer skills. This enables the introductory courses to focus on computer-based topics about how to develop materials for the internet which are likely to be used to involve their future students in using technology in the classroom.

Recommendations for Further Research

- Open up the study to include graduate teacher education programs in addition to undergraduate pre-service teacher programs.
- Investigate how technology education is being integrated into methods courses and other coursework.
- Examine how technology instruction is addressed differently depending on the audience of the course. For example, how elementary pre-service teachers learn about technology in comparison to secondary, or special education pre-service teachers.

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Appendix A – Letter to Deans

To: Teacher Education Representatives
From: "Anthony K. Betrus" <betrusak@potdam.edu>
Subject: Introductory Technology Course for Teachers

October 22, 2010

Teacher Education Representative:

In an effort to gain a better understanding of the introductory technology course taught to undergraduate pre-service teachers nationwide, a national survey of instructors of the introductory technology course is being conducted. The purpose of this message is to request contact information for the most senior person teaching the introductory technology course at your institution so he/she may participate in the survey.

To this end, could you please respond with the following information: (all information below refers to the most senior person teaching the introductory technology course for undergraduate pre-service teachers in the Fall 2010 term)

Name of Instructor:

E-mail Address:

Mailing Address:

In the event that your institution **does not** offer an introductory technology course for undergraduate pre-service teachers, please place an X next to the selection below that best describes your institution:

- Our institution does not teach undergraduate pre-service teachers.
- Technology use and integration is integrated into methods courses.
- Technology use and integration is not addressed.
- Other (please specify)

Thank you for taking the time to respond to this message, it is sincerely appreciated,

Anthony K. Betrus
393 Dunn Hall
SUNY Potsdam
Potsdam, NY 13676

Appendix B – Follow-up letter to Deans

To: Teacher Education Representatives
From: "Anthony K. Betrus" <betrusak@potdam.edu>
Subject: Introductory Technology Course for Teachers

November 3, 2010

Teacher Education Representative,

You are receiving this message as a follow-up to a message regarding technology instruction at your institution. We would like to request contact information for the most senior person teaching the introductory technology course at your institution so he/she may be invited to participate in a national survey of the course. This study is a ten-year update of a 2000 study that was conducted at Indiana University, department of Instructional Systems Technology, and is a national survey of the introductory technology course at the undergraduate level within the last ten years. (See below if your institution does not offer an introductory technology course.)

If you have not already replied, could you please respond with the following information (all information below refers to the most senior person teaching the introductory technology course for undergraduate pre-service teachers in the Fall 2010 term):

Name of Instructor:

E-mail Address:

In the event that your institution **does not** offer an introductory technology course for undergraduate pre-service teachers, please place an X next to the selection below that best describes your institution:

(Respond below **ONLY** if your institution **DOES NOT** offer an introductory technology course)

- Our institution does not teach undergraduate pre-service teachers.
- Technology use and integration is integrated into methods courses.
- Technology use and integration is not addressed.
- Other (please specify)

Thank you for taking the time to respond to this message, it is sincerely appreciated,

Anthony K. Betrus
393 Dunn Hall
SUNY Potsdam
Potsdam, NY 13676

Appendix C – Survey Invitation for Instructors

To: Teacher Education Representatives
From: "Anthony K. Betrus" <betrusak@potdam.edu>
Subject: National Survey of Introductory Technology Course for Teachers

November 10, 2010

Teacher Education Representative,

This survey, concerned with the content of introductory technology courses taught to undergraduate education students, is part of a ten year update of a dissertation study conducted at Indiana University in 2000. Now at the State University of New York at Potsdam, we are conducting a study that is a national survey of the introductory technology course at the undergraduate level to determine the changes that have taken place in the last ten years.

This project is concerned specifically with determining the present status of undergraduate introductory technology courses taught to education majors in the United States. The results of this study will help to inform those people who currently influence how this course is taught, including the instructors themselves, administrators, and state and national accreditation agencies.

We are particularly interested in obtaining your responses because of your experience in teaching the course. Your responses will contribute significantly towards solving some of the problems faced in this transitional area of education.

It will be appreciated if you will complete the electronic survey prior November 22, 2010. Additionally, we would welcome any comments that you may have concerning any aspects of not covered in the instrument (which you can provide by responding directly to this e-mail or in the appropriate comment boxes on the survey). Finally, if you are interested in a copy of the results, please let me know, we would be happy to provide this for you.

Please copy the following URL into your web browser to begin the survey.

<http://www.surveymonkey.com/s/P5SZV8H>

Sincerely,

Dr. Anthony K. Betrus
393 Dunn Hall
SUNY Potsdam
Potsdam, NY 13676

Appendix D – Survey Invitation to Respondents from 2000 Survey

To: Teacher Education Representatives
From: "Anthony K. Betrus" <betrusak@potdam.edu>
Subject: National Survey of Introductory Technology Course for Teachers

November 17, 2010

Teacher Education Representative,

You are receiving this message as a follow-up to a survey you completed regarding technology instruction at your institution. We are conducting a ten-year update of a dissertation study conducted at Indiana University in 2000. Now at the State University of New York at Potsdam, we are conducting a study that is a national survey of the introductory technology course at the undergraduate level to determine the changes that have taken place in the last ten years.

The results of this study will help to inform those people who currently influence how this course is taught, including the instructors themselves, administrators, and state and national accreditation agencies. We are particularly interested in obtaining your responses because of your experience in teaching the course and because you responded to the study in 2000.

It will be appreciated if you will complete the electronic survey prior to November 22, 2010. Additionally, we would welcome any comments that you may have concerning any aspects of not covered in the instrument (which you can provide by responding directly to this e-mail or in the appropriate comment boxes on the survey). Finally, if you are interested in a copy of the results, please let me know, we would be happy to provide this for you.

Please copy the following URL into your web browser to begin the survey.

<http://www.surveymonkey.com/s/P5SZV8H>

Sincerely,

Dr. Anthony K. Betrus
393 Dunn Hall
SUNY Potsdam
Potsdam, NY 13676

Appendix E – Survey Update/ Reminder Letter

To: Teacher Education Representatives
From: "Anthony K. Betrus" <betrusak@potdam.edu>
Subject: Introductory Technology Course for Teachers: UPDATE

December 1, 2010& December 8, 2010

Teacher Education Representative,

You are receiving this message as a second follow up to a survey invitation sent November 10th requesting your participation in a national survey of the introductory technology course taught to undergraduate education students.

I would like to thank those of you who have taken the time to complete the survey (10 minutes has been the average completion time thus far). Interestingly, we have had a surprising number of respondents indicate that there were multiple courses taught at their institution. We have modified the survey to now allow you to report the content of your course, even if you have multiple introductory courses at your institution (in the previous version it skipped you to the end). For those of you who were skipped to the end of the survey without a chance to report the information about your course, we encourage you to complete the full survey now that these limitations have been removed.

The most recent national survey of the introductory technology course was conducted in 2000, and much has changed since that study. It is my sincere hope that you will take the time to participate in this year 2010 benchmark study of the introductory technology course. The results of this study will help to inform those people who currently influence how this course is taught, including the instructors themselves, administrators, and state and national accreditation agencies. Your responses will contribute significantly towards solving some of the problems faced in this transitional area of education.

It will be appreciated if you will complete the electronic survey prior to December 8, 2010.

Additionally, we would welcome any comments that you may have concerning any aspects not covered in the instrument (which you can provide by responding directly to this e-mail or in the appropriate comment boxes on the survey). Finally, if you are interested in a copy of the results, please let me know, we would be happy to provide this for you.

Please copy the following URL into your web browser to begin the survey.

<http://www.surveymonkey.com/s/P5SZV8H>

Sincerely,

Dr. Anthony K. Betrus
393 Dunn Hall
SUNY Potsdam
Potsdam, NY 13676

Appendix F – Survey Instrument

*** 1. You are invited to participate in this survey. This survey is part of an effort to evaluate the current status of the first introductory technology course offered to undergraduate education majors at post-secondary institutions in the United States.**

INFORMATION

In completing this survey, the information you provide should be based on the introductory technology course that you teach. Please take 15-20 minutes* to complete the survey, and send your responses by pressing the submit button at the end of the survey. Survey responses will be submitted anonymously to: Anthony Betrus, 393 Dunn Hall, SUNY Potsdam, 44 Pierrepoint Avenue Potsdam, NY 13676
betrusak@potsdam.edu.

*15 minutes was the average time respondents took to complete the questionnaire during the pretest.

BENEFITS

The efforts of this study are to improve teacher education programs, and specifically, to improve the first introductory technology course offered to education majors. We rely on your cooperation to help determine the current status of this type of course.

CONFIDENTIALITY

The information in the study records will be kept confidential. Individual questionnaires will not be reported. Additionally, your survey submission will be sent to the researcher through a third party company, Survey Monkey, whose role is to serve as a form server. Your survey submission information is never looked at or recorded by Survey Monkey. Once the responses are received by the researcher, they will be stored securely and will be made available only to persons conducting the study. No reference will be made in oral or written reports which could link you to the study.

CONTACT

If you have any questions at any time about the study or the procedures, you may contact the researcher at the address listed above. If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in this research have not been honored during the course of this project, you may contact Nancy Lewis, Chair IRB, 311-4 Satterlee Hall, SUNY Potsdam, 44 Pierrepoint Avenue, Potsdam, NY 13676, (315) 267-3713, lewishnl@potsdam.edu.

PARTICIPATION

Your participation in this study is voluntary, you may decline to participate without penalty. Because we do not ask for your name in the survey, and no other contact

information is asked or otherwise obtained, we will not be able to identify an individual survey to return or destroy if someone decides to withdraw after they have submitted the survey.

INTERNET RESEARCH DISCLAIMER

The survey website being used for this study has safeguards to keep your responses confidential. You are encouraged to review the specific precautions taken by the website by reviewing the privacy policy or statement posted on the site. Please keep in mind, though, that it is not possible to provide a 100% guarantee that information traveling over the Internet is safe. In addition, when information is collected on-line, there is a risk of that information leaving the direct control of the researcher and being accessed by others.

When sending private information over the Internet, you should take precautions to make sure the information you provide on-line cannot be viewed by others. First, if you complete the survey at work, please be aware that some employers use tracking software to monitor and record keystrokes, mouse clicks, and web sites visited. This could impact the confidentiality of your responses. Therefore, you are advised to complete the survey on your home computer or a public computer to better protect your privacy. Further, please remember to clear your browser's cache and page history after you submit the survey in order to better protect your privacy. If you do not know how to do this, you can go to the following websites for help:

<https://www.google.com/adSense/support/bin/answer.py?answer=23767> and
<http://www.computerhope.com/issues/ch000510.htm>

I have read the above information and wish to participate in the survey.

I do not wish to participate.

2. Does your institution offer an introductory technology course to undergraduate education majors?

Yes

No

3. Is there *one* introductory technology course offered to undergraduate education majors, or are there at least two separate courses?

Our institution offers *one introductory technology course* (select this choice if multiple sections of the same course are taught, or if the course you teach is the first in a sequence of courses).

Our institution offers *at least two separate introductory technology courses* for undergraduate education majors. (for example: a student has a choice of two or more introductory technology courses; students in different undergraduate programs take different introductory technology courses; or there are multiple technology courses taught with no sequence)

4. When responding to this survey please refer to the most recent version of the undergraduate technology course that you teach. Specifically, which of the following best describes the audience of the course that you are referring to? (check all that apply)

- Secondary Education Majors
- Middle School Education Majors
- Elementary (Childhood) Education Majors
- Early Childhood
- Other (please specify)

5. How many credit hours is the course?

6. How many total in-class contact hours, both lecture and/or lab, does the course have (eg. a 15 week course meeting for 2.5 hours per week would have 37.5 total in-class contact hours)?

7. How many sections of the course are offered in the 1st 2010 fall term*?

*Note: The word term is used throughout this survey as a variable for semester, trimester, or quarter, which varies depending on your institution.

8. Approximately how many total students (in all sections) are taking this course in the 1st 2010 fall term?

9. Over the course of your career, approximately how many total sections of the introductory technology course have you taught?

10. For approximately how many years have you been teaching the introductory technology course?

11. What academic unit (department, program, or area) is your primary appointment through?

- Instructional Technology or Educational Technology
- Education - Other
- Non-Education

12. In the previous question you informed us that your primary appointment was through an "education - other" or "non-education" academic unit (department, program, or area). Please specify in the space below.

13. Approximately what percentage of the students who take this course are: (total for all majors combined should be 100%)

% elementary education majors (through grade 6)	<input type="text"/>
% secondary education majors (grades 7-12)	<input type="text"/>
% special education majors	<input type="text"/>
% non-education majors	<input type="text"/>
% other (please specify)	<input type="text"/>

14. Approximately what percentage of class time is spent in: (total for all locations combined should be 100%)

a standard classroom or lecture hall (with no computer)	<input type="text"/>
a computer classroom/lab	<input type="text"/>
a smart classroom (podium and computer with projector)	<input type="text"/>

15. Rate your agreement or disagreement with the following statement. Base your answers on course sections you currently teach in the fall 2010 term.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The access to computer hardware (including peripherals) needed for use by the <u>instructor</u> meets the instructional needs of the course.	<input type="radio"/>				

Comments

16. Rate your agreement or disagreement with the following statement. Base your answers on course sections you currently teach in the fall 2010 term.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The access to computer hardware (including peripherals) needed for use by the <u>students</u> meets the instructional needs of the course.	<input type="radio"/>				

Comments

17. Rate your agreement or disagreement with the following statement. Base your answers on course sections you currently teach in the fall 2010 term

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The access to computer software needed for use by the <u>instructor</u> meets the instructional needs of the course.	<input type="radio"/>				

Comments

18. Rate your agreement or disagreement with the following statement. Base your answers on course sections you currently teach in the fall 2010 term.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The access to computer software needed for use by the <u>students</u> meets the instructional needs of the course.	<input type="radio"/>				

Comments

19. Rate your agreement or disagreement with the following statement. Base your answers on course sections you currently teach in the fall 2010 term.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The access to non-computer-based equipment needed for use by the <u>instructor</u> meets the instructional needs of the course.	<input type="radio"/>				

Comments

20. Rate your agreement or disagreement with the following statement. Base your answers on course sections you currently teach in the fall 2010 term.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The access to non-computer-based equipment needed for use by the <u>students</u> meets the instructional needs of the course.	<input type="radio"/>				

Comments

21. Do you use at least one textbook in the course?

- Yes
 No

Comments

22. If yes: Which textbooks?

1st textbook title

Author(s)

Required or Recommended

2nd textbook title

Author(s)

Required or Recommended

23. Do you use locally compiled materials in the course?

Yes

No

24. What type of locally compiled materials do you use in the course?

- locally compiled print materials (required)
- locally compiled print materials (recommended)
- locally compiled electronic materials (required)
- locally compiled electronic materials (recommended)
- I do not use locally compiled materials in the course

**25. Please indicate the *course emphasis* you currently place on these topical areas:
(total for all topics combined should be 100%)**

% computer-based topics	<input type="text"/>
% non-computer-based topics	<input type="text"/>
% instructional design/history/theory	<input type="text"/>
% other (please specify)	<input type="text"/>

**26. Please indicate the *course emphasis* you would like to place on these topical areas:
(total for all topics combined should be 100%)**

% computer-based topics	<input type="text"/>
% non-computer-based topics	<input type="text"/>
% instructional design/history/theory	<input type="text"/>
% other (please specify)	<input type="text"/>

27. Please indicate the approximate number of in-class hours allocated to computer based topics you teach to the left of the topic's name.

Word Processing/Desktop Publishing	<input type="text"/>
Spreadsheets	<input type="text"/>
Databases	<input type="text"/>
Presentation Software	<input type="text"/>
Multimedia Authoring	<input type="text"/>
E-Mail	<input type="text"/>
File Management	<input type="text"/>
Creating/Editing Web Pages	<input type="text"/>
Software Review or Evaluation	<input type="text"/>
Hardware installation and troubleshooting	<input type="text"/>
SMART Boards/technologies	<input type="text"/>
Social Networking Sites	<input type="text"/>
Professional Networking Sites	<input type="text"/>
Wikis	<input type="text"/>
Blogs	<input type="text"/>
Twitter	<input type="text"/>
Creating Podcasts	<input type="text"/>
Internet Safety	<input type="text"/>
Instructional Games	<input type="text"/>
Video Production	<input type="text"/>
Video Conferencing	<input type="text"/>
Other (please specify)	<input type="text"/>

28. Please indicate the approximate number of in-class hours allocated to non-computer based topics you teach to the left of the topic's name.

Overhead Projectors	<input type="text"/>
Video and/or Film (VHS/DVD/Bluray)	<input type="text"/>
Laserdiscs	<input type="text"/>
Other (please specify)	<input type="text"/>

29. Please indicate the approximate number of in-class hours allocated to Instructional Design/History/Theory topics you teach to the left of the topic's name.

Technology Integration	<input type="text"/>
Trends, Ethics, Issues	<input type="text"/>
Instructional Design	<input type="text"/>
Psychological/Learning Theory	<input type="text"/>
Other (please specify)	<input type="text"/>

30. We are trying to understand the degree to which your course emphasizes teaching future teachers to use technology *themselves* or teaching future teachers to facilitate the use of technology by *their students*. Please respond to the questions below with this distinction in mind.

	No emphasis	Low emphasis	Moderate emphasis	High emphasis
When teaching the <u>computer-based topics</u> in the course, please rate the overall emphasis you give to preparing pre-service teachers to use computer-based technology themselves.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When teaching the <u>computer-based topics</u> in the course, please rate the overall emphasis you give to preparing pre-service teachers to help their students use computer-based technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When teaching the <u>non-computer-based topics</u> in the course, please rate the overall emphasis you give to preparing pre-service teachers to use non-computer-based technology themselves.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When teaching the <u>non-computer-based topics</u> in the course, please rate the overall emphasis you give to preparing pre-service teachers to help their students use non-computer-based technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

31. We are trying to understand the degree to which your course emphasizes the ISTE National Educational Technology Standards (NETS) and Performance Indicators for Teachers. Please rate the overall emphasis you give in your course to each ISTE NETS/Performance Indicator listed below.

	No Emphasis	Low Emphasis	Moderate Emphasis	High Emphasis
#1: Facilitate and Inspire Student Learning and Creativity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
#2: Design and Develop Digital-Age Learning Experiences and Assessments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
#3: Model Digital-Age Work and Learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
#4: Promote and Model Digital Citizenship and Responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
#5: Engage in Professional Growth and Leadership	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32. Please answer the question below with your respective state's technology standards in mind.

	No Emphasis	Low Emphasis	Moderate Emphasis	High Emphasis
Please rate the overall emphasis you give to state technology standards in your course.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

33. Use the space below to write any comments or clarifications you might have upon completing this survey.