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

by
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<center>Chapter One - Introduction</center>

Purpose of the Study

The primary purpose of this study was to determine whether or not there has been a change in focus and content of the undergraduate introductory technology course taught to pre-service teachers in schools of education in the United States. 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.

Statement of the Problem

Documenting the content and emphasis of the introductory technology course taught to undergraduate pre-service teachers has been done in several studies throughout the history of the such courses (Stracke, 1932; Starnes, 1937; DeKieffer, 1947; DeKieffer, 1957; DeKieffer, 1967; DeKieffer, 1977; McCutcheon, 1984). While McCutcheon's 1984 study was the most recent, it was limited in that it was a regional study representing primarily mid-west institutions. DeKieffer's 1977 study was the last *national* survey that determined the content of introductory technology courses. Further, all of these studies were conducted prior to the proliferation of the computer in education. Since these surveys were conducted, the computer was added to the content of introductory technology courses, and perhaps more significantly, the proliferation of the computer sparked new introductory technology courses created to teach computer competencies.

<center>1</center>

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 not been at the undergraduate level, and have not focused on revealing the content emphasis of the introductory technology course. Thus, there is a gap in the knowledge of the content and emphasis of the introductory technology course since the proliferation of the computer in society.

At the same time that computer use proliferated, instructional technology theory was moving toward a view that suggested increased student benefit when teachers involve their students in using technology. Morrison and Lowther (1998) illustrated this position:

> Students are now encouraged to explore, collect data, and derive their own conclusions. . . . This method represents a change from using the power of the computer to deliver the instruction to letting the student use the raw power of the computer to manipulate data as part of the instructional process. (p. 14)

If introductory technology course instructors used this approach, the course content and emphasis should reflect a focus on instructing pre-service teachers to facilitate the use of technology by their students, rather than teaching them to use the computer to help manage their classroom or present instructional materials.

This study attempts to ascertain the status of the shift in focus of this course by documenting its content, 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 for other reasons, one being the overall role that this course plays in the Instructional Technology (IT) field. A large part of the IT field is in some way involved in teaching or supporting the introductory technology course. McCutcheon (1984), in his doctoral dissertation that surveyed the introductory technology course made this point:

> One might look upon the introductory technology course as being the single largest employer of professionals teaching in instructional technology, and the largest common denominator. Probably a majority of those with teaching responsibility in instructional technology have taught the introductory technology course at one time or another. (p. 10)

Knowledge of the content and instructional approaches used in the introductory technology course is relevant to a large community of educators concerned with teaching pre-service teachers the skills necessary to be effective educators.

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 student 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. As such, non-AACTE institutions,

whose graduates at the time the study was conducted constituted 15% of the annual teacher education graduates, were not represented. 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. To best represent institutions of all sizes, the 734 AACTE institutions sampled in this study were divided into four strata, representing the various sizes of all teacher education programs. These four strata included small, medium, large, and unknown-sized (for institutions not reporting information) and were based on the annual number of undergraduates completing the teacher education program as reported in the AACTE 2000 membership directory.

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. To help ascertain what was being done in practice, three instructors of the introductory technology course were interviewed (Appendix A) as part of the survey development process. Additionally, at the time that the survey was conducted, the researcher had taught the introductory technology course 11 times over three years. Information from both of these sources was used in developing the survey.

With the push to integrate the teaching of technology into methods classes and other coursework, it may be that at some institutions technology skills were taught in courses other than an introductory technology course. Such courses were not reached by this survey. Starnes (1937) recognized this limitation in one of the earliest surveys of technology course content:

The writer recognizes the fact that this study does not represent all the teacher training in the use of visual aids. For many years there have been teachers in teacher training institutions who have given their students instruction in the use of various visual aids as they pertained to a particular subject matter field. He also recognizes that part of the regular course for elementary teachers contains much training in the use of certain visual aids. (p. 4)

Further, in terms of sampling, responses were limited to one instructor per institution. At institutions with multiple instructors of the introductory technology course, instructors teaching other sections were not represented. Even if every AACTE institution had an instructor who returned the survey, this still would not represent every instructor teaching the course.

Additionally, the results of the present study do not reveal information articulating how this course links to other technology courses in teacher education. This has increasingly become an issue as undergraduates sometimes take more than one technology course in their teacher preparation program. The scope and content of an introductory technology course might be influenced by the presence of additional technology courses that students take later in the teacher education program. Whether or not the course was required might also affect the course content and emphasis, yet this too was not addressed in this study.

Finally, what effect the survey delivery method had on the results is uncertain. In a recent comparison of survey methods, Yun and Trumbo (2000, p. 1) observed that: "We do not observe significant influences of survey mode in our substantive analysis." Even so, it is possible that--because the responses came solely through completion of a web-based survey instrument--computer savvy instructors were over-represented, while those instructors with a limited background using the World Wide Web were under-represented. This may have led to an under-representation of those instructors who teach

a more "traditional audiovisual" course. It is accurate to state that this survey reflects only those instructors capable of responding to a web-based survey instrument. The unanswered question is "How many introductory technology course instructors did not complete the web-based survey instrument who otherwise would have completed a paper-based survey instrument?" Future information regarding the answer to this question would be useful in determining the effect that the web-based medium had on the results. Without this information, it is difficult to accurately gauge the ultimate effect that the electronic survey format had on the results.

Contributions of the Study

It is hoped that this study helps to cast light on the status of the introductory technology course and on the factors that influence its content and methods, putting this course into perspective in terms of historical evolution. By understanding the current state of the introductory technology course in relation to its historical evolution, future directions for the course can be anticipated. Documenting the current content and emphasis of the introductory technology course is a necessary step towards anticipating these future directions.

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. The understanding of both the content and emphasis in the introductory technology course can be used to help answer the practical question of how to structure the pre-service introductory technology course.

As the technologies, both hard and soft, keep changing and proliferating, it has become impossible to teach everything that beginning teachers should know about teaching with technology. Instructors in these courses need to identify the highest priority content. Another intent of this research is to inform those making decisions regarding the content and emphasis in this course. This could be any number of people or agencies, including the instructor of the course, a course coordinator, a state education department, or an accreditation agency.

Ultimately, the contributions cited from the earliest research on the introductory technology course to the latest all concur with the current research. Stracke (1932, p. 204) described the importance of understanding the introductory technology course: "This digest is offered in the sincere belief that one sure method of discovering the effectiveness of one's own teaching methods is to learn what others are doing in the same field." Later, McCutcheon (1984) had a similar statement:

> The opportunity to compare content may prove to have a unifying effect upon such courses, whose content is presently non-uniform, despite the already discussed importance of such courses to the students who take them, and to the institutions that offer them. (p. 85)

Finally, Hargrave (1997), stated in her recent study of the introductory technology course taught at the graduate level:

> Knowledge of the format, content, and emphasis on the formal technology instruction pre-service teachers receive is imperative for establishing technology expectations for future teachers; furthermore, such knowledge will provide insight into the status of instructional technology within schools of education. (p. 9)

The common thread among all of these studies, including the current study, is the desire to inform the community of people responsible for the design and delivery of the introductory technology course.

Chapter Two - Review of Related Research and Research Questions

<u>Early Studies (1920's and 1930's)</u>

While it is not clear when the first course focussing on the use of technology to support instruction was taught to pre-service teachers, ". . . Probably the first official credit course in visual instruction was given at the University of Minnesota in 1918 by Albert M. Field" (Saettler, p. 149). Saettler (1990) also reported the efforts of the Director of Visual Instruction at San Francisco State College, Anna V. Dorris, to determine the status of visual instruction in higher education:

> Anna V. Dorris of San Francisco State College made a survey in 1922 to determine what provisions were being made for teacher education in visual instruction. A questionnaire was sent to 171 normal schools (30 replied) and to 114 colleges and universities (37 replied). Four of the normal schools offered summer session courses; the Michigan Normal School offered one non-credit course. One university taught "graphs"; another gave a course on photography and slide making. Seventeen of the thirty-seven colleges and universities said they operated film distribution centers. Only four normal schools reported such service. (p. 149)

Ten years later, Stracke (1932) documented the number and content of introductory courses in visual instruction. Stracke surveyed 86 institutions listed as offering courses in visual instruction, with 44 returning the survey. Of those returning the survey, 75%, or 33 institutions, indicated they offered a course in visual instruction and listed the topics offered in the course (Stracke, 1932). The top twelve topics are noted in Table 2.1.

Table 2.1

The Top 12 Topics in Visual Instruction Courses

Rank	Topic
1	The philosophy and psychology of visual instruction
2	Projectors – operation, mechanics, and optics
3	Motion pictures – types (16mm. and 35mm.), standards of evaluation, and instructional, informational, auditorium or entertainment
4	Sources of visual aids
5	Lantern slides and their use
6	Stereographs and their use
7	Photographs and prints and their use
8	Exhibits
9	Organization of a city department
10	History of visual instruction
11	Field trips
12	Care, repair, and storage of materials and equipment

Source: Stracke, 1932

Five years after Stracke's study, Starnes (1937) conducted a similar survey at the end of what he referred to as the "pioneer stage" of the visual instruction movement. The purpose of his study was to "determine the present status of the visual instruction courses in the United States [as] the instructors in these courses have little to guide them in preparing their syllabi" (Starnes, 1937, p. 315).

To accomplish this goal, he sent surveys to 154 institutions listed in the *Visual Instruction Directory* as offering courses in visual aids (Starnes, 1937). Of the 140 that returned the survey, 80 reported that they currently offered a course in visual aids and completed the survey (Starnes, 1937). Table 2.2 represents a list of the 12 most popular topics as reported by Starnes (1937, p. 316), according to the average time spent on each topic.

Table 2.2
The 12 Most Popular Topics by Average Hours Spent on Topic

Rank	Topic	No. Hrs.
1	Technique in the use of motion pictures	3.80
2	Technique in the use of lantern slides, film slides, opaque projectors	3.75
3	Sources of visual aids materials; film slides, stereographs, projection apparatus, object-specimen model materials, etc.	3.75
4	Mechanics of projectors and projection	3.33
5	Result of scientific studies regarding use of visual aids	2.42
6	Psychological justification for the use of visual aids	2.12
7	Technique in the use of flat pictures, cartoons, maps, globes, etc.	2.12
8	Value of flat pictures, cartoons, maps, globes, etc.	2.00
9	Administration of a visual aids program	1.90
10	Technique in the use of object-specimen-model visual aids	1.90
11	Photography	1.75
12	Advantages and disadvantages of lantern slides	1.75

Source: Starnes, 1937

Additionally, Starnes noted the similar topics between his 1937 study and Stracke's 1932 study. Table 2.3 represents a list of 12 most commonly taught content in both studies.

Table 2.3
The 12 Topics Taught in Both Stracke's and Starnes's Studies

Rank	Topic
1	History of visual education
2	Psychological justification for the use of visual aids
3	Value of the school journey
4	Technique of conducting the school journey.
5	Technique in the use of the stereoscope.
6	Advantages and disadvantages of the stereoscope.
7	Technique in the use of lantern slides, film slides and opaque projectors.
8	Advantages and disadvantages of lantern slides.
9	Advantages and disadvantages of opaque projectors.
10	Technique in the use of motion pictures.
11	Advantages and disadvantages of motion pictures.
12	Mechanics of projectors and projection.

Source: Starnes, 1937

Later in the article, Starnes (1937) made recommendations for the course content based on the most frequently taught topics, including a sample course outline. In this

course outline, the first topic he proposed was "a brief history of visual instruction," followed by "the psychological background for the use of visual aids" and then "a discussion of results of experimentation with visual aids" (Starnes, 1937, p. 13). After this foundation was placed, the 10 units that followed were usage topics, including "flat pictures," "globes," "object-specimen-model materials," "the motion picture," and many others (Starnes, 1937, p. 13).

These early studies indicated that the topics taught in the courses in visual instruction were varied, and included some non-device related topics like "the history of visual education" and the "psychological justification for the use of visual aids," as well as many device-related topics (Starnes, 1937, p. 316). Some of these device-related topics included "technique in using the stereoscope," "technique in the use of motion pictures," "technique in the use of lantern slides, film slides, and opaque projectors," and "mechanics of projectors and projection" (Starnes, 1937, p. 316). Other device-related topics included the advantages and disadvantages to using these various instructional devices.

From these studies, a picture of early courses in technology emerges that shows a focus on theory, history, and psychology as foundations for teaching techniques for using individual devices. Further, devices were assumed to be used primarily by the teachers in the classroom setting, rather than by the students. There were a few notable exceptions that called for involving students in using technology, including "pupil-made glass slides," "photography," and "models" (Starnes, 1937, p. 316).

Later Studies (1940's, 1950's, and 1960's)

In the 10 years following Starnes 1937 study, there were many changes in the landscape of technology in instruction. World War II saw an increase in the use of not only *visual* aids, but *audiovisual* aids to instruct the soldiers. For example, the United States Army contracted Theodor Seuss Geisel, better known as Dr. Seuss, to produce a cartoon that demonstrated the concept that "loose lips sink ships." He produced a full-motion, audio-enhanced cartoon using Mel Blanc's popular "Loony Toons" characters to demonstrate this concept. This is just one example of the many ways that the US Army applied audiovisual instruction to training.

The use of technology use for entertainment purposes in society also gained popularity during this time, especially in the form of motion pictures. Audio-enhanced *color* motion pictures such as The Wizard of Oz gained popularity. These steady increases in the access to and use of technology, as well as the application of technology to instruction in various sectors of society, spurred a name change in the national organization dealing with visual aids. The Department of Visual Instruction (DVI), previously formed in 1923, changed its name to the Department of Audio-Visual Instruction (DAVI) in 1947 to reflect the incorporation of audio into the field (Saettler, 1990). Not surprisingly, the content of the introductory technology course taught to pre-service teachers also shifted to include audio materials. Through four national surveys of introductory technology course, DeKieffer (1947, 1957, 1967, 1977) documented this change, along with many other changes in the course (Table 2.4).

Table 2.4

Numbers and Ranks of Various Items of Content Included in Introductory Courses in Educational Media Offered by Four Year Institutions

Item	Rank			
	1947	1957	1967	1977
1. History and philosophy of educational media	5	5	7	11
2. Operation of equipment	3	1	3	1
3. Production of audio-visual materials				
a. Photographic materials	8	8	10	10
b. Non-photographic materials	7	6	5	4
c. Radio script writing, transcriptions and recordings	9	9	8	6
d. Video	10	10	12	9
e. Other types of productions	-	-	13	12
4. Selection of materials	2	4	2	3
5. Utilization of materials	1	2	1	2
6. Evaluation of materials	4	3	4	5
7. Administration of educational media	6	7	11	13
8. Theory of communication	-	-	6	7
9. Instructional systems	-	-	9	8
10. Other items	11	11	14	14

Source: DeKieffer, 1977

The period between 1947 and 1957 saw a rapid increase in the number of institutions offering an introductory technology course in audiovisual instruction. Initially extension divisions offered these new courses and later schools of education offered them (DeKieffer, 1970). DeKieffer conducted his 1957 survey in the year that the Soviet Union launched the first space satellite, Sputnik. Among other things, this resulted in the United States passing the National Defense Education Act (NDEA) in 1958. This proved to have a significant influence on the introductory technology course.

The NDEA spurred momentum for the teaching of technology, with a primary focus on winning the "space race" with the Soviet Union. The federal grant funding opportunities associated with the NDEA during the "golden years" of the 1960's were discussed at the "systems conference" held at Syracuse University in 1964 (Ely, 1998, p. 14). Along with discussing various federal funding opportunities, a national trend was

identified that recognized that: "With an increasing interest in a comprehensive approach to instructional development, a systems approach was being advocated by leaders in the field" (Ely, 1998, p. 15).

By 1967, recent innovations in communications technology, along with an advocacy for the systems approach in the professional field, manifested itself in the introductory technology course through the addition of two new topics that were introduced after DeKieffer's 1957 survey. Both "Theory and Communication" and "Instructional Systems" were not listed as being taught in the introductory technology course in 1957, but were ranked six and nine respectively in 1967 and seven and eight respectively in 1977 (DeKieffer, 1977, p. 61).

As shown in table 2.4, one of these changes was a significant drop in popularity in the topic "history and philosophy of educational media" from number 1 in 1937, to number 5 in 1947 and 1957, to number 7 in 1967, and finally to number 11 in 1977. DeKieffer interpreted this result by stating that: "In the area of history and philosophy of education media, there appears to have been a de-emphasis with the increased importance on the theory of communication and instructional systems" (DeKieffer, 1977, p. 62). He also noted that that: "It is interesting to note that over the years there has been very little shift in the ranking of the four basic ingredients, namely, operation of equipment, selection, utilization, and evaluation of materials" (DeKieffer, 1977, p. 61).

Recent Studies (1980's and 1990's)

McCutcheon (1984) surveyed instructors of the introductory technology course in the mid-west to determine what factors determined the content of introductory media courses. He found the primary determinant to be the instructors' professional judgment,

as opposed to external mandates, textbook choice, or other external factors (McCutcheon, 1984). In conducting the study, he also revealed that the topics taught in the course focussed on teaching pre-service teachers to produce materials, operate equipment, and apply materials and equipment to instruction (McCutcheon, 1984). The 12 most frequently taught topics in 1984 are listed in Table 2.5.

Table 2.5
The 12 Most Frequently Taught Topics in the Introductory Technology Course

Rank	Topic	% Courses
1-tie	How to operate an overhead projector	100
1-tie	How to operate a 2 x 2 slide projector	100
1-tie	How to operate a 16mm projector	100
4-tie	How to apply overhead projection to instruction	97.4
4-tie	How to produce overhead transparencies: handmade	97.4
4-tie	How to operate a filmstrip projector	97.4
4-tie	Criteria for selection and evaluation of instructional materials	97.4
8-tie	How to apply motion pictures to instruction	94.9
8-tie	How to apply slides to instruction	94.9
8-tie	How to produce mounted materials using rubber cement, tissues and other techniques.	94.9
11-tie	How to apply filmstrips to instruction	92.3
11-tie	How to produce overhead transparencies: thermal	92.3

Source: McCutcheon, 1984

One topic of interest not listed in table 2.5 was "Computer-assisted instruction," which instructors covered in 64.1% of the courses they taught. This placed it at number 40, tied with "How to produce demonstration and display boards" and "How to operate the spirit duplicator." Another topic not listed in the top 12 was "How to operate a microcomputer/printer," which instructors covered in 59% of the courses they taught. This topic placed at number 46, tied with "Instructional research related to the use of media" (McCutcheon, 1984).

At the time the research was conducted, recent surveys of the introductory technology course were limited to the study done by Hargrave (1997), who conducted a

study of schools in the Holmes group, a consortium of Teacher Education programs

taught exclusively at the graduate level. Her research showed that there were certain

topics in the introductory technology course that were more likely to be taught for

curriculum integration than for teacher productivity or personal use. These topics include

graphics/drawing, video editing, database, and hypermedia. Also, presentation software

indicated a significantly higher emphasis on teacher productivity than on personal use

(Hargrave, 1997). From Hargrave's study, the 12 most frequently taught topics in the

introductory technology course at the graduate level in 1997 are listed in Table 2.6.

Table 2.6
The 12 Topics Most Frequently Covered in the Introductory Technology Course Taught
at the Graduate Level

Rank	Topic	% Courses
1	Tool software - word processing	90.7
2-tie	Telecommunications - e-mail	88.4
2-tie	Tool software - graphics/drawing	88.4
4-tie	Telecommunications - internet	86.0
4-tie	Hardware - printer	86.0
6	Computer-based instruction - simulation	76.7
7	Computer-based instruction - problem-solving	74.4
8	Hardware - cd-rom	72.1
9	Tool software - database	67.4
10-tie	Tool software - spreadsheet	65.1
10-tie	Computer-based instruction - educational games	65.1
12	Computer-based instruction - tutorials	62.8

Source: Hargrave, 1997

What is interesting about Hargrave's study is that computer-based topics

dominated the content and focus of the introductory technology course, at least at the

graduate level, whereas McCutcheon's study in 1984 had only one computer-based topic

break the top 40. Also of interest is that only one "Educational Media" topic,

"Transparencies," broke the top 20. This topic was listed at number 18, and taught in

39.5% of the courses (Hargrave, 1997). The remaining 14 educational media topics that

followed included "slide projectors," "motion pictures," "video recording," and many of the topics listed in the top 12 in McCutcheon's study in 1984.

McCutcheon's study in 1984 and Hargrave's in 1997 both were limited in scope, for different reasons. McCutcheon surveyed 39 introductory technology courses taught in mid-west institutions and California, and Hargrave surveyed 43 introductory technology courses in graduate programs in the Holmes group. While there were no other large-scale surveys conducted in the 1980's or 1990's that focused on determining the content and emphasis of the introductory technology course, there were a number of studies that focused on the introductory technology course in other ways.

One study that addressed the desired content in introductory technology courses was a needs-assessment performed by McKenzie (1994). Her study is important because it gathered information from teachers of the introductory technology course, students in an introductory technology course, and administrators from public school systems. The instructional technology course topics suggested by students in her study are listed in table 2.7.

Table 2.7
Suggested Instructional Technology Course Content

Rank	Topic
1	Computers
2	CD-ROM players
3	Videotape player/recorder
4	Laserdisc player
5	Multimedia

Source: McKenzie, 1994

It is interesting to note that, of all the topics all except two--"Laserdisc player" and "Videotape player/recorder"--could be considered computer-based, with no emphasis or

desire for topics in the area of Instructional Design or Communications, both popular

topics in previous surveys.

Cuban and Kirkpatrick (1998) performed another study concerned with the

effectiveness of computer-using classrooms. They addressed the question of whether or

not the computer actually improves students' performances in schools. Their meta-

analysis showed that:

> Student achievement outcomes consistently favored the computer-using
> classrooms. In other words, where students used computers in classrooms, scores
> were repeatedly and significantly higher than the scores of students in the non-
> computer-using classrooms. Percentage differences in scores ranged from 2 to 16
> percentage points. (p. 28)

Cuban and Kirkpatrick, (1998) also concluded that:

> For efficiency and student attitudes, the meta-analysis found that both were
> significantly improved in computer-using classes. Students were able to learn
> more in less time and had slightly better attitudes toward computers, instruction,
> and subject matter. (p. 28)

Overall, Cuban and Kirpatrick's study supports the notion that having the students use the

computer, as their meta-analysis showed, increased performance, efficiency, and attitudes

in those students that used the computer.

Other studies offered recommendations for what topics to teach in the

introductory technology course and revealed in part what was being done by various

groups and in various regions. They did not, however, reveal what was being taught in

introductory technology courses for undergraduate pre-service teachers nationwide.

DeKieffer (1977) performed the last comprehensive national survey of the pre-service

introductory technology course taught at the undergraduate level. It was after

DeKieffer's 1977 study that the proliferation of the computer into society could have

influenced the evolution of the introductory technology course.

<u>Shift in Course Emphasis</u>

Throughout the 1980's and 1990's, there has been an increase in technological innovations in society. The proliferation of the computer in society during this time accelerated the transition from an industrial age to an information age. Apple's initiative to place a computer in every school was one example of the movement to integrate computer technology into education. With this and other similar initiatives, teachers began to see a new tool in their classrooms. Saettler (1990) articulated this point:

> A new hope for the use of the computer in education arose in the late 1970's when the first microcomputer became available to a growing market. By the early 1980s, school systems began to invest heavily in microcomputers for classroom use, and, by 1985, it was reported that there were at least one million microcomputers in American elementary and secondary schools. By 1988, the estimate was as high as three million! (p. 457)

He goes on to describe the era from 1977 to 1983 as a time when educators saw "many anticipated unique benefits from computers in education" (Saettler, 1990). McCutcheon conducted his 1984 survey as this trend just started to have ramifications in the content of the introductory technology course.

Through the late 1980's and 1990's the personal computer continued to proliferate in public schools. By 1995 the number one trend in educational technology was: "Computers are pervasive in schools and higher education institutions. Virtually every student in formal education has access to a computer" (Ely, 1996, p. 15). The proliferation of the computer in education and society at large spurred an important evolutionary step in the changing nature of the introductory media course. Prior to the proliferation of the computer in society and public schools, there were many schools of education that did not have an introductory media course. As the computer became more and more ubiquitous in society, societal forces caused many schools to start an

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introductory technology course to teach pre-service teachers to use the computer. These

societal pressures led an of American Association of Colleges for Teacher Education

(AACTE) subcommittee task force on technology to produce a paper outlining "The

Challenge of Electronic Technologies for Colleges of Education" (Uhlig, 1988, p. 5).

This paper attempted to help Deans of Colleges of Education to address this issue of

technology in their teacher education programs, and was illustrated in the language

leading up to the listing of the 10 considerations for the Deans (Uhlig, 1988).

> In attempting to support Deans who are committed to the integration of
> technology into preservice and inservice teacher education, and at the same time
> convert (or failing that, at least apprise) other Deans, the Task Force identified ten
> "critical considerations for schools, colleges, and departments of education."
> (p.5)

Along with these new courses emerging to teach the computer, the content of the

introductory technology courses already being offered shifted to include computer

technologies, as was seen in the addition of computer-based topics in to newer editions of

textbooks previously used to teach the introductory media course.

Thus, it is proposed that there are two types of courses that can be categorized by

the time that they were initially offered and their relative focus on computer-based

technologies. The older course evolved from previous courses introduced from 1922

through the 1970's and can be associated with members of the Department of Visual

Instruction (DVI), predecessor to the Department of Audio-Visual Instruction (DAVI),

which was predecessor to the Association for Educational Communications and

Technology (AECT). The new course emerged in the late 1970's, 1980's, and 1990's

primarily to teach computer technologies, and is often associated with the content

interests of the membership of International Society for Technology in Education (ISTE).

As stated by long-standing member of AECT and Instructional Technology historian Don Ely: "The trends seem to reflect a hardware emphasis" (1996, p. 33). He also stated that: "The emergence of a new definition for 'educational technologist' is worrisome to some of the more established professionals" (Ely, 1996, p.33).

Both courses continued to be offered through the 1980's and into the 1990's. After the introduction of the computer into society came the introduction of the Internet. The computer, along with the Internet, helped the acceleration toward a global competitive economy. Participation in this worldwide community and access to the information contained in computer software and on the Internet required a new set of skills: computer skills. Societal forces urging the teaching of computer skills in public schools also encouraged pre-service technology courses to inform teachers how to teach their students how to use computers. These forces affected the content of both types of courses, and the degree to which they are discernible from each other today is unknown.

The degree to which various technologies are taught in the introductory technology course is one question, the degree to which they are *used by teachers* is another. Molenda and Harris (in press) reported that overall there has been little research in recent years to track school use of the traditional audiovisual technologies. However, they cited reports from regional media centers that indicated circulation of film and video programs was holding steady after a decline from the high point in the late 1970s.

In one small-scale survey, a national sample of school technology coordinators reported that about three-quarters of all classrooms had VCRs, two-thirds had access to cable or satellite TV, and about one-third of all teachers used cable or satellite systems on a regular basis. The survey also found that approximately four out of five classrooms

were equipped with overhead projectors. The respondents estimated that about one-third of all teachers use the overhead projector daily (Misanchuk, Pyke, & Tuzun, 1999).

Despite these indications that teachers tended to use the traditional audiovisual media at least as heavily as computers, it appears that these media may be neglected in pre-service teacher education programs. A large-scale survey of teachers in Virginia (Center for Community Research, 1999) found that only 5% of teachers reported that they learned how to use video for instruction in their pre-service courses, while 63% said they were self-taught. There were also indications from Hargrave's study (1997) were that traditional media were not emphasized, at least at the graduate level. Thus, the congruency between what is taught in the introductory technology course and what is being practiced in classrooms is also an implication of this study.

Changing Approaches to Teaching Technology Use

Throughout the history of the introductory technology course, instructors considered it appropriate to focus primarily on teaching pre-service teachers the knowledge and skills needed to support their presentation of course material to students. When first introduced, the computer was conceived as just another teaching tool that the teacher could use to present material to the students, with a notable exception being early initiatives in computer programming in the 1980's. A significant departure from this view subsequently occurred. This view calls for a change in the role of the technology-using teacher.

It became increasingly important not only for teachers to be able to use technology themselves, but also to be ready to facilitate their students' use of technology. Some of these conceptions appeared in the literature: "Rather than using technology

simply as a medium for delivering pre-specified content, our research is predicated on the

belief that technology can be used to provide a fertile context from which grounded

constructions may emerge" (Barab, Hay, and Duffy 1998, p. 15). The authors went on to

illustrate a number of ways that technology could be used to provide these contexts,

including using technology as a communication tool, a construction kit, and an

information resource. There are many other ways that grounded constructions can be

made, most of which are predicated on the belief in involving students in using the

technology.

One approach that calls for students using technology is *Mindtools*. The basic

conception of *Mindtools* is that: "Technologies should not support learning by attempting

to instruct the learners, but rather should be used as knowledge construction tools that

students learn with, not from" (Jonassen, Carr, and Yueh, 1998, p. 24). Another

approach, the NteQ Model, proposes that: "The **computer** is not what the students learn

about, but rather a tool they use to collect, investigate, and present their findings and

solutions" (Lowther and Morrison, 1998, p. 33). Yet another approach is Project

TEAMS, an instructional approach in which: "Computer hardware and software are used

during every rotation to provide students with instruction and practice on the skills they

are learning" (Reiser and Butzin, 1998, p. 41). These instructional approaches all

advocate involving students in using the computer to construct knowledge.

One of the primary methods for conveying these approaches to teachers is through

the pre-service introductory technology course. It is likely that instructors of this course

would like to teach pre-service teachers the skills necessary to involve their students in

using technology. Yet there are no studies, which have sought to ascertain the degree to

which pre-service teachers are being taught pedagogical approaches that enable them to facilitate their students' technology use.

The primary goal of this study is to help fill in the gaps between what is known, and what needs to be known, about the content and emphasis in the introductory technology course. There are, however, many factors that could potentially be related to both the content emphasis and the emphasis placed on involving students in using technology, and are of interest in this study.

Access to Resources

At a fundamental level, instructors who wish to teach computer-based topics in their course would likely need access to computer hardware and software. This point was articulated in an Office of Technology Assessment (OTA) report (1995): ". . . many colleges of education have so little equipment that any effort to increase technology presence in coursework would overwhelm existing resources." Without access to computer hardware and software, they might be limited in the number of computer-based topics they could teach. Additionally, without adequate resources, instructors in the introductory technology courses are limited in the extent that they can model techniques used for involving students in technology use. It would be difficult for future teachers to involve their students in using technology without first seeing a model of the instructional techniques. Hargrave (1997) stated this in her recent survey of the introductory technology course:

> Poignantly articulated in the prescriptive literature is the premise that preservice teachers' ability to integrate technology into the curriculum will be the result of two factors: Their basic technology skills and the effective modeling of technology integration by teacher educators. (p. 1)

For example, one teacher educator, Frances Clark (1998), modeled an approach that enabled her class of pre-service teachers to become "Entrepreneurs of imaginary pizza restaurants . . . using computers to create logos, maintain inventories, and maintain account information." It is extremely difficult, and arguably less effective, to teach a pre-service teacher *about* Ms. Clark's project without the use of computers, than for the future teachers to experience firsthand what they then in turn would do with their own students.

Experience of the Instructor

In terms of experience teaching the course, the instructors' backgrounds might be associated with varying content in the course. For example, it is possible that instructors who have taught the course for over 20 years taught the course before computers were introduced, and might have carried through some of the earlier topics such as instructional design or communications, or even some of the audiovisual topics. It is also possible that instructors who have taught the course for less than 10 years have taught computer topics in some capacity for all of this time and might place a higher emphasis on computer-based topics.

Experience might also influence the degree to which the instructor emphasizes teaching pre-service teachers to involve their students in using technology. It is possible that instructors with less experience graduated more recently, and through their coursework learned to place a high emphasis on involving students in using technology. Therefore, this study is interested in the relationship between the emphasis in the course and the different levels of experience of the instructors.

<u>Credit Hours</u>

Another factor that could influence the course content and emphasis placed on involving students in using technology could be the number of credit hours in the introductory technology course. In interviews with instructors of the introductory technology course during the survey development phase of the study, instructors who taught one-credit hour versions of the course indicated that they taught the course primarily as a computer-skills course and had little room for any non-computer-based content or instructional design topics. Thus, the one-credit hour course might place a higher emphasis on teaching computer skills. Additionally, with a high emphasis on computer skills for the teacher, it is possible that the emphasis placed on teaching pre-service teachers to involve their students in using technology would be reduced.

<u>Academic Affiliation</u>

During the formative development of the survey instrument, interviews with instructors in non-instructional technology programs indicated that they placed a heavy emphasis on computer-based topics, primarily to deliver instruction. They also indicated that their colleagues in non-education programs who taught sections of the introductory technology course placed an even greater emphasis on computer-based topics. Instructors from instructional technology programs indicated that they placed less of an emphasis on computer-based topics, and more emphasis on instructional design and "process technologies." Pretest results also indicated differences in course content and emphasis among instructors with different backgrounds. Therefore, the relationship between the course content and emphasis in the course and the academic affiliation of the instructor is of interest in this study.

Textbook and Course Materials

The textbook used in the course might be another influencing factor on the content of the course or the emphasis the instructor places on involving the student in using technology. As stated in McCutcheon (1984, p. 45), "Both Shuy and Kachaturoff (1982) hold the position that curriculum should determine textbook use and selection, but both concede that this does not always take place in practice." For example, instructors using Jonassen's textbook Mindtools might place a high emphasis on teaching students to involve their students in using computers, as the text focuses on teaching principles of instruction with the students at the center of the instructional process. Instructors using Heinich, Molenda, Russell, and Smaldino's text Instructional Media and Technologies for Learning (1999) might emphasize using the technology as teacher support tools and presentation tools, as this text concentrates more on improving teachers' instructional preparation and presentation techniques.

Summary and Conceptual Framework

Prior research on the introductory technology course, current literature, interviews with instructors of the course, and the experience of the researcher as an instructor of the introductory technology course all contribute to form a picture of the introductory technology course. It is a course that is influenced by multiple factors, perhaps in more numerous and complex ways than a typical college course. The introductory technology course instructor typically is responding to forces beyond his/her own department, including state certification requirements, professional association standards, and Teacher Education faculty expectations. These "political" issues are not the norm with other college courses, as the introductory technology course is usually a service course required

of students in many different certification programs, yet not owned by any one program specifically. These factors make it subject to the scrutiny of many different constituencies. Further, the course is highly dependent on hardware and software resources. What to teach and how to teach it may be significantly constrained by access to resources. Other factors influencing the content and emphasis might be comparable to the factors other instructors face, including the instructor's experience and academic affiliation, the number of course credit hours, the materials used in the course, and the audience to whom the course is being taught.

<u>Research Questions</u>

1. What is the content of the introductory technology course?

   (1.1) Does the size of the teacher education program correlate with whether or not an introductory technology course is offered?

   (1.2) What is the section size of the introductory technology course at small, medium and large teacher education programs?

   (1.3) Are there patterns of emphasis in the topics taught in the course that would justify the classification of the course into different categories?

   (1.4) To what extent does the course emphasis correlate with the access to resources needed in the introductory technology course?

   (1.5) To what extent does the course emphasis correlate with the years of experience of the instructor?

   (1.6) To what extent does the course emphasis correlate with the number of credit hours allocated to the course?

   (1.7) To what extent is the course emphasis related to the academic affiliation of the instructor?

   (1.8) To what extent is the course emphasis related to the textbook used in the course?

   (1.9) How does the content of current introductory technology courses compare with the past history of the content of the introductory technology course?

2. In the introductory technology course, what emphasis is placed on teaching pre-service teachers pedagogical approaches that emphasize involving their students in using technology.

    (2.1) To what extent does the emphasis on teaching pre-service to involve their students in using technology correlate with the course emphasis?

    (2.2) To what extent does the emphasis on teaching pre-service teachers to involve their students in using technology correlate with the access to resources needed in the introductory technology course?

    (2.3) To what extent does the emphasis on teaching pre-service teachers to involve their students in using technology correlate with the years of experience of the instructor?

    (2.4) To what extent does the emphasis on teaching pre-service teachers to involve their students in using technology correlate with the number of credit hours allocated to the course?

    (2.5) To what extent is the emphasis on teaching pre-service teachers to involve their students in using technology related to the academic affiliation of the instructor?

    (2.6) To what extent is the emphasis on teaching pre-service teachers to involve their students in using technology related to the textbook used in the course?

Therefore, in order to develop a dynamic understanding of *what* this course is and *why* it is that way, a multifaceted inquiry that probed into these potentially influential factors was conducted.

Chapter Three - Methods

<u>Population and Sample</u>

The population of this study consisted of the first undergraduate introductory technology course taught at American Association of Colleges for Teacher Education (AACTE) member institutions. AACTE was chosen as it has 734 teacher education institution members, with representation from: ". . . more than 85% of new school personnel entering the profession each year . . ." (Hinrichs & Madison, 2000, p. 1). AACTE annually publishes a membership directory that includes information for each institution. Using this information, a spreadsheet was created with a list of school names, institutional representative contact information, and school productivity (number of graduates annually from initial certification programs).

While there are 734 AACTE members, 154 did not report productivity information and were placed in a separate category, which was labeled "unknown size." The remaining 580 institutions were ordered from smallest to largest. The list was divided into three equal strata based on the annual productivity of the teacher education department. The first 193 institutions with the smallest student productivity constituted the "small" stratum, with a range in size from 1 to 71 annual graduates. The next 193 institutions constituted the "medium" stratum, with a range in size from 72 to 218 annual graduates. The final 194 institutions constituted the "large" stratum, with a range of 219 to 1159 annual graduates (Table 3.1).

Table 3.1
AACTE Member Institutions Stratified by Size (N=734)

Stratum size (annual number of teacher education graduates)	Mean number of graduates	Total number of institutions in stratum
Small (1-71)	39.2	193
Medium (72-218)	129.2	193
Large (219-1159)	416.1	194
Unknown-size[a]	Unknown	154

Source: AACTE 2000 Membership Directory
[a] The annual number of teacher education graduates was not reported in the AACTE 2000 membership directory.

AACTE institutional representatives from each of these four strata were sent an e-mail message that requested contact information for the instructor of the first undergraduate introductory technology course at their institution. In the case of multiple instructors, contact information for the most senior instructor at the institution was requested. 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 275 introductory technology courses for which instructor contact information was obtained from institutional representatives.

Survey Instrument Development

A survey instrument was developed to collect information to address the research questions. The development of the survey instrument began first by examining previously conducted surveys (Stracke, 1932; Starnes, 1937; DeKieffer, 1947; DeKieffer, 1957; DeKieffer, 1967; DeKieffer, 1977; McCutcheon, 1984). The major areas addressed in these surveys were analyzed and then the appropriateness of the items was judged based upon the goals of this study.

<u>Interviews.</u>

Interviews were performed with three members of the target population to gain a better picture of what instructors were teaching in the introductory technology course (Appendix A). The interviews revealed information about the course that was neither available from the research, nor necessarily reflected in the current content of the textbooks used in the course. Specific information regarding the topics taught and the motivations and constraints for teaching the topics were revealed. For example, one instructor of a one-credit hour course indicated that if the course had more credit hours, he would be able to cover more topics that went beyond computer competencies. Another instructor indicated that the limited computer knowledge that the students entered the course with dictated that he cover more basic computer topics, but if the students had more background knowledge, he would not cover these basic topics. The interview results helped to modify the survey instrument to best reflect the topics actually taught in the course. In addition to the interviews, the personal experience of the researcher teaching the introductory technology course helped to shape the survey instrument. Further development of the survey instrument was done through a content validity test and a pretest.

<u>Content Validity.</u>

To help establish the validity of the questionnaire, a content validity instrument was developed (Appendix B). From April 1, 2000 through April 5, 2000, the survey instrument and the content validity instrument were presented together to five instructors of the introductory technology course. The content validity instrument asked instructors to express how well items 17A and 18 on the survey instrument addressed the construct

"course emphasis," and how well items 19 and 20 addressed the construct "involving students in using technology." Each of these five instructors was also interviewed to discuss their responses. All of the instructors agreed or strongly agreed that the items listed on the content validity instrument fit the construct it was supposed to address. As such, each of these items remained essentially intact, although the interviews did result in some clarification for each of these items, including the selective use of bold and italic type for emphasis.

    <u>Pretest.</u>

    Once the content validity test was completed and appropriate modifications were made, a pretest of the survey instrument was conducted. The pretest addressed the clarity and length of the survey instrument, as well as face validity, and was conducted with 20 members of the population. At the 1998 meeting of the Professors of Instructional Development and Technology (PIDT) in Smith Mountain Lake, Virginia, 20 instructors volunteered to participate in the pretest. These 20 instructors were contacted via e-mail on April 6, 2000 with a request (Appendix C) to complete a pretest of the survey instrument. One week later, on April 13, 2000, a follow-up message (Appendix D) was sent. Of the 20 instructors contacted, 8 completed a web-based survey instrument that included room for comments after each question. The information gathered from the pretest pertained to the ease of use of the survey, the time needed to complete the survey, and specific information regarding the wording and interpretation of individual questions. 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 item 17B, which addressed the instructor's *desired* course emphasis. Previously only the

actual course emphasis was asked. Parenthetical clarifications were added to items 3B, 5, 8, 9, 17A, and 17B, and item 18 was reorganized to include additional spaces for write-in topics.

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 the e-mail addresses listed in AACTE 2000 membership directory. This message requested the name, e-mail address, and mailing address of the most senior person teaching the introductory technology course. Additionally, for those institutions with no e-mail address listed in the directory, web searches were conducted to obtain an e-mail address for the institutional representative. Of the 734 AACTE institutions, 386 correct e-mail addresses were listed in the membership directory. Another 224 e-mail addresses were obtained through web searches. This left 124 institutions for which no e-mail address was listed in the AACTE membership directory, nor could be found through a web search. Therefore, the total number of institutional representatives for whom a correct e-mail address was ultimately obtained was 610 (Table 3.2).

Table 3.2

Sources of E-mail Contact Information for AACTE Institutional Representatives

Source of e-mail contact information	Number of representatives
Listed correctly in AACTE 2000 membership directory	386
Obtained through web searches	224
Total correct e-mail addresses obtained	610

These 610 institutional representatives--representing 83.1% of the 734 AACTE member

institutions--were all sent an e-mail message (Appendix E) that requested instructor

contact information.

A follow-up message (Appendix F) was sent one week later to those

representatives who did not respond to the initial mailing. In total, 344 of the 610

institutional representatives who were contacted, or 56.4%, responded with basic

information regarding the undergraduate technology course taught at their institution. Of

these 344 responses, 69 indicated that no introductory technology course was offered.

The remaining 275 institutional representatives indicated that an introductory technology

course was offered at their institution, and provided contact information for the instructor

of the course.

Invitation to Participate.

Using the information provided by the institutional representatives, the 275

instructors of the introductory technology course were then sent an e-mail letter of

transmittal (Appendix G) on April 17, 2000, inviting them to participate in a voluntary

survey. Two weeks later, on May 1, 2000, a follow-up e-mail letter of transmittal

(Appendix H) was sent. Both the original letter of transmittal and follow-up included

directions for accessing the online survey instrument. The online survey instrument

started with a cover sheet (Appendix I) describing the study. Suggestions for the letter of

transmittal and cover sheet were taken from Isaac (1990) and Borg (1989). The survey instrument (Appendix J) was then made available on the World Wide Web at the following address: http://www2.potsdam.edu/educ/betrusak/survey/surveystart.html

Upon entering the electronic web address into a web browser, the first thing that the respondent saw was the coversheet. The coversheet included information about the study, confidentiality information, and instructions for completing and submitting the survey. To access the survey instrument, the survey respondent selected the "Click Here to begin the Survey" button located at the bottom of the online coversheet. Once the respondents completed the survey, they pressed the "submit survey" button.

Response Rate.

Completed surveys were collected over a period of approximately five weeks, from April 17, 2000 through May 24, 2000. Of the 275 instructors contacted, 119 returned surveys, which represents 43.3% of the 275 instructors contacted, 19.5% of the 610 institutions contacted, and 16.7% of the 714 AACTE institutions. Of those who responded, 100 indicated that one introductory technology course was offered at their institution, and 19 indicated that their institution offered no course or multiple introductory courses. These 19 respondents were instructed to submit the survey instrument without completing it. The remaining 100 instructors completed and returned the survey instrument.

Additionally, upon submission of the survey the respondents were taken to a screen that reviewed the responses they submitted, as well as gave instructions for requesting a summary of the study. In total, there were 77 requests for summaries of the study, consisting of 1 dean, 3 pretest respondents, and 73 respondents. While not all

respondents requested summaries, the respondents who did request a summary represent

institutions from 35 of the 50 states.

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.

The data were analyzed using the Statistical Package for the Social Sciences

(SPSS). To determine differences among means, the Analysis of Variance (ANOVA)

procedure in SPSS was used. To determine associations among various attributes of the

introductory course, the Pearson Product Moment (PPM) correlation procedure in SPSS

was used. The size of the correlation and the corresponding interpretations used in this

study are based on Cohen's (1988) guidelines, and are illustrated in table 4.1.

Table 4.1
Guidelines for Interpreting the Size of a Correlation Coefficient

Size of r^2	Interpretation
.01	Small
.09	Medium
.25	Large

General Course Information

> (1.1) Does the size of the teacher education program correlate with whether or
> not an introductory technology course is offered?

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 344 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 344 who responded, 275, or 79.9%, indicated that their institution

offered an introductory technology course for undergraduate pre-service teachers.

Additionally, 49, or 14.2%, indicated that at their institution technology use and

integration were integrated into methods courses and other coursework. Another 16, or

5.5%, indicated that their institution had no undergraduate program and 4, or 1.2%,

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 AACTE Institutional Representatives

	Unknown-size [a]	Small (1-71)	Medium (72-218)	Large (219 - 1159)	Total
Intro course offered	32	68	88	87	275 (79.9%)
Coursework integration	5	18	15	11	49 (14.2%)
Grad. program only	6	4	2	4	16 (4.7%)
Not addressed	0	2	2	0	4 (1.2%)
Total responses	43	92	107	102	344

[a] The annual number of teacher education graduates was not reported in the AACTE 2000 membership directory.

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. 68 (73.9%) institutions with small teacher

education programs (1-71 annual graduates) offered an introductory technology course.

This was less than the medium and large programs, which offered the introductory

technology course at rates of 82.2% and 85.3% respectively. The second most popular

method of addressing technology was through methods classes and other coursework.

While most teacher education programs address technology in methods classes and other

coursework to some degree, institutions with small teacher education programs were

more likely to choose this route exclusively (19.6%), than medium programs (14%) or

large programs (10.8%). Only four representatives indicated that technology integration

was not addressed at their institution.

As indicated earlier, the 275 instructors for whom contact information was

provided were then contacted. From these 275 instructors, 119 total surveys were

returned (43.3%). Of those surveys returned, 10 instructors indicated that the institution

at which they taught did not offer an introductory technology course to undergraduate

pre-service teachers. Additionally, nine instructors indicated that their institution offered

multiple introductory technology courses. In total, 19 respondents indicated that either

no course was offered or multiple courses were offered. Instructions on the survey

instrument told these 19 respondents to submit the survey without completing it. The

remaining 100 respondents indicated that their institution offered one introductory

technology course, and completed the survey (Table 4.3).

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

	Unknown-size [a]	Small (1-71)	Medium (72-218)	Large (219-1159)	Total
No course	1	1	3	5	10
Multiple courses	2	1	2	4	9
One course	14	25	30	31	100
Total	17	27	35	40	119

[a] The annual number of teacher education graduates was not reported in the AACTE
2000 membership directory.

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, 10 of the 119

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, 57.6% of the

students were elementary education majors, 26.1% were secondary education majors,

8.5% were special education majors, and 4.5% were non-education majors (Table 4.4).

Table 4.4
Audience of the Introductory Technology Course

Audience	Percent of total students
Elementary education	57.6
Secondary education	26.1
Special education	8.5
Non-education	4.5
Other	4.0

Section Size.

(1.2) Does the size of the teacher education program influence the section size
of the introductory technology course?

The size of the teacher education program not only played a factor in whether or

not the institution offered an introductory technology course, but also in the average

enrollment per section, or section size. There was little difference in section size among

"small," "medium," and "unknown-sized" teacher education programs, which had average

section sizes of 19.7, 20.8, and 21.8 respectively. In "large" teacher education programs,

however, the average section size was 28.2 (Table 4.5).

Table 4.5
Average Sections, Students, and Section Size by Size of Teacher Education Program

	Average no. sections	Average no. students	Average section size
Small	1.9	37.9	19.7
Medium	3.7	74.1	20.8
Large	5.5	144.5	28.2
Unknown-size [a]	3.6	82.3	21.8
Overall	3.8	88	22.9

[a] The annual number of teacher education graduates was not reported in the AACTE 2000 membership directory.

There may be various reasons why different sized teacher education program had different section sizes, including increased enrollments and increased resources to support larger section sizes at larger schools. Resources such as graduate assistants and teaching assistants are examples of resources more likely to be found at larger institutions. With these resources, it becomes more reasonable to have larger section sizes. Whatever the cause may be, the introductory technology courses taught in large teacher education programs had larger section sizes than small or medium teacher education programs. As was discussed on p. 12 in the limitations section, this information is based only on the sections that the responding instructors were teaching at the time the study was conducted, not on all sections taught at that institution.

Course Categories

> (1.3) Are there patterns of emphasis in the topics taught in the course that would justify the classification of the course into different categories?

Information for this question was derived from item #17, which determined the course emphasis. 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."

Early results from the pretest indicated that some instructors emphasized computer-based topics at a different level from what they desired. Some pretest respondents indicated that the actual content of the course did not indicate what content they wanted to teach in the course. At that time no question on the survey instrument gave them an opportunity to contrast the actual content with their desired content. Item #17B was added to account for potential discrepancies between actual and desired content. 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%)	11%	10%	-1%
Moderate comp. emphasis (33%-66%)	17%	28%	+11%
High comp. emphasis (67%-100%)	72%	62%	-10%

As shown in table 4.6, 72% of the courses had a high computer emphasis, 17% had a moderate computer emphasis, and 11% had a low computer emphasis. In comparing the actual course emphasis with the desired course emphasis, one instructor wanted to move from a low to a moderate computer emphasis in the course, and 10% 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 11% 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
Higher emphasis on computer-based topics desired	3
The same emphasis on computer-based topics desired	67
Less emphasis on computer-based topics desired	30

As table 4.7 illustrates, approximately two-thirds of instructors, or 67%, placed the amount of emphasis on computer-based topics that they desired, while the remaining one-third placed an emphasis on computer-based topics different from their desired emphasis. In the one-third who wished to change their emphasis, 30% indicated that they desired to place less of an emphasis on computer-based topics. Only 3% 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 72.5%, while the average desired computer emphasis was 68.3%.

<u>Class Setting.</u>

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	% Other
Low comp. emphasis	11	27.0	68.7	4.3
Moderate comp. emphasis	17	13.2	84.7	2.1
High comp. emphasis	72	7.6	89.2	3.2
Total	100	10.9	86.2	2.9

To further support this idea, there was a low positive correlation ($\underline{r}(100) = .299$, $\underline{p} < .01$)

between computer emphasis and time spent in a computer lab/classroom.

Courses with a high computer emphasis spent 89.2% of class time in a computer

lab/classroom. Surprisingly, in the 17 *moderate* computer emphasis courses 84.7% of

class time was spent in a computer lab/classroom, and even in the 11 low computer

emphasis courses 68.7% of class time was spent in a computer lab/classroom. The high

percentage in this last case may be due to many institutions scheduling all courses of this

type in a computer lab, 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/classroom was 86.2%. This average is

consistent with the high emphasis that most instructors placed on computer-based topics

in the course.

<u>Involving Students in Using Technology</u>

(2.1) To what extent does the emphasis on teaching pre-service to involve
their students in using technology correlate with the course emphasis?

In the final two questions of the survey, 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 4.9
Self-Rated Emphasis on Teaching Pre-Service Teachers to use Technology Themselves and to Involve Their Students' in Using Technology

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

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 (2.31). 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. 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.

A higher emphasis in the course on computer-based topics was associated with a lower emphasis on involving students in using computer-based and non-computer-based technology. There was a small *negative* correlation ($\underline{r}^2(99) = -.08$, $\underline{p} < .01$) between the emphasis on computer-based topics and involving students in using computer-based technology. There was also a medium negative correlation ($\underline{r}^2(99) = -.09$, $\underline{p} < .01$) between the emphasis on computer-based topics and involving students in using non-computer-based technology. In other words, an instructor with a high emphasis on computer-based topics was somewhat less likely to use pedagogical approaches that emphasize involving students in using technology, and somewhat more likely to focus on teaching future teachers to use technology themselves. This could be due to the instructors placing a heavy emphasis on computer competencies, which are often thought of as a prerequisite for more advanced applications of technology. It might be a difficult leap for an instructor to emphasize teaching the pre-service teachers to involve their students in using technology, when they are just learning the technology themselves.

Access to Resources

(1.4) To what extent does the course emphasis correlate with the access to resources needed in the introductory technology course?

(2.2) To what extent does the emphasis on teaching pre-service teachers to involve their students in using technology correlate with the access to resources needed in the introductory technology course?

As much of the course time was spent in a computer lab/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 for small, medium, large, and unknown-sized institutions are listed in table 4.10.

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

Adequate:	Unknown-size [a]	Small (1-71)	Medium (72-218)	Large (219-1159)	Total
Instructor hardware access	4.2	4.2	4.0	4.7	4.3
Student hardware access	4.0	4.0	3.8	4.5	4.1
Total hardware access	4.1	4.1	3.9	4.6	4.2
Instructor software access	3.8	4.2	3.9	4.6	4.2
Student software access	3.6	4.0	3.8	4.5	4.0
Total software access	3.7	4.1	3.8	4.6	4.1
Instructor non-computer equipment access	3.6	4.0	3.7	4.2	3.9
Student non-computer equipment access	3.6	3.9	3.6	4.1	3.8
Total non-computer equipment access	3.6	4.0	3.7	4.2	3.9
Total instructor access	3.9	4.2	3.9	4.5	4.1
Total student access	3.7	4.0	3.7	4.4	4.0
Total access to resources	3.8	4.1	3.8	4.4	4.1

[a] The annual number of teacher education graduates was not reported in the AACTE 2000 membership directory.
Note: All scores in this table were based on a scale with a range from strongly disagree (1) to strongly agree (5)

Courses with limited access to resources were not limited in the computer-based topics that were covered. There was little or no correlation ($\underline{r}^2(99) = .006$, $\underline{p} < .01$) between access to computer-based resources and a emphasis on computer-based topics. This was likely due to the consistently high scores that instructors rated for access to resources for most courses. Overall the course topics covered were not limited by the access to resources in the course.

The review of literature suggested that the access to resources might correlate with a higher emphasis on involving students in using technology. This was not the case, as there was little or no correlation ($\underline{r}^2(99) = .000$, $\underline{p} < .01$) between access to computer-based resources and involving students in using technology. There was a small positive correlation ($\underline{r}^2(99) = .011$, $\underline{p} < .01$) between access to non-computer-based resources and involving students in using technology. Again, this was likely due to the high level of access to resources for most courses, as most instructors agreed or strongly agreed that both their own and their students' access to computer-based resources were adequate to meet the instructional needs of the course.

What is also shown in table 4.10 is that in total, computer hardware access was rated slightly higher (4.2) than computer software access (4.1). Both of these were rated higher than access to non-computer-based equipment (3.9). Other differences were minor, with the overall picture showing that the majority of introductory technology courses had adequate access to resources to meet the instructional needs of the course. However there were still a small percentage of instructors--10% in this study--who reported having inadequate resources.

It was stated in the review of literature that the larger section sizes found in large teacher education programs might be due in part to better access to resources. The responses to questions 10 through 15, illustrated in table 4.10, support this notion. Access to resources was a slightly larger problem for small and medium-sized teacher education programs. Instructors teaching the introductory technology course at large teacher education programs rate their overall access to resources at 4.4, while instructors teaching in small and medium-sized programs rate their overall access to resources at 4.1 and 3.8 respectively. This may help to explain the larger section sizes in the introductory technology course in larger teacher education programs, although there may be other factors at work in this area.

Experience of the Instructor

> (1.5) To what extent does the course emphasis correlate with the years of experience of the instructor?

> (2.3) To what extent does the emphasis on teaching pre-service teachers to involve their students in using technology correlate with the years of experience of the instructor?

It was stated in the review of literature 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 in the last 10 years, and that instructors with less than 10 years of experience would have started teaching after this shift was already complete. Essentially, the thought is 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. As it turns out, this was not the case. There was little or no correlation ($\underline{r}^2(99) = .002$, $\underline{p} <$

50

.01) between the years of experience of the instructor and the course emphasis. This might be due in large part to the fact that 81% of the instructors had 10 or fewer years of experience (Table 4.11).

Table 4.11
Years of Experience of the Instructor

Years of experience	Number	Cumulative %
0	2	2
1	9	11
2	11	22
3	16	38
4	5	43
5	13	56
6	8	64
7	6	70
8	4	74
9	3	77
10	4	81
11	3	84
12	5	89
13	1	90
14	2	92
15	3	95
16	2	97
19	1	98
20	1	99
30	1	100

Note: Median = 5 years of experience

Additionally, it was stated in the review of literature that instructors with less experience possibly graduated more recently and through their coursework were instructed to place a higher emphasis on involving students in using technology. There was a small positive correlation ($\underline{r}^2(99) = .018$, $\underline{p} < .01$) between years of experience and involving students in using computer-based technology, and little or no correlation ($\underline{r}^2(99) = .001$, $\underline{p} < .01$) between years of experience and involving students in using non-computer-based technology.

Of the 100 instructors who responded, only 19 had more than 10 years

experience, while the remaining 81 had 10 or less years of experience. In fact, 56% of

the instructors had five or fewer years of experience and 38% 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.

Credit Hours

> (1.6) To what extent does the course emphasis correlate with the number of
> course credit hours?

> (2.4) To what extent does the emphasis on teaching pre-service teachers to
> involve their students in using technology correlate with the number of
> course credit hours?

The number of credit hours in the introductory technology course was asked in

item #3 on the survey instrument. The lowest number of credit hours offered in any

course was one-half, and the highest was five, with one instance of each. The most

frequent number of credit hours was three (58.6%), followed by two (21.2%), one

(13.1%), four (5.1%), 5 (1.0%) and .5 (1.0%). The median number of credit hours in the

introductory technology course was three (Table 4.12).

Table 4.12
Number of Credit Hours of the Introductory Technology Course

Credit hours	Number of courses
.5	1
1	13
2	21
3	58
4	5
5	1
Total	99

Note: Mean = 2.57, Median = 3.0, Mode = 3.0

Early interviews with instructors of the course indicated that reduced number of

credit hours in the course might limit the course content to computer-based topics, while

higher number of credit hours might enable more non-computer-based topics to be taught. In fact, 9 of the 13 one credit hour courses had a high computer emphasis and 14 of the 21 two credit hour courses had a high computer emphasis, which might seem to support this notion. However, instructors in 46 of 58 of the three credit hours courses also indicated that they had high computer emphasis. Thus, there was little or no correlation ($\underline{r}^2(99) = .000$, $\underline{p} < .01$) between the number of credit hours and the course emphasis. This was due largely to the fact that nearly all courses, regardless of credit hours, had a high computer emphasis.

Interviews with instructors of one and two credit hour introductory technology courses also indicated that these courses placed a high emphasis on teaching computer competencies for the students and placed a low emphasis on teaching future teachers to involve their students in using technology. It was stated that instructors teaching courses with more credit hours might have time to teach beyond computer competencies. The results of this survey indicate that more credit hours in the course did *not* result in more time spent on teaching future teachers to involve their students in using technology, but simply resulted in more time spent on computer-competencies. Thus, there was little or no correlation ($\underline{r}^2(99) = .003$, $\underline{p} < .01$) between course credit hours and emphasis placed on involving students in using computer-based technology. There was also little or no correlation ($\underline{r}^2(99) = .001$, $\underline{p} < .01$) between course credit hours and emphasis placed on involving students in using non-computer-based technology.

Academic Affiliation

> (1.7) To what extent is the course emphasis related to the academic affiliation of the instructor?

(2.5) To what extent is the emphasis on teaching pre-service teachers to involve their students in using technology related to the academic affiliation of the instructor?

It was stated in the review of literature that the academic affiliation of the instructor might be related to the topics taught in the course or the emphasis placed on involving students in using technology. In fact none of these was the case. There was no difference in course content based on the academic affiliation of the instructor ($F(2,97) = 3.032$, $p=.503$). There was also no difference in involving students in using computer-based technology based on the academic affiliation of the instructor ($F(2,95) = .892$, $p=..413$). Finally, there was no difference in involving students in using non-computer-based technology based on the academic affiliation of the instructor ($F(2,96) = .225$, $p=.799$). In other words, there was no difference in course content or emphasis among instructors whose primary academic appointments were from different departments or programs.

A related finding was that instructors affiliated with instructional technology programs were equally likely to place a high emphasis on computer-based topics, and placed no more emphasis on involving students in using technology than instructors from other areas. It is also notable that only 16 of the 100 instructors listed their academic affiliation as Instructional Technology or Educational Technology. Additionally, 12 of these 16 taught in institutions with large teacher education programs (Table 4.13).

Table 4.13
Academic Affiliation of Instructor

	Small (1-71)	Medium (72-218)	Large (219-1159)	Unknown-size [a]	Total
Instructional/Educational Technology	2%	1%	12%	1%	16%
Education - other	21%	28%	19%	10%	78%
Non-education	2%	1%	0%	3%	6%
Total	25%	30%	31%	15%	100%

[a] The annual number of teacher education graduates was not reported in the AACTE 2000 membership directory.
Note: The number of instructors represented in this table is 100.

Among the remaining instructors, 78 listed themselves as being affiliated with education in general, and six listed their primary academic affiliation as non-education. Overall, the majority of instructors of the introductory technology course were affiliated with education, and in some larger teacher education programs, affiliated with Instructional Technology. It was rare for an instructor of the introductory technology course at an institution with a small or medium-sized teacher education programs to be affiliated with Instructional Technology, possibly due to the limited number of IT programs at institutions with small or medium-sized teacher education programs.

Textbook and Course Materials

> (1.8) To what extent is the course emphasis related to the textbook used in the course?

> (2.6) To what extent is the emphasis on teaching pre-service teachers to involve their students in using technology related to the textbook used in the course?

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, 59 of the 100 respondents used at least one

textbook, 54 used locally compiled print materials, and 64 used locally compiled

electronic materials.

Table 4.14
Materials Used in the Introductory Technology Course

Course material	No. required	No. recommended	Total
Textbook	56	3	59
Locally compiled print materials	49	5	54
Locally compiled electronic materials	54	10	64

While a textbook was required in 56 courses and recommended in 3 more, the

actual textbook used was far from consistent. In total, for the 59 courses that used

textbooks, there were 31 different textbooks required. The top 10 most popular texts

used are listed in table 4.15.

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

Rank	Textbook adopted (or used)	Author(s)	n
1	Teachers Discovering Computers	Shelly, Cashman, Gunter	8
2	Instructional Media and Technologies for Learning	Heinich, Molenda, Russell, and Smaldino	6
3	Integrating Educational Technology into Teaching	Roblyer and Edwards	4
4-tie	Instructional Technology for Teaching and Learning	Newby	3
4-tie	Computer Education for Teachers	Sharp	3
4-tie	The Computer as an Educational Tool	Forcier	3
7-tie	Using Technology in the Classroom	Bitter and Pierson	2
7-tie	Integrating Technology for Meaningful Learning	Grabe and Grabe	2
7-tie	Computer Technology in the Classroom	Morrison and Lowther	2
7-tie	Essentials of Educational Technology	Schwartz and Beichner	2

The textbook used did not prove to be related to the course content or emphasis.

There was no difference in course content based on textbook used in the course ($F(27,31)$

= .836, p=.679). There was also no difference in involving students in using computer-

based technology based on the textbook used in the course ($F(27,31) = 1.593$, p=.106).

Finally, there was no difference in involving students in using non-computer-based

technology based on the textbook used in the (F(27,31) = 1.175, p=.330). This was likely

due to the inconsistent choice of textbook and the extremely large number of overall

textbooks used (32 different textbooks were used).

Course Content

> (1.9) How does the content of current introductory technology courses
> compare with the past history of the content of the introductory
> technology course?

Like previous surveys of the introductory technology course, this survey sought to

ascertain the most popular topics taught in the introductory technology course. The top

12 most frequently taught topics are listed in Table 4.16.

Table 4.16
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, 9 were computer-based topics, with the top 7 all being

computer-based topics. The remaining three topics were instructional design, technology

integration, and trends/ethics/issues. Of note is that there were no audiovisual topics

among the top 12. Hargrave's 1997 study showed that the majority of topics being taught

in the introductory technology course at the graduate level were computer-based. This study shows that the majority of topics taught at the undergraduate level were also computer-based. In the last national survey of the undergraduate introductory technology course conducted 23 years ago by DeKieffer (1977), there were no computer-based topics taught. Sixteen years ago, McCutcheon (1984), in his study of 39 mid-west institutions, showed that no computer-based topics had broken the top 12, with the highest rated computer-based topic being computer-assisted instruction, ranked 40, tied with "how to operate the spirit duplicator." This demonstrates a dramatic change in the introductory technology course-- a nearly complete shift towards an emphasis on computer-based topics--in just 16 years.

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 4.17
Topics Taught in the Introductory Technology Course

	No. of courses	Rank	Average in-class hours (when taught)	Rank
Computer-based topics				
Internet / world wide web	95	1	5.03	2
Presentation software	90	2	4.44	4
Word processing / desktop publishing	87	3	3.94	5
E-mail/discussion groups/newsgroups	84	4	2.33	12
Spreadsheets	83	5	3.42	7
Software evaluation	80	6	2.58	10
Databases	76	7	3.39	8
Multimedia authoring	66	10	4.8	3
Hardware installation and troubleshooting	46	12	1.79	16
Scanning/digital imaging/graphics (write-in)	11	18	2.14	14
HTML/web page creation (write-in)	9	19	3.67	6
Basic computer terminology (write-in)	4	20	3.0	*
Copyright/ethics/social issues (write-in)	4	20	4.0	*
Course management software (write-in)	3	22	1.67	*
Assistive technology (write-in)	3	22	2.0	*
Video capture (write-in)	2	24	.75	*
DVD (write-in)	1	27	2.5	*
Non-computer-based topics				
LaserDiscs	22	14	1.34	17
Video and/or film	21	15	1.63	16
Video conferencing	20	16	2.01	15
Overhead projectors	16	17	1.04	18
Distance learning (write-in)	2	24	3.00	*
Instructional design/theory/history topics				
Trends/ethics/issues	74	8	2.16	13
Technology integration	72	9	5.08	1
Instructional design	60	11	2.56	11
Psychological/learning theory	34	13	3.08	9
Technology standards (write-in)	2	24	1.13	*

* 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.

In terms of the evolution of the introductory technology course, nearly all courses have adopted a primary focus on computer-based topics. It is unclear which courses are new courses added to teacher education programs to teach computer-based content, and

which are older introductory technology courses that have shifted their focus to incorporate computer-based content. What is clear is that there is very little carryover from early conceptions of the course, especially in the time since the last national survey of the undergraduate introductory technology course took place.

The shift to computer-based topics, it seems, is complete. In fact, when instructors were asked to rate the relative emphasis they placed on computer-based topics, 30 of 100 felt that they spent more time on computer-based topics than they desired, while only three thought they spent less time than they desired on computer-based topics. This indicates that in the opinion of many of the instructors, the shift in emphasis to computer-based topics is more than just complete, in fact, it has shifted too far.

Chapter Five - Summary and Conclusions

Summary

The primary purpose of this study was to ascertain the current status of the shift in focus of the introductory technology course taught to undergraduate pre-service teachers in the United States. To this end, institutional representatives listed in the 2000 AACTE membership directory were contacted to obtain basic course information and instructor contact information. Once this information was obtained, the instructors of the introductory technology course were contacted with a request to complete a questionnaire regarding the content and focus of the introductory technology course they taught in the Spring 2000 semester. Completed questionnaires were returned over a period of one month, and compiled to reveal the current content, including the relative emphasis placed on computer-based content. Further, the relative focus instructors placed on teaching technology for use by the teachers themselves was documented, along with the emphasis placed on teaching pre-service teachers approaches that involve their students in using technology.

Conclusions

Perhaps the most noteworthy conclusion to be drawn from this study is that the current version of introductory technology course taught to undergraduate pre-service teachers nationwide is focussed primarily on computer-based content. This focus brings with it a somewhat decreased emphasis on traditional audiovisual technologies. Further, these courses are characterized by an emphasis on teaching per-service teachers to use technology themselves, rather than teaching teachers to involve their students in using technology.

It is clear is that the conception of the introductory technology course has changed significantly since the last national survey of the undergraduate technology course. There were in fact no common topics in the top 12 between DeKieffer's 1977 study and the current study. Additionally, there were no common topics in the top 12 between McCutcheon's 1984 study and the current study. Whereas 11 of the top 12 topics in McCutcheon's study were audiovisual topics, none of the top 12 topics were audiovisual topics in the current study. Rather, computer-based topics were dominant, and included the top 7, as well as 9 of the top 12. Keep in mind that in 1984 the highest computer-based topic shared the number 40 spot with "how to operate the spirit duplicator."

Overall, the nearly complete shift away from audiovisual topics that were typical in the introductory technology course since its inception in 1918, and toward computer-based topics, is remarkable. This is especially noteworthy in light of the fact that most *practicing* teachers are still using traditional audiovisual devices. While the shift to computer-based content is nearly complete, there were still some instructors who had a moderate or low emphasis on computer-based topics. As such, the course *can* be categorized by its relative emphasis on computer-based topics. However, the low and moderate computer emphasis categories had much smaller numbers than the high computer emphasis category, which was by far the most popular among instructors.

Beyond the relative focus on computer-based content, a snapshot of the introductory technology course as it exists in the year 2000 emerges from the data. An overall picture of the introductory technology course shows that most institutions offered the course, although institutions with small teacher education programs were somewhat less likely to offer an introductory technology course than institutions with medium or

large teacher education programs. While it was clearly the minority, especially for larger programs, some institutions taught technology integration exclusively through other teacher education coursework.

When taught, the course was typically three credit hours, although there were also many one and two credit hour courses. The section size was usually around 20 in small and medium-sized teacher education programs and just under 30 in large programs. The audience of the course consisted primarily of elementary education majors, followed by secondary education and special education majors.

The instructor of the introductory technology course was typified by having five or fewer years of experience, and if the instructor had more than five years experience, it was usually 10 years or less. In most cases the instructor was affiliated with a school or department of education, although in some cases, usually in larger teacher education programs, the instructors had an Instructional Technology affiliation. Rarely was the instructor affiliated with a non-education department. The instructor typically had adequate resources to teach the course, although the access to resources was often better at institutions with large teacher education programs. This improved access to resources might help to explain the larger section sizes reported by instructors at institutions with larger teacher education programs. Locally compiled print materials and locally compiled electronic materials were both popular, with locally compiled electronic materials being somewhat more popular among instructors. A textbook was also commonly used (in 59 of 100 courses). While many instructors used textbooks, they did not typically use the same textbook, and there was no single text that was widely popular. Of the 59 instructors that used textbooks, there were 31 different textbooks used, with the

average textbook used by less than two instructors. None of these factors, however, seems to change the fact that the primary emphasis of the course was on computer-based content.

While most instructors acknowledged placing a high emphasis on computer-based content, many instructors indicated that they placed a higher emphasis than they desired. Nearly one-third of the 100 instructors who responded desired to teach *less* computer-based content, while only three total instructors desired to teach *more* computer-based content. While the majority of instructors placed a high emphasis on computer-based content and had no desire to change, many of the instructors placed a higher emphasis on computer-based content than they desired.

Regarding the focus of the instruction in the course, its primary emphasis was on teaching pre-service teachers to use technology themselves, although there was an emphasis placed on teaching teachers to involve their students in using technology as well. There were very few correlations between the factors identified studied and the relative focus on instructing pre-service teachers to involve their students in using technology, although two correlations were significant.   Specifically, there was a low negative correlation between computer content emphasis and instructing teachers to involve their students in using computer-based technology, as well as a low negative correlation between a computer content emphasis and instructing teachers to involve their students in using non computer-based technology. While both were low negative correlations, this indicates that, at least to a small degree, the more a course emphasized computer-based content, the less focus was placed on involving students in using both computer-based and non-computer-based technology. Other factors, for which an

association might be expected, were not significantly correlated with the relative emphasis placed on instructing pre-service teachers to involve their students in using technology. This may be due to the high percentage of respondents who indicated emphasizing computer content. This in turn made for a lack of variation in responses, which by default allows for less variance of statistical or practical significance.

Discussion

Being a descriptive study, it would be inappropriate to draw conclusions for policy or practice. However, the conditions described may have relevance for practitioners and researchers.

Relevance for Practitioners.

Instructors of the introductory technology course may wish to compare the content and emphasis of their course with what other instructors are teaching. An early indication of this was seen in many respondents' interest in a summary of the study. Of the 100 respondents, 73 indicated that they desired a summary of the study once it was completed. Additionally, a summary of the results was shown at a session given the AECT 2000 conference in Denver. Those who attended the session were interested primarily in what topics other instructors were teaching, so that they might modify their course to be more consistent with what was going on nationwide. The desire to inform the community of people responsible for the design and delivery of the introductory technology course is a common thread from the earliest surveys of the course through the current study.

<u>Recommendations for Further Research.</u>

In studying the introductory technology course in the future, articulations between the first introductory technology course and later technology courses would be valuable. A few instructors commented at the end of the questionnaire that other courses in the instructional sequence significantly influenced their focus in the introductory technology course. Specifically, these instructors indicated that the first introductory technology course was primarily a computer-competencies course, while later courses focussed more on the application of technology to instruction. The initial interviews with instructors, the content validity interviews, and the pretest submissions all failed to indicate that additional technology courses were typically offered later in the students' instructional sequence. It would be valuable to know how widespread additional technology courses are, as well as the extent to which these courses influence the content and focus of the introductory technology course.

It would also be interesting to study further why one-third of instructors would like to reduce the computer emphasis. Specifically, why do they not make the changes they would like to make? McCutcheon (1984) revealed that the number one determinant of the content of the introductory technology course was the instructors' judgement of what should be in the course. It seems that this version of the introductory technology course may have other content determinants that, in some cases, are more influential than the instructors' judgement.

While this study attempted to describe the shift in content away from traditional audiovisual technologies, and toward computer-based topics, it fell short in this regard. The fact that most courses are currently focussed on computer based content does not

necessarily imply how they came to be this way. Further research in this area might help to reveal to causes of this dramatic shift.

While the causes that have shaped the current version of the introductory technology course are less clear, the current status of the course is much clearer, and has been articulated. What has not been articulated is what the introductory technology course *should* look like. It is hoped that the current status of the course as identified by this study, along with research that indicates what is currently being used by practicing teachers, will be used in future studies that propose to specify the content of the introductory technology course. Such a study should also seek to identify the substantive differences between how technology is taught. Specifically, institutions have a choice to offer (or require) a pull-out technology course, or integrate technology into other coursework. This choice should be kept in mind when recommending the content and emphasis of the introductory technology course, as a stand-alone course itself may not be the most appropriate way of addressing technology competencies. Further, it is hoped that this study will be used as a point of comparison with the course as it exists in the future, as well as a link to the course as it has existed in the past.

There are many possibilities for future versions of the introductory technology course. Based on current societal trends, the teaching of computer competencies will continue to be taught at ever-earlier ages. In many locations high school students are taught computer-competencies, and in some locations elementary school students are taught computer-competencies, a trend that that might increase in the future. This trend towards teaching competencies at earlier ages could lead to less of a focus on computer competencies in the introductory technology course, and more of a focus on the

application of the technology competencies that the students bring with them to the course. Alternatively, it might simply lead to teaching more sophisticated computer competencies. It will be left to future studies to determine how these and other factors manifest themselves in the content and emphasis of the introductory technology course.

References

Barab, S.A., Hay, K.E., & Duffy, T.M. (1998). Grounded Constructions and How Technology Can Help. TechTrends, 43(2), 15-23.

Borg, W.R. & Gall, M.D. (1989). Educational research: an introduction, 5th edition. White Plains, NY.

Clark, F.T. (1998). Integrating Technology into the Classroom: A Teacher's Perspective. TechTrends, 43(2), 45-46.

Cohen, J. (1988). Statistical Power Analysis for the Behavioral Sciences 2nd edition. Hillsdale, New Jersey.

Cuban, L. & Kirkpatrick, H. (1998). Computers Make Kids Smarter--Right? Technos, 7(2), 26-31.

DeKieffer, R.E. & DeKieffer, M.H. (1970). Media milestones in teacher training. Pullman, WA: The Educational Media Council.

DeKieffer, R.E. & DeKieffer, M.H. (1977). Media milestones in teacher training revisited. Washington, D.C.: Information Futures.

Ely, D.P. (1998). The Evolution of Instructional Design & Development: The Syracuse Program at Fifty. Syracuse, NY: Center for Support of Teaching and Learning.

Ely, D.P. (1996). Trends in educational technology 1995. Syracuse, NY: Center for Science & Technology.

Hargrave, C.P. & Hsu, Y. (1997, April). Survey of instructional technology courses for pre-service teachers. Paper Presented at the meeting of the Society for Information Technology and Teacher Education, Orlando, Florida.

Heinich, R., Molenda, M., Russell, J.D., & Smaldino, S.E. (1999). Instructional media and technologies for learning, 6th Edition. Upper Saddle River, NJ: Prentice-Hall.

Hinrichs, D. & Madison, S. (Eds.) (2000) AACTE 2000 Directory of Members. Washington, D.C.: AACTE Publications.

Isaac, S. and Michael, W.B. (1990). Handbook in research and evaluation, 2nd edition. San Diego, CA.

Jonassen, D.H., Carr, C., & Yueh, H-P. (1998). Computers as Mindtools for Engaging Learners in Critical Thinking. TechTrends, 43(2), 24-32.

Kachaturoff, G. (1982) Textbook evaluation and selection: a professional responsibility. The Social Studies, 73(1), 32-36.

Lowther, D.L. & Morrison, G.R. (1998). The NTeQ Model: A Framework for Technology Integration. TechTrends, 43(2), 33-38.

McCutcheon, J.W. (1984). Factors Influencing the Content of Introductory Educational Media Courses. Doctoral Dissertation, Indiana University, Bloomington, IN.

McKenzie, B K. (1994). What Content Should be included in Pre-Service Instructional Technology Courses? Technology and Teacher Education Annual. 423-426.

Misanchuk, M, J. G. Pyke, & H. Tuzun. (1999). Trends and issues in educational media and technology in KB12 public schools in the United States. Instructional Media, Newsletter #24 (Spring 1999): 3-5.

Molenda, M., & Harris, P. (in press). Issues and trends in instructional technology. In R.M. Branch & M.A. Fitzgerald (Eds.), Educational Media and Technology Yearbook 2001: Volume 26. Englewood, Co: Libraries Unlimited.

Morrison, G.R., & Lowther, D.L. (1998). Learning with Computers in the K-12 Environment. TechTrends, 43(2), 14.

Reiser, R.A. & Butzin, S.M. (1998). Project TEAMS: Integrating Technology into Middle School Instruction. TechTrends, 43(2), 39-44.

Saettler, P. (1990). The evolution of American educational technology. Englewood, Co: Libraries Unlimited.

Shuy, R.W. (1988) What the teacher knows is more important than texts or tests. Language Arts, 58(8), 919-929.

Starnes, G.W. (1937). The Present Status of Teacher Training in the Use of Visual Aids. The Educational Screen, 16(10), 315, 316, 331.

Stracke, G.A. (1932). What is Being Taught in Courses in Visual Instruction? The Educational Screen, 11(1), 204.

Uhlig, G. E., and Tucker, S. (1988). The Challenge of Electronic Technologies for Colleges of Education, SIGTE Bulletin 4(3) 5-8.

U.S. Congress, Office of Technology Assessment, Teachers and Technology: Making the Connection, OTA-HER-616 (Washington, DC: U.S. Government Printing Office, April 1995).

Yun, G.W., and Trumbo, C.W. (2000) Comparative Response to a Survey Executed by Post, E-mail, & Web Form. <u>Journal of Computer Mediated Communication</u>. 6(1) 1-14.

Appendix A - Interview Questions

Interview Questions

1) Is the introductory media and technology course offered at (university name) a required course of all education majors? Do other non-education majors take the course?

2) How many sections of the course will be offered in the fall semester? What is the average class size of these sections? Are the students in these sections randomly placed, or placed according to their concentration?

3) How many instructors will be teaching these sections? Are the instructors who teach the course predominantly full-time faculty, part-time faculty, adjunct faculty, or graduate students?

4) Approximately what percentage of the students who take this course are Elementary Education Majors? Secondary Education Majors? Non-Education Majors? If non-education majors take the course, what major do they typically have, if any?

5) What class year are students who take this course? Do you recommend that the students take this course early as freshman or sophomores, or later as juniors and seniors?

6) In terms of the general scope and purpose of the course, what weighting do you give to computer competency, traditional media utilization, instructional design/ development, or other areas?

7) What, if any, is the required textbook for the course? (if yes) Why was this textbook chosen? Did the title of the textbook influence the title of the course? (if no), Why is there no required textbook? Why was the title of the course chosen? What instructional resources are used in lieu of the textbook?

8) What topics are taught as part of the course? (if a textbook is used) Were these topics influenced by the content of the textbook?

9) What determined the content sequence for the course?

10) Regarding methods used in the course, how would you weight the importance and time given to standard class discussions, teacher demonstrations, laboratory time, or other methods?

11) What type of out-of-class work are students required to do?

12) Do the topics being covered influence what in class or out of class methods are used in the class? How?

13) How many computers do your students have access to during a standard classroom session? Do you feel that this is adequate? What is the quality of technical support for these sections?

14) How many computers do your students have access to during a class held in a computer lab? Do you feel that this is adequate? What is the quality of technical support for these sessions?

15) Describe the availability of software and equipment for use in the course?

16) Describe the role that e-mail plays in the course. Do all of the students have e-mail accounts through your school?

17) Describe the role that the World Wide Web plays in the course. Do all of the students have World Wide Web access?

18) Do your students have the ability to create their own World Wide Web pages through accounts provided by (institution name)? (if yes) Do the students use these accounts for class purposes? (if no) Would the course change if there were accounts provided?

Appendix B - Content Validity Instrument

Instructions: Please rate how well each item fits the given construct by marking your agreement or disagreement with each item. If you disagree that the item fits the construct, please indicate why. If you have any items that you think should be included, yet are not listed below, please write them in the space provided at the bottom of each table. You will need to have the survey instrument available to complete this instrument. In indicating your answers, please use the following scale:

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SD	D	N	A	SA

Construct: Course Emphasis
Definition: The relative content emphasis of the course on one of two areas: A) computer-based hardware/software, or B) non-computer-based topics, including: traditional audiovisual media use; instructional design; instructional theory; or the history of IT.

Questionnaire Item	This item fits the construct "Course Emphasis" well	If this item does not fit the construct, why?
Question # 17A	SD D N A SA	
Question # 18	SD D N A SA	
Please indicate any items you think should be included:_____ _____		

Construct: Involving Students in using Technology
Definition: The relative emphasis place in the introductory technology course on teaching future teachers to facilitate the use of technology by their students.

Questionnaire Item	This item fits the construct "Involving Students in using Technology" well	If this item does not fit the construct, why?
Question 19.A	SD D N A SA	
Question 19.B	SD D N A SA	
Question 20.A	SD D N A SA	
Question 20.B	SD D N A SA	
Please indicate any items you think should be included:_____ _____		

Appendix C - Letter Sent to Institutional Representatives

Date: Thu, 6 Apr 2000
To: Teacher Education Representatives
From: "Anthony K. Betrus" <betrusak@potsdam.edu>
Subject: Introductory Technology Course

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 Spring 2000 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
216 Satterlee Hall
SUNY Potsdam
Potsdam, NY 13676

Appendix D - Follow-up Letter Sent to Institutional Representatives

Date: Thu, 13 Apr 2000
To: Teacher Education Representative
From: "Anthony K. Betrus" <betrusak@potsdam.edu>
Subject: Introductory Technology Course

Teacher Education Representative,

You are receiving this message as a follow-up to a message sent April 16th 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 part of a doctoral dissertation being conducted at Indiana University, department of Instructional Systems Technology, and is the first national survey of the introductory technology course at the undergraduate level to be conducted since 1977. (see below if your institution does not offer an introductory technology course)

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 Spring 2000 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:

(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

Appendix E - Cover Letter to Pretest Participants

To: Pretest Participants
From: "Anthony K. Betrus" <betrusak@potsdam.edu>
Subject: Introductory Technology Course Survey *Pretest*

Xxxxxxx,

You are receiving this message as a result of a discussion held at the 1998 PIDT conference in Smith Mountain Lake, Virginia. The discussion there pertained to teaching technology to pre-service teachers. During that discussion, I shared with you my desire to conduct a national survey of Introductory Technology Courses. After the discussion, you agreed to participate in a pretest of the survey instrument.

It is almost two years later, and the pretest is now ready. In the time between the 1998 PIDT conference and now, I have placed the survey on the World Wide Web, and the pretest instrument I would like you to complete is also available online. Below is a letter of transmittal, describing your role in the study. At the bottom of this message is the URL for the online pretest. If you could please complete the survey pretest by April 14th, that would allow me time to get the survey tightened up and out to the full recipient list by the end of this semester. If you can not complete the pretest, that is not a problem at all, I would just ask that you let me know,

Thanks, and I look forward to your feedback,

Below is the cover letter

Department of Instructional Systems Technology
INDIANA UNIVERSITY
Bloomington, Indiana

April 7, 2000

Survey Pretest Participant:

A survey instrument concerned with the content taught in introductory technology courses taught to undergraduate education students is currently being developed as part of a study being carried out by the Instructional Systems Technology department at Indiana University. This project is concerned specifically with determining the present status of the introductory undergraduate technology courses taught to pre-service 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. We invite you to participate in this pretest of the survey instrument. We have included space after each

question for you to fill in comments about the question. Simply type any problems you had with the question in the space provided beneath the question. We will use your feedback in modifying the survey instrument before being sent to the entire survey population.

It will be appreciated if you will complete the electronic survey prior to April 14, 2000.   We would welcome any comments that you may have concerning any aspect of principal selection not covered in the instrument. While your responses will be held in strictest confidence, we would like you to send us your e-mail so that if we have any questions about your feedback we can contact you.

We will be pleased to send you a summary of the final survey results if you desire. Once you have completed the survey, and have submitted the results, you will be taken to a page that thanks you for completing the survey. If you wish a copy of the results, you can click on the link that states "Click here to request a summary of this study" on the thank you page. You may also respond directly to this e-mail if you wish.

To begin the pretest, copy the following URL into your web browser:

http://www2.potsdam.edu/educ/betrusak/survey/preteststart.html

Sincerely,

Anthony K. Betrus

Appendix F - Follow-up Letter to Pretest Participants

To: Pretest Participants
From: "Anthony K. Betrus" <betrusak@potsdam.edu>
Subject: Introductory Technology Course *Pretest*

April 14, 2000

Survey Pretest Participant,

I am following up on an April 6th message requesting your participation in a pretest of an instructional technology course survey. I was hoping to get most responses in by 4/14/00, but I understand that everyone has other commitments, and there were times that our server was down as well. If you can not participate in this pretest (so far the average time of the people completing it is 15 minutes), just let me know, and I'll remove you from my list, no problem. If you can participate, please respond by Monday, April 17th if possible, and
April 21st at the latest.

A national survey of the introductory technology course has not been done since 1977, and I would like to make sure that the survey as it stands is clear, concise, complete, and easy to fill out. This is where you come in. I have left comment sections after each section for you to include any comments about the question. You need not fill in all of these comment fields, only for questions that you feel need clarification.

Thanks, and I look forward to your feedback.

To begin the pretest, copy the following URL into your web browser:

http://www2.potsdam.edu/educ/betrusak/survey/preteststart.html

Appendix G - Cover Letter sent to Survey Participants

From: "Anthony K. Betrus" <betrusak@potsdam.edu>
Subject: Introductory Technology Course Survey

Department of Instructional Systems Technology
INDIANA UNIVERSITY
Bloomington, Indiana

April 17, 2000

Survey Participant:

This survey, concerned with the content of introductory technology courses taught to undergraduate education students, is part of a study being carried out by a doctoral student in the Instructional Systems Technology department at Indiana University. 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 to April 30, 2000. We would welcome any comments that you may have concerning any aspect of principal selection not covered in the instrument.

We will be pleased to send you a summary of the final survey results if you desire. Once you have completed the survey, and have submitted the results, you will be taken to a page that thanks you for completing the survey. If you wish a copy of the results, you can click on the link that states "Click here to request a summary of this study" on the thank you page.

Copy the following URL into your web browser to begin the survey.
http://www2.potsdam.edu/educ/betrusak/survey/surveystart.html

Sincerely,

Anthony K. Betrus

Appendix H - Follow-up Cover Letter for Survey Participants

To: Intro Tech Course Instructors
From: "Anthony K. Betrus" <betrusak@potsdam.edu>
Subject: Introductory Technology Course Survey

Department of Instructional Systems Technology
INDIANA UNIVERSITY
Bloomington, Indiana

April 30, 2000

Survey Participant:

It has come to my attention that many of you were unable to access the online survey instrument referred to in the message sent April 17th requesting your participation in a national survey of the introductory technology course taught to undergraduate education students. I have looked into the problem, and the computer that housed the survey was prone to crashing, which occasionally left the online survey instrument unavailable. I would like to apologize for any inconvenience that this may have caused you, and have moved the survey instrument to a more stable server. You may now access the survey instrument at the new address listed at the end of this message. You may also access the survey instrument from the address listed in the original message.

Additionally, do to the anonymous nature of the survey submissions, you may be receiving this message even if you have filled out the survey instrument. I would like to thank those of you who have taken the time the 10-20 minutes (15 minutes being the average) to complete the survey. Your input is invaluable in helping to determine the current state of the introductory technology course taught to undergraduate pre-service teachers. The most recent national survey of the introductory technology course was conducted in 1977, and much has changed since that study. It is the sincere hope of this researcher that you will take the time to participate in this year 2000 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.

I am 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.

Do to the technical problems with the original survey instrument, the date for submission of the survey instrument has been extended to May 7, 2000. I would welcome any comments that you may have concerning any aspect of principal selection not covered in the instrument.

I will be pleased to send you a summary of the final survey results if you desire. Once you have completed the survey, and have submitted the results, you will be taken to a page that thanks you for completing the survey. If you wish a copy of the results, you can click on the link that states "Click here to request a summary of this study" on the

thank you page. If you have already completed the survey, and would like a copy of the results, you may reply to this message, and include the words "summary request" in the subject or body of the message.

To begin the survey, copy the following URL into your web browser.

http://www.potsdam.edu/betrusak/survey/survey3start.html

Sincerely,

Anthony K. Betrus

Appendix I - Study Information Sheet

INDIANA UNIVERSITY - BLOOMINGTON
STUDY INFORMATION SHEET
Trends in Teaching the Introductory Technology Course
for Undergraduate Pre-Service Teachers

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

This study information sheet has been prepared to inform you how the information gathered in the survey will be confidentially managed. 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, 99 Elm St., Potsdam, NY 13676 betrusak@potsdam.edu. Please respond to the survey by April 30, 2000.
*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. Results of this survey will be available by request from Anthony Betrus by conventional mail at 99 Elm St., Potsdam, NY 13676, or by e-mail at betrusak@potsdam.edu upon completion of this study.

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, Response-O-Matic, whose role is to serve as a form server. Your survey submission information is never looked at or recorded by Response-O-Matic. Once a form is processed, and the information is sent to the researcher, all files are deleted from the Response-O-Matic servers. 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.
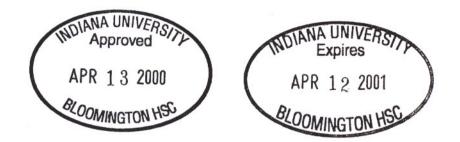
CONTACT

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 the office for the Human Subjects Committee, Bryan Hall 110, Indiana University, Bloomington, IN 47405, (812) 855-3067, iub_hsc@indiana.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.

Study #97-1785
Indiana University
Bloomington HSC
Approved: April 13, 2000
Expires: April 12, 2001

Click Here to begin the Survey

Appendix J - Survey Instrument

Department of Instructional Systems Technology
Indiana University
INSTRUCTIONAL TECHNOLOGY COURSE SURVEY

1) Does your institution offer an introductory technology course to undergraduate education majors?
❍ Yes - *continue with question 2*
❍ *If No, stop, scroll down to the end of this survey and press the submit button to submit the survey (please do not answer any other questions)*

2) 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). - *continue with question 3*
❍ 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) - *stop, scroll down to the end of this survey and press the submit button to submit the survey (please do not answer any other questions)*

GENERAL COURSE INFORMATION

3A) How many credit hours is the course? ___
3B) 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)? ___
4) How many sections of the course are offered in the 1st 2000 spring term*? ___
*Note: The word term is used throughout this survey as a variable for semester, trimester, or quarter, which varies depending on your institution.
5) Approximately how many total students (in all sections) are taking this course in the 1st 2000 spring term? ___
6A) Over the course of your career, approximately how many total sections of the introductory technology course have you taught? ___
6B) For approximately how many years have you been teaching the introductory technology course? ___

7) What academic unit (department, program, or area) is your primary appointment through?
❍ Instructional Technology or Educational Technology
❍ Education - Other (please specify)
❍ Non-Education (please specify)

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

_____ % elementary education majors

_____ % secondary education majors

_____ % special education majors

_____ % non-education majors

_____ % other (please specify)

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

_____ % a standard classroom or lecture hall

_____ % a computer classroom/lab**

_____ % other(please specify)

** If 0% for computer classroom lab, skip to question #16

ACCESS TO RESOURCES

10-15) Select Strongly Disagree, Disagree, Neutral, Agree, or Strongly Agree to rate your agreement or disagreement with each of the following statements. Base your answers on course sections you currently teach in the spring 2000 term.

Access to computer hardware

10) The access to computer hardware (including peripherals) needed for use by the instructor meets the instructional needs of the course.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
O	O	O	O	O

11) The access to computer hardware (including peripherals) needed for use by the students meets the instructional needs of the course.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
O	O	O	O	O

Access to computer software

12) The access to computer software needed for use by the instructor meets the instructional needs of the course.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
O	O	O	O	O

13) The access to computer software needed for use by the students meets the instructional needs of the course.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
O	O	O	O	O

Access to non-computer-based equipment

14) The access to non-computer-based equipment needed for use by the instructor meets the instructional needs of the course.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
O	O	O	O	O

15) The access to <u>non-computer-based equipment</u> needed for use by the <u>students</u> meets the instructional needs of the course.

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
❍	❍	❍	❍	❍

COURSE CONTENT

16A) Do you use at least one textbook in the course?
❍ Yes ❍ No
If yes: Which textbooks?

   1st textbook title _____

_____ ❍ required text ❍ recommended text

   author(s) _____

   2nd textbook title _____

_____ ❍ required text ❍ recommended text

   author(s) _____

16B) Do you use locally compiled materials in the course?
❍ Yes ❍ No
If yes: These materials consist of: (check all that apply)
❑ locally compiled print materials - ❑ required ❑ recommended
❑ locally compiled electronic materials - ❑ required ❑ recommended

17A) Please indicate the *course emphasis* **you currently place** on these topical areas:
(total for all topics combined should be 100%)
_____ % computer-based topics
_____ % non-computer-based topics
_____ % instructional design/history/theory
_____ % other (please specify)

17B) 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
_____ % non-computer-based topics
_____ % instructional design/history/theory
_____ % other (please specify)

18) Please Indicate the approximate number of **in-class hours** allocated to each topic you teach to the left of the topic's name. Use the other categories to indicated topics not listed.	
Computer-Based Topics	**Non-Computer-Based Topics**
___ Word Processing/Desktop Publishing	___ Video Conferencing
___ Spreadsheets	___ Overhead Projectors
___ Databases	___ Video and/or Film
___ Presentation Software	___ Laserdiscs
___ Multimedia Authoring	___ Other _____
___ E-Mail/Discussion Groups/Newsgroups	**Instructional Deisgn/History/Theory**
___ Internet/World Wide Web	___ Technology Integration
___ Software Review or Evaluation	___ Trends, Ethics, Issues
___ Hardware installation and troubleshooting	___ Instructional Design
___ Other _____	___ Psychological/Learning Theory
___ Other _____	___ Other _____

19-20) 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 19 & 20 with this distinction in mind.

19) When teaching the computer-based topics in the course, please rate the overall emphasis you give to each of the following:

A) Preparing pre-service teachers to **use computer-based technology themselves.**
0-No emphasis   1-Low emphasis   2-Moderate emphasis   3-High emphasis
          ○   ○   ○   ○
B) Preparing pre-service teachers to **help their students use computer-based technology**.
0-No emphasis   1-Low emphasis   2-Moderate emphasis   3-High emphasis
          ○   ○   ○   ○

20) When teaching the non-computer-based topics in the course, please rate the overall emphasis you give to each of the following:

A) Preparing pre-service teachers to **use non-computer-based technology themselves**.
0-No emphasis   1-Low emphasis   2-Moderate emphasis   3-High emphasis
          ○   ○   ○   ○

B) Preparing pre-service teachers to **help their students use non-computer-based technology**.
0-No emphasis   1-Low emphasis   2-Moderate emphasis   3-High emphasis
          ○   ○   ○   ○

Comments

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

_____
_____
_____
_____
_____
_____

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Curriculum Vitae
Anthony K. Betrus

Education

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Ph.D. in Instructional Systems Technology,
Indiana University, Bloomington, December 2000
Dissertation Title: "The Content and Emphasis of the Introductory Technology Course
for Undergraduate Pre-service Teachers"

Master of Science in Education (with distinction)
SUNY Potsdam, August 1994
Thesis Title: "Potsdam Interactive"

Bachelor of Arts (Magna Cum Laude)
Mathematics and Education
SUNY Potsdam, May 1993

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Teaching Experience

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9/1997 – 12/2000	Instructor, State University of New York (SUNY) at Potsdam Potsdam, NY

Courses:
- Media and Technology
- Microcomputers for Educators
- Multimedia Authoring and Scripting
- Research and Theory in Instructional Technology
- Web Page Design
- Systematic Instructional Design
- Computer Graphics and Audiovisual Design
- Video Production and Design
- Multimedia Production
- Practicum in Technology
- Simulations and Games
- Project Development

6/1997 - 6/1999   Adjunct Instructor, Walden University

Courses:
- Course Development and Delivery Utilizing Technology
- Culminating Experience

9/1996 – 7/1997   Associate Instructor, Instructional Systems Technology
Indiana University Bloomington

Courses:
- Applications of Multimedia
- Simulation and Gaming