REDUCING RESISTANCE TO INSTRUCTIONAL TECHNOLOGY AMONG HEALTH EDUCATORS

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BY

LISA CLARK, MPH

DENTON, TEXAS

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COLLEGE OF HEALTH SCIENCES

TEXAS WOMAN'S UNIVERSITY
DENTON, TEXAS

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To the Associate Vice President for Research and Dean of the Graduate School:

I am submitting herewith a dissertation written by Lisa G. Clark, entitled, "Reducing Resistance to the Use of Instructional Technology Among Health Educators". I have examined the final copy of this dissertation for form and content, and recommend that it be accepted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy, with a major in Health Studies.

Mary Walker Shaw
Dr. Mary Walker-Shaw
Major Professor

We have read this dissertation
and recommend its acceptance:

Susan Ward
Eva Doyle
Susan Ward
Chair, Department of Health Studies

Jean Pyburn
Dean, College of Health Sciences

Accepted:
Leslie M Thompson
Associate Vice President for Research
and Dean of the Graduate School

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ABSTRACT

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Texas Woman's University, Denton, Texas

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The purpose of this study was to determine the most effective sequencing of instruction for reducing computer anxiety and increasing average hours of computer use per week among health professions instructors. The intervention was designed with two major components: anxiety-reduction and cognitive-support. One group received an intervention that addressed the affective aspects of computer use prior to the cognitive component. The other group received an intervention that addressed the cognitive component prior to the affective component. Two instruments were used to collect study data: the Teachers' Attitudes Toward Information Technology Questionnaire (TAT) and a postcard with a question about the amount of time spent on computer per week. The TAT is a 198-item questionnaire that usually requires 10 minutes to complete. The instrument includes nine background questions on participants' computer experience. A postcard, used for a three month follow-up, contained a question asking participants to report their weekly average of hours spent on a computer at work.

A multivariate analysis of covariance (MANCOVA) was used to test for

differences in computer anxiety and computer usage in the classroom. Pre-workshop anxiety and weekly hours spent using the computer in the classroom were used as covariates in the final analysis. There were no significant differences between the two treatment groups (AR, CS) on the descriptive variables of age, teaching experience, and computer usage and training. The multivariate analysis revealed a significant difference between the two groups (AR and CS) on the pooled dependent variable ($F[4, 31] = 3.84$, $p = .045$). Univariate analysis of the individual variables revealed a significant difference in post-test anxiety scores ($F[1, 33] = 6.854$, $p = .015$). No significant difference was found between groups on weekly hours of classroom computer usage ($F[1.33] = .077$, $p = .784$). Results indicate that addressing affective issues prior to cognitive computer training may reduce computer anxiety.

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CHAPTER I

INTRODUCTION

Instructional technology in health education is at a turning point. Distance education and other technology-mediated instruction offer health educators the opportunity to expand and change their role as never before. Health educators have a vested interest in acquiring the skills necessary to adopt instructional technology as a tool that increases their effectiveness and credibility in the information age. Use of instructional technology is a core competency for health educators and an important skill for all instructors in health professions (Spotts & Bowman, 1995). Instructional technology is applicable to the areas of health education responsibility in the following ways: (1) Dissemination of and access to health information by experts and non-experts, (2) evaluating online health information and software (setting and applying criteria), (3) community organization (health advocacy), (4) professional development of health educators, (5) interdisciplinary collaboration, research and evaluation. Computers and information technologies are transforming every aspect of a health educators' personal and professional lives (Warren, 1998). With easy access to electronic networks, databases, and distance-learning courses, interactive instructional materials are instantly accessible any place and any time (Irby, 1997).

Technology can be used by faculty as tools within the context of an effective

lesson plan. Specifically, computer hardware and software can be used effectively to perform certain tasks such as stimulating student interest in a topic, providing information, providing stimuli for class discussion or group projects, and assessing student achievement. However, Roth and Sanders (1996) concluded that "too few health education faculty are embracing technology" (p. 28), and that, in order for health education programs to continue to exist, health educators must become technologically competent to pass these skills to future generations.

The demand for and use of instructional technology will increase exponentially along with the need for computer-mediated instruction faculty development (Massey & Zemsky, 1995). Understanding which technologies work best for which type of learning and what instructional approach works best to alleviate computer anxiety is important in order to orchestrate adoption of instructional technology by health education faculty (Lewis & Watson, 1997, Martocchio, 1994; Multimedia, 1998). Although there is ample literature describing barriers to computerization, little exists to describe the process for successful planning and implementation of computer technology (Chang, 1984; Evans, 1996). Therefore, it is crucial to acknowledge and identify computer resistance and implement appropriate strategies to overcome it.

Resistance to use of current computer technologies by higher education faculty encompasses many factors such as lack of resources, limited time to learn a new skill, age, gender, and computer anxiety (Chodorow, 1996; Eddy & Spaulding, 1996; Hemby, 1998). Other difficulties in implementing technological advances in academic settings may

be due to lack of understanding of the potential of technology to support instruction and lack of funds for hardware and software (Lewis & Watson, 1997). Additional concerns faced by faculty may include perceived threat to traditional faculty roles, fear of loss of employment, and a perceived inability to control the teaching process (LeDoux, 1990; Negron, 1995). These concerns often lead to negative attitudes about computers and resistance to adopting instructional technology (Doronina, 1995) . Facilitating technological change requires a proactive approach. Understanding the point of view of persons involved in the change process is critical to overcoming potential resistance to change (Harris, 1995).

A review of the literature about computer anxiety yielded several hundred abstracts of articles, reports, and dissertations, most of which were published after 1980. On the basis of the review of this literature several broad conclusions were drawn: (1) research on computer anxiety predating 1980 is sparse; (2) copious studies have been conducted related to computer anxiety, but the findings involving variables of age, gender, previous computer experience, and keyboarding skills have been inconsistent; (3) studies involving computer anxiety appear to be published primarily between 1985 and 1991, with the majority of the research following this period seeking to replicate or extend the original findings and, (4) various measures of the computer anxiety construct were used.

Current pedagogical studies focused on innovators or adopters, not on those who are resistant to the use of computer technology. Faculty in higher education are seldom provided with training on instructional technology, and what is available is typically

oriented toward equipment operation instead of conceptual level training regarding the integration of technology into college teaching (Albright, 1995). The climate to support and encourage technology use has been somewhat less than nurturing. Although more comprehensive and relevant faculty training is needed, little is known about how to design training to overcome resistance by new users. No research was found that reported sequencing of training strategies and whether the sequence reduced the users anxiety and receptivity towards computer instruction.

The use of computer technology is limited only by the imagination, interest, and talent of the instructor (Roth & Sanders, 1996). Classroom learning can be facilitated by available software or simply by innovative applications of technology. A.D.A.M.™ is a multimedia, CD-ROM-based set of programs in human anatomy and physiology that is widely used to supplement instruction in biology, anatomy, and related courses. This software allows the learner to see and explore inside the human body, which has tremendous applications for health educators. With the Internet, it is now possible to gain far quicker and far-reaching access to information about government and politics than ever before. Increasingly, according to Schwartz (1996), the distinctions between traditional activism and cyberactivism will begin to blur as advocacy groups utilize electronic mailing lists and Web sites. The Internet enables health educators to present and retrieve information at far less cost than using conventional media. Other advantages of technology for health education practice include: speed, efficiency, low cost, ease of information dissemination and access, convenience, and up-to-date information (Ward &

Lee, 1995). Community outreach begins to have new meaning for people living in remote areas or those who are physically challenged when using information technology. Clearly, eliminating the barriers to developing instructional technology competencies is vital to the health education profession in this age of electronic information.

Statement of the Problem

The purpose of this study was to determine the most effective sequencing of instruction for reducing computer anxiety and increasing average hours of computer use per week among health professions instructors. The intervention was designed with two major components: anxiety-reduction and cognitive-support. One group received an intervention that addressed the anxiety producing aspects of computer use prior to the cognitive component. The other group received an intervention that addressed the cognitive-support component prior to the anxiety reduction component.

Hypotheses

The following hypotheses for this study were tested:

H1. There is no significant difference in computer anxiety scores between the anxiety-reduction group and the cognitive-support group following exposure to the intervention.

H2. There is no significant difference in average number of hours spent using the computer per week between the anxiety-reduction group and the cognitive-support group at one month following exposure to the intervention.

H3. There is no significant difference in reported workshop satisfaction between the anxiety-reduction group and the cognitive-support group.

Definitions of Terms

The following terms are defined for the purposes of this study:

1. Anxiety-reduction Group (AR). Treatment group that received an intervention that addressed the anxiety producing aspects of computer use prior to the cognitive-support component.

2. Cognitive-support Group (CS). The group that received an intervention that addressed the cognitive-support component prior to the anxiety-reduction component.

3. Computer anxiety. According to Scott and Rockwell, "Computer anxiety is the most common form of technology anxiety. Computer anxiety has been defined as the complex emotional reactions that are evoked in individuals who interpret computers as personally threatening," (1997, p. 45).

4. Computer Resistance. According to Negron, "Computer resistance is defined as a negative attitude toward computer technology that is characterized by negative reactions such as sabotaging the equipment, projecting all failure onto the computer, or deliberately avoiding or ignoring information provided through the computer," (1995, p. 173).

5. Computer Literacy. According to Doronina, "Computer literacy is a general working knowledge of the uses, limitations, and impact of computers," (1995, p.4).

6. Instructional Technology. According to Albright, "Instructional technology is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating and managing solutions to those problems involved in all aspects of human learning," (1996, p.1).

7. Information Technology. According to Albright, "Information technology is the acquisition, processing, storage, and dissemination of vocal, pictorial, textual, and numerical information by a microelectronic-based combination of computing and telecommunications," (1996, p.4).

8. Information Literacy. According to Gilbert "Information literacy is a new liberal art that extends from knowing how to use computers and access information to critical reflection on the nature of information itself, its technical infrastructure, and its social, cultural and even philosophical context and impact," (1995, p.18).

Limitations

The study was limited by the following:

1. The sample was a self-selected convenience sample thus the results may not be generalizable.
2. Attrition may be a selection factor with the one month follow-up.
3. There may be a historical threat to validity between the intervention and the follow-up.

Delimitations

This study is delimited to participants who are English speaking health education instructors over the age of 18 years and who attended the workshop.

Assumptions

For the purposes of this study, the following was assumed:

1. The health education profession recognizes the need to investigate the use of instructional technology in the pursuit of professional development.

2. The participants in the study would answer questions honestly and accurately.

3. The participants from each group of the intervention would not interact during the intervention and so contamination between participants would be reduced.

4. Each intervention would be taught consistently.

Significance and Background

The information age provides both promise and challenge for health educators. The new role of health educators requires greater emphasis on information technology than on information dissemination. Rather than continuing to practice on the basis of outmoded approaches, health educators who employ instructional technology can serve as promoters of active learning in which health information seekers construct their own learning. The role of the health educator has shifted from expert, disseminator of health information to facilitator, guide to and manager of health information. Health information in the past was limited, and difficult to access. In the information age, health information is large and an ever-changing body of knowledge; offers universal access and unlimited information sources. The communications among health professionals has also changed with instructional technology. In the past communications were costly, time consuming and irreversible. Now communications can be fast, efficient, inexpensive, and modifiable.

Computer instruction provides several advantages in comparison to more traditional classroom tools (Roth & Sanders, 1996). Computer instruction reaches all the senses, which enhances learning. Multimedia can be tailored to the learning styles of

individuals, whether they are visual, verbal, auditory or physical learners. Using technology in the classroom encourages and validates self-expression (Green & Gilbert, 1995). By allowing students to decide how they want to create a project through words, images, and sound, teachers are facilitating student control, allowing students more voice in their own learning process. This leads to a sense of ownership in the learning process. Students actually create what they learn, and there is often physical evidence, such as a portfolio, that documents the learning. Green (1996) commented, "computer instruction engages the disengaged" (p. 4). In other words, this form of teaching creates an active rather than passive atmosphere because it forces the students to participate and think about what they are learning. The use of the computer via e-mail can foster communication. Electronic conversations start between students and teachers and allow ideas to flow in ways that may not otherwise occur. Technology is already built into the lives of today's students (television, radio, telephones, computers). Thus many students are already comfortable with this medium.

Computer instruction assignments can promote active learning through complex projects, rethinking of assumptions and positions, and collaboration with other students in the development of a finished product (Ehrmann, 1995). Technology has revolutionized a type of assignment that has been around for ages. Students are moving from being passive receptors of information to active participants in the construction of knowledge (from reception to engagement). Through technology, students are learning to express, understand and use ideas in a variety of symbol systems (from text to multiple

representation). According to Kozma and Johnston (1991), technology allows a shift in our perception of learning as an individual act done in isolation toward learning as a collaborative activity (from isolation to interconnection). Technology provides students with new insights into the processes that create knowledge, because they are able to use the same tools as scholars, and in the same ways (from products to processes). Technology provides a means for drill and practice activities (from coverage to mastery). Kozma and Johnston (1991) cited a videodisk simulation in which law students learn how to manage a case, from client interviews to courtroom defense (from the classroom to the real world). Technology offers many rewards for the faculty and students who use it.

Advantages of using computer instruction in the classroom have been discussed by a variety of scholars. Hemby (1998) highlights these advantages as: facilitating self-directed learning; providing a multi-cultural perspective to all students; making powerful ideas available to students who might be intimidated by the traditional classroom; providing students with mentors from diverse backgrounds; connecting students with professionals in their field; providing students with writing experience through chat rooms and discussion groups and encouraging teachers to develop innovative curricula.

As encouraging as these studies are, the increased use of technology by faculty members has occurred as a result of pressure from external forces such as students, as well as the public and private sector of society rather than from a large-scale institutional commitment to aid faculty is using technology to enhance teaching (Roth & Sanders,

1996). Electronic mail, multimedia, CD-ROMS, and the World Wide Web are common terms used by even the most technologically unsophisticated students. In fact, 55% of freshman have had some instructional technology training prior to going to college (Green, 1996). Faculty members are beginning to realize that this has become an important consideration in instructional planning because students enter the classroom expecting quality teaching, which, in their view, incorporates advanced technologies (Twigg, 1996). This in turn brings up the issue of training faculty and strategies that optimize training time.

Technologies are not ends in themselves, but rather are the vehicles that can provide more efficient and cost effective methods that compliment more traditional modes of education. They are more than tools because they affect the way in which people learn and interact. New learning technologies and methodologies need to be developed, tested, and analyzed to realize and maximize the full potential of technology-supported learning environments. Fear, frustration, and failure to make time for incorporating instructional technology into traditional curricula will create and perpetuate the computer illiterates of the next century. There is an opportunity to move beyond traditional teaching and learning paradigms into exciting and interactive learning exchanges through the use of computer technology exchanges. Students should not be viewed primarily as recipients of information, but as collaborators in the pursuit and creation of knowledge. Instruction can no longer be based solely on what is known, but should be based on what is known to create new knowledge and information bases.

The effective health educator must be able to make intelligent decisions about the adoption of new tools and resources as well as have the ability to continually adapt to, understand, evaluate and make use of the continually emerging innovations in instructional technology. Computer technology is more than a trend and its impact on health education cannot be ignored. Therefore it is essential to promote strategies to reduce resistance to instructional technology. Health educators stand to benefit from blending traditional values and processes of the past with efficient and powerful technologies of the future in order to position the profession to be effective in the 21st century.

CHAPTER II

REVIEW OF LITERATURE

New computer technologies are transforming the ways in which health educators engage in professional practice, boosting demand for new knowledge and new types of skills. These new technologies are providing new types of learning and offering a potential solution to meet challenges such as the demand for more flexibility in the delivery of health education, specifically in terms of time, location, content, and form (McLean & Hill, 1993; Wagner & McCombs, 1995). Computer technology is not meant as a replacement of health educators but as a tool for potential learning under expanded circumstances and modalities. However, resistance to the new technologies may result in health educators lagging behind in the information age. Understanding the issues surrounding resistance and learning what strategies are effective in reducing anxiety concerning computer technology is imperative if health educators are to remain effective as professionals. Fear of the unknown can no longer justify putting off learning the new technologies.

Current literature regarding use of instructional technology is overwhelming (Barr & Tagg, 1995; Caine & Caine, 1991; DeLoughry, 1995; Ehrmann, 1995a; Gilbert, 1995; Mauldin, 1995; Maxwell, 1995; Romano, 1990; Taylor & Todd, 1995). Articles range from how to use instructional technology (IT) to enhance teaching (Bailey & Cotlar, 1994,

debating the usefulness of IT (Ehrmann, 1995c; Green and Gilbert, 1995), confusion over the definitions of common instructional technology terms to discussion of the restructuring of higher education (Albright, 1996; Anderson, 1996; Harris, 1995; King, 1991; Scott & Rockwell, 1997; Thorpe, 1995; Twigg, 1996; Weil & Rosen, 1990). Lewis (1988) chronicled the historical roles of instructional technology: (a) to accomplish tasks that faculty cannot do by themselves, such as helping students experience times, places, people, and events that might not otherwise be possible in class; (b) to accomplish tasks better than instructors can by themselves, such as using a video camera mounted on a microscope; and (c) to reach, via distance education, those students who cannot attend classes on campus for various reasons. Studies center on reducing barriers to change, examining attitudes toward instructional technology, teaching strategies to engage learning and the ideology of teacher-centered versus student-learning in higher education (Bohlin & Hunt, 1995; Bracy, 1988; Busch, 1995; Davis et al. 1992; Doronina, 1995; Ehrmann, 1995b; Faison, 1996; Fletcher & Deeds, 1994; Francis, 1994; Hignite & Echternacht, 1992; Irby & Hekelman 1997; Knezek & Christenson, 1996; LaLomia & Sidowski, 1993; Levine & Cooper, 1991; Raub, 1984; Schumacker & Hossain, 1997; Smith & Kotrlike, 1990; Todman & File, 1990; Woodrow, 1996).

The proliferation of computers in higher education will continue to place demands on health education professionals to develop proficient computer skills. A variety of training mechanisms exist that allow health educators to develop and hone any needed computer skills (Cravener, 1998; Flynn, 1994; Russell, 1995). Nonetheless, identical

training mechanisms are nonetheless likely to result in individuals with different computer abilities (Hicks, Hicks, & Sen, 1991). Existing research has examined differences in demographic factors (Busch, 1995; Loyd & Gressard, 1986) as well as differences in attitudes (Francis, 1994; Negron, 1995; Raub, 1984; Speier, Morris, & Briggs, 1995) toward computer usage. Much of the research examining adoption of instructional technology focused on the changes in attitudes (computer anxiety) that occur as a result of a training intervention (Emanuele, Dale, & Klions, 1997; Irby, 1997).

This review of literature about resistance to computer instruction will examine the following topics: (1) definitions of computer anxiety, (2) methods of assessing computer anxiety, (3) resistance to new pedagogy , (4) barriers to adoption of instructional technology, (5) attitudes toward computers, (6) learning theories and instructional technology, (7) research on strategies to reduce computer anxiety, and (8) sequencing of instruction to optimize learning and reduce anxiety toward computers.

Definitions of Computer Anxiety

Definitions of computer anxiety range from psychological, physical or sociological discomfort, to fear (Albright, 1992; Bracy, 1988; Fletcher & Deeds, 1994). Computer anxiety has also been defined as "the fear of impending interaction with a computer that is disproportionate to the actual threat presented by the computer" (Rosen & Maquire, 1990 p. 182). For many, computer anxiety is a transient condition which has a peak intensity when experience with computers is limited. The moderation of that anxiety is largely beyond the jurisdiction of the novice, simply because the novice lacks sufficient procedural

knowledge (Anderson, 1996). Computer anxiety can relate to the complex technology of computers, thoughts about computers, or attitudes toward the technology. Rosen and Maquire (1990) devised three differently named categories to describe people who were "computer anxious:" anxious computerphobic, cognitive computerphobic, and uncomfortable user. An anxious computerphobic is one who exhibits a general fear of computers, while a cognitive computerphobic is one who is fearful and anxious about computer usage as a result of lack of knowledge or understanding of the computer. An uncomfortable user may have more experience using a computer but still shows apprehension.

The definition of computer anxiety used in this research referred to the psychological discomfort that might come from using a computer (Albright, 1996). This discomfort might come from using something unknown, concern over making mistakes, or destroying pertinent information.

Methods of Assessing Computer Anxiety

Simonson, Mauer, Montag-Torandi, and Whitaker (1987) devised a standardized test of computer literacy and a computer anxiety index which have been used in a number of studies to measure the before and after levels of computer literacy and computer anxiety. Four categories of knowledge and skills required of a computer literate person were: "computer attitudes, computer applications, computer systems and computer programming" (Simonson, et al., p.15). Results revealed "that a positive, anxiety free attitude toward computing was a necessary prerequisite of computer literacy" (Simonson,

et al., p.18). Computer anxiety and computer literacy are closely aligned. A computer anxious person will take longer to become e-mail literate than a computer literate person as anxieties "usually occur in situations where one is learning something new and this causes resistance to change...has negative effects on learning" (Simonson, et al., p.19). Marker and Ehman (1989) support the need for computer literacy before a user will invent relevant applications which make effective use of the technology.

According to Marcoulides (1988), for some individuals, computer anxiety can be present regardless of computer exposure. In fact, recent studies indicated that experience alone will not eliminate anxiety, and in many instances will exacerbate the problem (Rosen & Maquire, 1990). The main results of a study by Hignite and Echternacht (1992) inferred:

> "that the relationship between computer attitudes and computer literacy is direct or simple...both positive attitudes toward computers and adequate computer literacy skills are critical to the successful incorporation of new technology into the classroom." (p. 386)

Therefore, based on the results of these studies and others (Hignite & Echternacht, 1992; Lewis, 1988; Marcoulides, 1988; Marcoulides, et al. 1995; Marker & Ehman 1989; Rosen & Maquire, 1990; Simonson, et al., 1987), it appears that the degree to which computers can be used effectively is influenced by computer anxiety. The higher the level of computer anxiety, the lower the computer achievement. It follows that, in order to

increase computer usage and overall computer literacy, reduction of user's computer anxiety is imperative.

Resistance to New Pedagogy

An important skill to have today is the ability to respond to the diversity of learners in the classroom. People who are receptive to change see opportunities of great potential for teaching. People have varying levels of difficulty with change. Some with only mild difficulty or fear of computer instruction can read a book or take a class and are captive. Others have moderate difficulty and need a varied means of instruction and support to become engaged in computer instructed teaching (Emanuele, et al., 1997; Ford, 1995; Gos, 1996; King, 1991; Thorpe, 1995) . For others, change is extremely difficult and perceived as an unnecessary pedagogical shift (Dryli, and Kinnaman, 1994; Joshi, 1996). Personal expressions of fear of change relate to: lack of time, lack of knowledge about technology and available resources, frustration with unreliable or difficult to use equipment, fear of the unknown possibilities of computer instruction, fear of failure, and lack of training available to meet needs.

There are several recurring reasons for resistance to change. Faculty conservatism and a commitment to traditional means of teaching is reported as a major barrier (Barr & Tagg, 1995; Coffman, 1996; Faison, 1996; Hannafin & Savenye, 1993; Levine & Cooper, 1991; Ray & Minch, 1990; Roth & Sanders, 1996; Schumacker & Hossain, 1990; Turnipseed & Burns, 1991). Other research themes reported include: reward systems that penalize faculty for concentrating on teaching instead of research; lack of commitment to

technology at the highest echelons of the administration; poorly-equipped classrooms; disproportionate access; and the rapid pace of change and the speed in which expensive new technologies become obsolete.

Massy and Zemsky (1995) suggested a host of barriers to adoption of instructional technology stemming from the conservative tendencies of universities to established institutional norms relating to teaching methods, faculty autonomy, and notions of productivity. The set of teaching method norms includes such considerations as teaching loads, student-teacher ratios, and class sizes. The study also reported that most faculty think of productivity in terms of scholarship, especially research, and in terms of teaching tasks rather than learning accomplishments (Massy & Zemsky, 1995). Most faculty, given the choice of additional money for information technology or another faculty member, would chose the additional faculty member. Almost none would opt for additional expenditures on information technology if the result would be a smaller faculty. Faculty intrinsically value other faculty members (Davis, et al., 1992; Fletcher & Deeds, 1994; Francis, 1994). The resistance to pedagogical changes through the utilization of technology is partially due to lack of information or strategies about how to facilitate the process. Therefore, it is important to address this conservatism and apprehension with appropriate strategies that take these attitudes into account.

Barriers to Adoption of Instructional Technology

Many researchers have studied constraints to the use of computers (Fletcher & Deeds, 1994; Loyd & Gressard, 1986; Smith & Kotrlik, 1990). Anxiety, lack of

confidence, and lack of enjoyment have been related to low computer use. Limited computer experience has been found to be a factor influencing anxiety (Loyd & Gressard, 1986b).

Harris (1995) indicated that faculty move through several phases as they integrate the use of computers and instructional technology, suggesting that faculty should learn the technical aspects of the technology before moving on to the instructional applications. The Stages of Concern (SOC) questionnaire, developed by Hall and Rutherford (1977), was used to measure faculty attitudes and concerns about adoption of computer technology in a university-based school of nursing. Using information from the SOC questionnaires, a series of workshops to address initial and on-going learning needs were developed. In this particular institution, the process of computerization evolved over a three-year period. Strategies focused on a program of faculty development, evolution of an informatics committee and development of a process for curriculum integration. Initial outcomes of these efforts included the regular use of computer-based instruction in several graduate and undergraduate courses, the use of the Internet as an adjunct to instruction across the curriculum, and several funded research projects related to informatics in client and professional education. An important key to the success of faculty development projects will be skilled attention to the processes involved in structuring the interpersonal and social aspects of training sessions (Ward & Lee, 1995).

Staggers (1994) designed and tested a questionnaire to assess fears that nurses had to using technology. Prior experience with computers resulted in lowered anxiety scores

and thus resulted in more positive attitudes toward the changes that the technology would create. Woodrow (1991) compared four computer attitude scales. The results also suggested that, with increased time on task on the computer, users where more inclined to have a positive attitude toward the computer.

Affective issues, such as anxiety aroused by cognitive dissonance, may play a substantial role in the willingness of educators to participate. This dynamic was apparent in a 1993 survey of Internet use patterns (DeLoughry, 1993). Faculty and administrators tended to rate their own knowledge and skill levels unrealistically high. In some cases, a negative relationship was seen between self-ratings of proficiency and actual range and frequency of use of Internet resources. The researchers concluded that this effect was probably a result of a certain blissful ignorance of the possibilities for confusion and error. In addition, the tendency to define the self in terms reflecting competence was in effect. People who had achieved a degree of success in their professions, whose normal definitions of self included the words "expert" or "authority" were likely to have difficulty seeing themselves in dependent learner roles. To the extent that participants were asked to self-define their current knowledge base as inadequate or insufficient, they were likely to reject the validity of the new information. This affective barrier to learning is an age-old phenomenon that changes little, if at all, while the information technology changes relatively quickly (DeLoughry, 1995; Igbaria & Parasuraman, 1989; Ketnan & Geoffry, 1990; Martin & Briggs, 1986).

At many universities, faculty either fail to attend workshops that have been planned

to enhance their ability to use educational technology, or fail to implement material and concepts to which they have been introduced after the workshop ends. The problem is usually related to a marked misunderstanding of motivational patterns (Gonce-Widner, et al. 1993). Faculty tend to have areas of interest and areas of concern that differ from the focus on the instructional staff (Kopp & Fergusion, 1996; Lewis & Watson, 1997). Whereas staff tend to focus on selection and teaching of new technologies to improve teaching and research, the faculty, paradoxically, tend to be less concerned with that domain. In general, the faculty are already successful at teaching and research. Further, to propose to a successful professional educator that she or he needs to learn new media for teaching and scholarship implies that the old way was somehow inadequate, insufficient, or not optimal: a potential threat to self-concept (Rakes, 1989; Schwartz, 1996).

A faculty member cannot adopt a combination of new teaching approach, application of technology, and instructional materials as easily as picking a new textbook for a course. There is no longer any single comprehensive source of information about relevant instructional materials for most courses. Skimming and evaluating materials as a potential computer-enhanced instructional asset is a new skill for faculty members. It is rare for a faculty member to have had direct personal experience as a student or observer in a course where new applications of information technology were successfully used by the teacher. It is almost as rare for a faculty member to have had training in the instructional uses of information technology (Shotsberger, 1996; Tassone and Heck,

1997).

Johnston (1987) suggests that the success or failure of educational innovations related to the introduction of microcomputers into the classroom will be determined by the attitudes of teachers toward them. Todman and File (1990) developed an instrument to assess attitudes toward computers. The scale has been shown to be sufficiently sensitive to pick up differential changes in attitude following different computing experiences.

Learning Theories and Instructional Technology

McKenzie (1996) describes stages of mastery of technology into four stages. The survival stage, mastery stage, impact stage, and innovation stage (See Table 1). Most instructional technology training models omit the initial survival stage and begin strategies aimed at mastery stage goals. This type of training does not address common attitudes of inexperienced instructional technology users and may, therefore, create anxiety.

Table 1

The Stages of Mastery of Technology

Survival Stage	Mastery Stage	Impact Stage	Innovation Stage
Struggle against technology Assailed by problems Status quo in classroom Cannot anticipate problem Teacher-directed Unrealistic expectations Management problems Chaos	Developing coping strategies Increased tolerance New forms of interactions Increased technical competence Increased experience with new classroom structure Increased confidence More engagement	Learner-centered Less threatened by technology Teacher as facilitator New structure and working relationship Technology enhanced curriculum coverage	Restructuring of curriculum and learning activities Modification of learning environment

Mandinach, E. and Cline, H. 1992

In addition, new developments in constructivist psychology of higher-order cognition offer more understanding of the learning process. Schott (1992), suggested three trends: (1) the complexity of learning and problem-solving is becoming better understood through more naturalistic examinations and is not isolated for laboratory examination; (2) individuals are considered, as far as learning and problem solving are concerned, as active information processors who do not simply receive information but, instead, act upon their learning environment to construct understanding and; (3) learners' prior knowledge and motivation are considered to have a decisive influence on their learning and thinking abilities. It is important, when developing instructional technology teaching strategies, to take into account the basic ways that people learn. Also, strategies that are geared to decrease faculty's negative perceptions, fears, and anxiety concerning computer usage may help to alleviate faculty reluctance (Brandt, 1996; Leidner & Jarvenpaa, 1995) .

Case and Bereiter (1996) described the history of current instructional technology's use of cognitive development as part of it's theoretical framework in its approach to instructional teaching strategies. The writers start with the contributions of B.F. Skinner, the subsequent shortcomings of the Skinnerian model, and R. M. Gagne''s modifications (Gagne', 1962). The article concludes by summarizing the framework for instructional technology, that mental structures are tripartite, involving: 1) the representation of the current situation; 2) the representation of the desired situation; and 3) the strategy bridging the gap between the two.

The cornerstone of behaviorist theory was the idea that behaviors are learned (become habitual) as a result of reinforcement (Skinner, 1968). Gagne´ (1985) and Martin and Briggs (1986) maintain this idea is not sufficient to form the basis for an instructional technology strategy because it deals with strengthening behaviors already present in the learner; instructional technology is concerned with teaching **new** behaviors. Also, the focus of behaviorists is on the outputs of the learning process.

Constructivists, however, believe that learning occurs when learners are able to add new concepts and ideas to their cognitive structure by recognizing a relationship between something they already know and what they are learning (Caine & Caine, 1991). The focus is on the inputs of the learning process. Thus, instructional technology training needs to acknowledge and address the current state of trainees attitudes, anxieties, and knowledge before addressing content.

In 1956, Benjamin Bloom headed a group of educational psychologists who developed a classification of levels of intellectual behavior important in learning. This became a taxonomy including three overlapping domains; the cognitive, psychomotor, and affective. Cognitive learning is demonstrated by knowledge recall and the intellectual skills: comprehending information, organizing ideas, analyzing and synthesizing data, applying knowledge, choosing among alternatives in problem solving, and evaluating ideas or actions. This domain on the acquisition and use of knowledge is predominant in teacher-centered learning. Bloom identified six levels within the cognitive domain, from the simple recall or recognition of facts as the lowest level, through increasingly more

complex and abstract mental levels, to the highest order which is classified as evaluation (See Table 2).

Affective learning is demonstrated by behaviors indicating attitudes of awareness, interest, attention, concern and responsibility (Thomas, et al. 1995). Other aptitudes of affective learning include: ability to listen and respond in interactions with others; and ability to demonstrate those attitudinal characteristics or values which are appropriate to the test situation and the field of study (See Table 3).

Table 2 Blooms Taxonomy on **Cognitive** Learning

Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
arrange	classify	choose	appraise	arrange	predict
define	describe	demonstrate	calculate	assemble	assess
duplicate	discuss	illustrate	compare	collect	argue
label	identify	practice	contrast	compose	select
list	indicate	operate	criticize	construct	judge
memorize	locate	schedule	discriminate	design	rate
recognize	review	sketch	examine	formulate	support
recall	select	solve	question	organize	value
reproduce	translate	use	experiment	plan	defend
state	report	write	test	propose	estimate

Bloom, 1956

Table 3 Blooms Taxonomy of **Affective** Learning

Emotion	Attitude	Appreciation	Value
enjoy	accept	conserve	respect
dispute	judge	share	support
accept	attempt	praise	volunteer
challenge	defend	question	dispute

Bloom, 1956

Research on Strategies to Reduce Anxiety Toward Computers

Research on the psychological effects of computers has important practical implications but not a long tradition (Finnegann & Ivanoff, 1991; Ford, 1995; Gassert & McDowell, 1995; Harris 1995; Hemby, 1998; Means & Olson, 1994; Rosen & Maquire, 1990). Prior to the 1980s, much of the writing about computer anxiety and attitudes toward computers was concentrated in trade and business publications (Howard et al, 1987; Igbaria & Parasuraman, 1989). Raub (1981) developed an instrument to measure computer anxiety. Raub's work is one of the most frequently cited in the literature on computer anxiety. Her anxiety scale has been employed extensively in studies on computer anxiety (Howard, 1986; Igbaria & Parasuraman, 1989; Morrow, Prell, & McElroy, 1986; Ray & Minch, 1990). Howard sought to uncover the psychological mechanisms which trigger computer anxiety. The Teachers' Attitudes Toward Information Technology Questionnaire (TAT) is an instrument designed to determine the perceptions of teachers regarding the use of information for their professional productivity and the benefit of their students. The TAT was developed by Gerald Knezek and Rhonda Christensen from the University of North Texas (1997).

Attitudes are thought to influence future behavior and have implications for such things as the use of computers (Busch, 1995). Kay (1995) found that both cognitive and affective attitudes were significant predictors of commitment to the use of computers. Marcoulides (1988) found that computer anxiety is an important predictor of computer achievement. Raub (1984) found that gender was significantly related to computer

anxiety. In contrast, Loyd and Gressard (1985) and Koohang (1989) did not find gender to be significantly related to computer attitudes on any of three selected subscales of anxiety, confidence, and liking. Chen (1986) found that men held more positive attitudes of interest in and confidence for computer experience, however, men and women responded with similar interest. Loyd and Gressard (1984a, 1985) reported that female students had less computer anxiety than male students, and female students like working with computers more than male students. Rosen, Sears, and Weil (1993) reported results that revealed a complex relationship between gender and attitudes toward computers. Gender was not related to computer anxiety, but was significantly related to computer attitudes, with women having more negative attitudes. Levine and Cooper (1991) concluded that boys have significantly more positive affective attitudes toward computers than girls, but the major finding of their study suggested that prior computer exposure (in particular, having a computer at home) had a stronger influence than did gender.

Computer attitudes are sets of beliefs about using computers that determine a feeling of attraction toward or repulsion away from them (Finnegann & Ivanoff, 1995; Fletcher & Deeds, 1994; Morrow, et al. 1986) . Beliefs can have a strong impact on fears and expectancy for success. Computer attitudes, therefore, are usually related to computer anxiety, confidence, and use. Computer confidence, anxiety, perceived usefulness, and liking of computers are also important variables because anxiety, attitudes, and confidence are strong predictors of behavior (Bozionelos, 1997; Gist, et al., 1989; Gos, 1996; Hemby; 1998). Specifically, anxiety is believed to interfere with attention to

task, processing, and encoding of learned information (Igbaria & Parasuraman, 1989; Ketnan & Geoffry, 1990; Koohang, 1990; Rosen & Maquire, 1990). Therefore, situations that reduce reliance upon learned material are expected to compensate for the anxiety effects. Thus, more frequent training sessions, with a variety of strategies used, would be expected to have a greater influence on changes in anxiety and confidence.

Research on computer anxiety has focused on computer experience, computer knowledge, sex, age, mathematics anxiety, the social impact of computers, and playfulness as major factors affecting computer anxiety and computer attitudes (Albright, 1996; Barr & Tagg, 1995; Bohlin & Hunt, 1995; Doronina, 1995; LaLomia & Sidowski, 1993; Webster & Martocchio, 1996; Scott & Rockwell, 1997). Anderson (1996) found that perceived knowledge rather than experience is a predictor of computer anxiety. It was recommended that care should be taken not to view programs aimed at increasing knowledge of computers as the panacea for computer anxiety. Research has shown that programs which use a cognitive behavior therapy approach can be very effective in alleviating and/or eliminating computer anxiety (Chute, 1993; Lambert, 1991; Thomas & Necessary, 1996). Yet, prescribing more experience for a person who is extremely computer-phobic may only exacerbate the situation (Rosen & Maquire, 1990).

As the use of technology expands, computer anxiety continues to be a challenging concern. To properly integrate computers into the classroom curriculum, teachers need the proper skills and disposition (Chapman, 1994). Specifically, teachers should not be anxious about the use of computers. Further, they need confidence and positive attitudes

toward computers and their ability to use them.

Anxiety, confidence and attitudes are all important factors in determining voluntary behaviors . Anxiety, lack of confidence, and negative attitudes can interfere with one's willingness or ability to comfortably use computers (Reed & Overbaugh, 1993). Teachers with negative affective states toward computers, therefore, are less likely to choose to use computers in their teaching (Rosen, et al., 1993). Attitudes not only affect choices, but can be unconsciously transferred to students through modeling. Assisting teachers to reduce anxiety and to develop positive confidence and attitudes toward computers, therefore, is an important step in giving their students sufficient opportunities to acquire the types of computer skills and affect needed for the twenty-first century (Stone & Lester, 1996). Thus, it is very important to learn more about the nature of computer anxiety of pre-and in service teachers so that effective interventions can be prescribed.

Attitudes have long been recognized as important predictors of individual differences in educational application, learning and achievement (Evans, 1965). As a consequence considerable investment has been made in monitoring the attitudinal dimensions of established curriculum area like math education, and science education.(Shapiro & Hughes, 1996). More recently, literature has begun to develop concerned with undergraduate college students. Koohang and Byrd (1987) explored the relationship between attitudes toward the perceived usefulness of computers and computer experience with trainee teachers. Turnipseed and Burns (1991) compared the attitudes of students and non-student working adults. Finnegan and Ivanoff (1991) explored the

impact of a brief computer training course on the computer attitudes of social work students. Sigurdsson (1991) explored the relationship between attitudes toward computers and personality characteristics in psychology undergraduates. Woodrow (1996) examined the relationship between computer attitudes and locus of control among student teachers. Savenye, Davidson, and Orr (1992) examined the effects of an educational computing course on pre-service teachers' attitudes toward computers. The integration of the findings for these various studies is made complex not only by the number of different instruments which have been employed but also because there is no common agreement regarding what computer-related attitude scales really seek to measure.

Moreover, in the wider field of attitude research, there is a significant debate between two; schools of theorists regarding the meaning or the term attitude itself. One school, represented by Krech et al. (1962) conceptualizes attitudes as embracing three distinct components, the affective, the behavioral and the cognitive. The other school, represented by Fishbein and Ajzen, (1975) argues that attitude measurement should be concerned solely with the affective domain, and that belief and behavioral intention should be measured separately. Content inspection of current computer-related attitude scales indicates that these instruments tend to combine the cognitive and behavioral dimensions with the affective dimension (Welsh, 1993; Woodrow, 1996). At the same time the affective dimension of these scales may embrace the construct of computer anxiety as well as the positive and negative valencies indicative of pro and anti-computer attitudes. On the

grounds that multi-dimensional constructs are difficult to operationalize (Rickel & Johnson, 1997) there may be clear advantages to developing an intervention that separates the two constructs.

Sequencing of Instruction to Optimize Learning and Reduce Computer Anxiety

It has been suggested that a formal instructional design process be followed. Sequencing of instructional practices is a current theme in the literature. Research to date, however, has not extended the effect of training on attitudes in regards to the sequencing of the training sessions. One important point has been made that it is imperative that instructional materials, whether computer or paper-based, be designed to accommodate the learning preferences of the intended audience (Peterson & Orde, 1995). Jonassen (1990) accepts the premise that learning is the reorganization of knowledge structures and has used two tools for depicting those representations. The first is Preeceis' (1976) method of free association of word lists to create a semantic map of knowledge and Buzanis (1974) technique of note taking in the form of patten mapping of knowledge structures. These techniques have been incorporated into computer environments such as Learning Tool (Kozma, 1987) . In a set of three studies, Jonassen (1990) wanted to investigate the extent to which a semantically structured hypertext affects the acquisition of structural knowledge, knowledge structures being the organization of an individual's ideas.

In the first two studies, individuals took part in a learning task where material was presented either with or without the experts semantic map of the material. In these

studies, there was no difference in knowledge acquisition and structural knowledge gained between subjects presented with semantic maps compared with subjects who were not presented with these maps. However, in the third study, experimental subjects were required to create their own semantic maps of the subject field. There were still no differences in recall scores. However, in this study, subjects performed significantly better on the relationship task than the two groups instructed to only study the materials. These results support the idea that the more deeply a learner processes information, the more likely it is that the person will remember material to be learned.

Other considerations in sequencing an instructional design intervention include: time on task, time for exploration, and flexible schedule that allows for in-depth exploration. Curriculum sequencing which takes into consideration long and short range goals translates into relevant activities. All instruction should relate and be clearly understood for its content and purpose.

Summary

New computer technologies are transforming the ways in which health educators practice, increasing demand for new knowledge and new types of skills. Understanding the issues surrounding resistance and learning what strategies are effective in reducing anxiety concerning computer technology is imperative for current health education professionals. Computer anxiety has definitions ranging from psychological, physical or sociological discomfort, to fear (Albright, 1992; Bracy, 1988; Fletcher & Deeds, 1994). Massy and Zemsky (1995) suggested a host of barriers to adoption of instructional

technology stemming from the conservative tendencies of universities to established institutional norms relating to teaching methods, faculty autonomy, and notions of productivity.

To properly integrate computers into the classroom curriculum, teachers need the proper skills and disposition. Specifically, teachers should not be anxious about the use of computers. Further, they need confidence and positive attitudes toward computers and their ability to use them.

Content inspection of current computer-related attitudes scales indicated that these instruments tend to combine the cognitive and behavioral dimensions with the affective dimension (Welsh, 1993; Woodrow, 1996). On the grounds that multi-dimensional constructs are difficult to operationalize (Rickel & Johnson, 1997), there may be clear advantages to developing an intervention that separates the two constructs.

CHAPTER III

METHODOLOGY

The purpose of this study was to determine the most effective sequencing of instruction for reducing computer anxiety and increasing the average hours of computer use per week among health profession instructors. This chapter presents the methodology of this quantitative study in relation to its population and sample, instrumentation, intervention, procedures used to collect the data, and statistical analysis and descriptive techniques used to treat the data.

Procedures

The procedures involved selecting an instrument, developing two instructional interventions, obtaining permission from the Texas Woman's University Human Subjects Review Committee, marketing the workshop to ensure appropriate subject recruitment, implementing the workshop and instructional interventions, and collecting and analyzing the data. In addition, the investigator planned the entire workshop which was designed to test the impact of sequencing the instructional intervention.

Population and Sample

The subjects for this study comprised a convenience sample of volunteers from the "Take the First Step" workshop attendees who agreed to participate. The sample was drawn from the population of workshop attendees. During the opening session of the

workshop, the investigator asked workshop attendees to volunteer to participant in the research study. Participants who volunteered to participate in the study were requested to read and sign the consent form in the workshop packet (see Appendix A) . The population of workshop participants were recruited by means of postings to electronic mailing lists via the internet and mailings of the workshop brochure (see Appendix B) to members of health profession organizations. These organizations included: Texas Society of Public Health Educators (TSOPHE), Health Education Directory List-serv (HEDIR), and Texas Association for Educational Technology (TAET). A total of 44 individuals registered for the workshop and 39 individuals attended the workshop. The study sample consisted of 33 health profession instructors recruited as volunteers from the "Take the First Step" workshop held on the Texas Woman's University Denton Campus on August 14, 1998.

Instrumentation

Two instruments were used to collect study data: a 70-item modified version of the Teachers' Attitudes Toward Information Technology Questionnaire (TAT) (see Appendix C) and a postcard with a question about the amount of time spent on computer per week (see Appendix D). The authors of the TAT granted permission to the researcher to use the instrument in the current study (see Appendix E). The TAT (Knezck & Chirstensen, 1997) was designed to determine the perceptions of teachers regarding the use of information technology for their professional productivity and the benefit of their students. The TAT was developed by Gerald Knezek and Rhonda Christensen from the University

of North Texas (1997). The TAT has been administered to samples similar to the sample of this study with internal consistency reliabilities for the ten TAT subscales ranging from a low of .91 to a high of .98 (Christensen & Knezek, 1997). Instrument developers contend that content validity for the TAT is high but acknowledge that construct and criterion-related validity are yet to be established.

The TAT is a 198-item questionnaire that usually requires 10 minutes to complete. The instrument includes nine background questions to collect data on participants' length of teaching, self-rating of computer experience, self-report of current and past computer use in the classroom per week, type of computer training received, place of computer training, access to a computer at home, gender, and age (see Appendix F).

A postcard developed using Microsoft Office was used for a three month follow-up. The postcard contained a question asking participants to report their weekly average of hours spent on a computer at work. The postcard also had space for respondents to write in additional comments. The postcard was mailed to all "Take the First Step" participants three months after the intervention. Thirty-seven postcards were returned and used in data analysis.

Workshop

Workshop planning, development, and scheduling entailed attention to parameters dictated by the Office of Continuing Education, availability of facilities, and research design. The researcher and a university faculty member developed a six hour workshop titled "Take the First Step: A Faculty Development Workshop on Instructional

Technology for the Rest of Us" to serve as the context in which the study interventions were conducted.. Both individuals have expertise in instructional technology, teaching, faculty training in computer technology.

The workshop was intended to meet the instructional technology training needs of health faculty relatively new to the use of computers in teaching. Attendees were guided in the process of joining the instructional technology age in a friendly environment. One unique feature of the workshop was the contribution to the development of a single webpage by all workshop participants that was then posted on the Internet for viewing in the closing session (See http://www.twu.edu/hs/hs/workshop/group.htm, Appendix G). The workshop was conducted on Friday, August 21, 1998, from 8:00 a.m. through 5:00 p.m. on the campus of Texas Woman's University in Denton, Texas and hosted by the Department of Health Studies in the College of Health Sciences with the cooperation and assistance of the Office of Continuing Education. The workshop schedule included one hour for an opening session with an invitation to participate in the study and complete the study pretest, three hours for the first participation session, one hour for lunch, three hours for the second participation session, and one hour for administration of the post-test to study participants, the wrap-up, viewing of the group-developed webpage, participant evaluation, and closing remarks.

The workshop also included use of a website (http://www.twu.edu/hs/hs/workshop/firststep.htm, see Appendix H) with detailed descriptions including benefits of attending, objectives, presenters' credentials, schedule,

registration and certification information, invitation to participate in the study, and hyperlinks to webpages including content for the two participation sessions. The Workshop webpage stated the following objectives: "Upon completion of the workshop, participants will be able to: (1) Contribute to the creation of a health-related webpage suitable for posting on the Internet; (2) Make effective use of instructional technology; (3) Use instructional technology to enhance professional development; (4) Identify instructional technology resources and techniques; (5) Identify course delivery strategies and systems; (6) Utilize software that will help the instructional; technology decision-making process; and (7) Gain insight into implementing the latest technology." (http://www.twu.edu/hs/hs/workshop/firststep.htm).

Study participants attended the same workshop as those who did not want to participate in the research study. Those who volunteered to participate did so in the opening session of the workshop.

The Texas Woman's University Human Subjects Review Committee granted permission to conduct the study (See Appendix I). The workshop packet provided information that assured anonymity, described the purpose of the study, discussed benefits and risk involved in being a participant, assured that participation was voluntary, and that participants had the right to withdraw from the study at anytime.

Intervention

Study participants were assigned to one of two treatment groups by convenience. The groups were created based upon the number on their information packets. All

participants with an odd numbered packet were asked to go to one room and participants with an even numbered packeted were asked to meet in another room. Participants were asked not to switch packets. Each group received a different intervention based upon the sequence of instruction. One group, labeled "anxiety-reduction group," received the component that addressed anxiety-producing aspects of computer use prior to the cognitive component. The other group, labeled "cognitive support group," received an intervention that addressed the cognitive component prior to the anxiety-reduction component.

The intervention was comprised of the two workshop participation sessions that addressed anxiety reduction and cognitive support. In her workshop sessions (see http://www.twu.edu/hs/hs/workshop/baker.htm, see Appendix J), one facititator guided participants through the process of conducting an effective forum and chat room for students and internet adventures and discoveries for classroom use. The intervention included a dynamic, interactive, and hands-on skill-building component (cognitive support) in which participants were led as a group through the process of contributing to and developing a web page. Efficient internet searching for health information, shortcuts and tips for teachers using the Internet for instruction, and electronic networking were also covered.

The researcher facilitated the other workshop participation sessions on anxiety-reduction which included guided discussion and activities addressing participants' fears and barriers to the use of technology: icebreaker, group activity, group discussion, and a

cognitive mapping exercise (see Appendix K). The ice-breaker exercise included audience participation involving comments to a cartoon about change. The cartoon illustration depicted a stressed employee staring at a computer screen with garbled language. Participants responded to the cartoon expressing fear of information overload, fear of breaking the computer and the fast paced nature of technological change.

A group activity was introduced that required groups of four people to put together cut pieces of paper into a shape without talking. This exercise was developed to discuss frustration and different work styles in terms of computer instruction. Instruction also consisted of discussion of participants' best and worst experiences with technology, love-hate relationships with computers, and cognitive mapping of the internet, computers and technology.

Cognitive mapping requires participants to draw their perceptions of the connection between the internet, the World Wide Web, and personal computers. This exercise was followed up with participants each receiving a card with a picture and instructions to place themselves in line in the order of information on the cards (see Appendix L). The all-you-can-eat buffet phenomenon on Internet/information explosion was discussed in terms of organization of online resources, bookmarking and not getting overwhelmed. The session concluded with a discussion of the role of technology and new learning environments.

Data Collection

All workshop participants convened for a one hour opening session. During this

session, the modified TAT instrument was distributed for volunteer participants to complete the instrument.

Participants were asked to complete a second modified TAT during the workshop closing session to re-assess computer anxiety. Participants were reminded that a postcard would be mailed to the address that they wrote on the survey for follow-up information regarding computer usage in the classroom. All participants received the postcard three months after the "Take the First Step Workshop."

Treatment of Data

Descriptive techniques and statistical analysis were used to identify characteristics of the sample and test the hypotheses. Frequencies and percentages were computed for data collected from the background items on the first distribution of the TAT. A multivariate analysis of covariance (MANCOVA) was used to test for differences in computer anxiety and computer usage in the classroom. Pre-workshop anxiety, as measured with the initial TAT, was used as a covariate in the final analysis. Computer usage in the classroom was also assessed before the workshop and used as a covariate in the final analysis. Where significance was found on the multivariate test, univariate tests of individual variables were performed to identify differences between groups in the individual variables. Descriptive techniques were used to perform a qualitative analysis on the data collected from the workshop satisfaction questionnaire.

CHAPTER IV

FINDINGS

This chapter presents a descriptive statistical analysis of data collected regarding age, gender, computer experience, number of weekly hours spent on the computer (pre and post intervention), and computer anxiety scores (pre and post intervention) generated from the study instrument.

Participant Demographics

Twenty-eight of the 33 participants who volunteered for the study were female. Seventy percent of the participants (n = 22) were over the age of 46 years. The rest of the participants ranged between 31 and 45 years of age. Two (6 %) participants were between the ages of 31 - 35 years of age, with 4 participants each within the age categories of 36 - 40, and 41 - 45 years of age. Fifty percent of the participants (n = 16) reported over 15 years of teaching experience. The remaining half of the participants reported from 1 to 14 years of teaching experience with 6 participants reporting within 2 to 5 years of experience (See Figure 1).

All participants had previous experience with computers. Eighty-eight percent of participants use applications such as word-processing and spreadsheets regularly. Thirty-one percent of participants reported using computers for instruction in the classroom at least occasionally (See Figure 2). Fifty-seven percent of participants did not

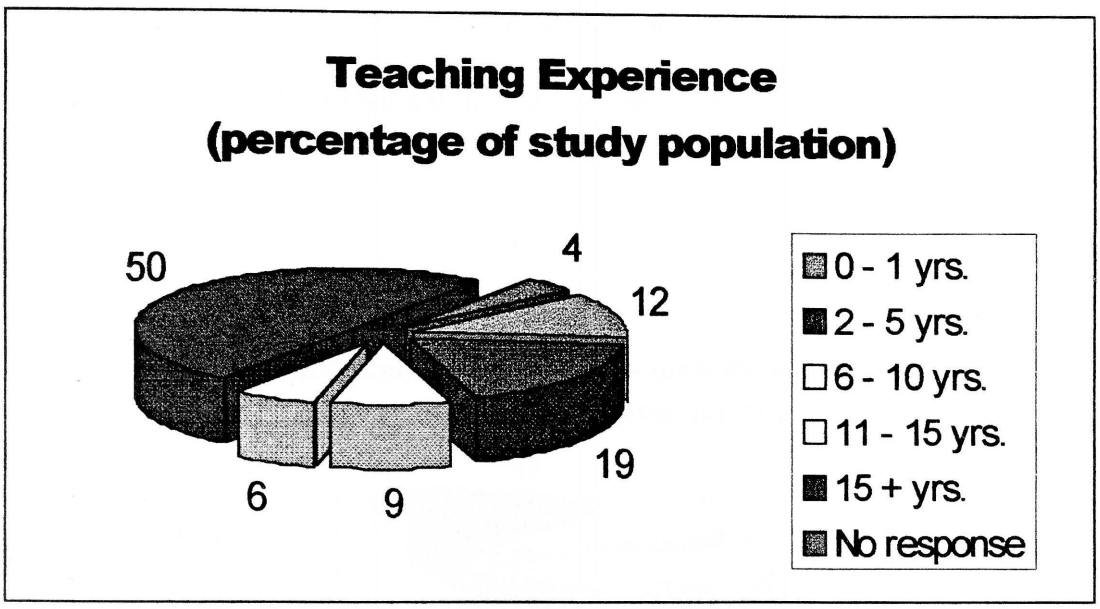

Figure 1. Teaching experience.

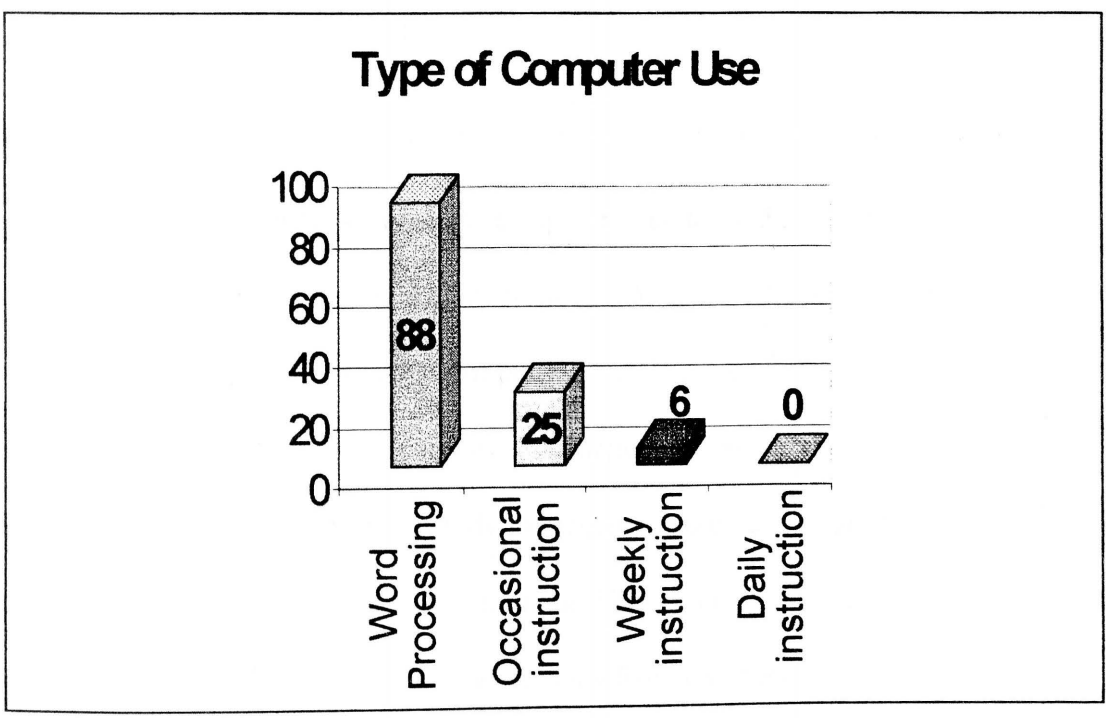

Figure 2. Type of computer use.

use the computer in the classroom. The remaining percentage of participants reported classroom computer usage ranging from less than one hour to 20 hours per week (See Figure 3).

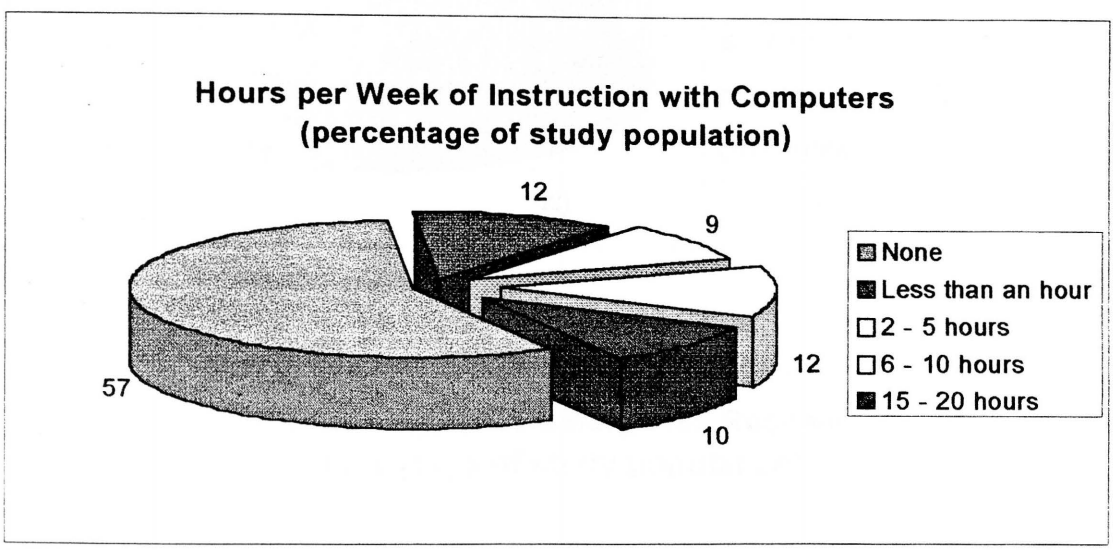

Figure 3. Hours per week of instruction with computers (pre-workshop).

In response to a question about computer training, 40% of participants had received at least basic computer literacy training. Another 40% related receiving training in computer applications. Only 12% of participants had received training on the integration of computer use in the classroom curriculum (See Figure 4).

Forty-seven percent of the study participants were self-taught in the use of computers. Of those receiving formal training, 37% received the training at a college or university. The remaining 16% received training from a variety of venues including the military, workshops, spouses, and friends (see Figure 5).

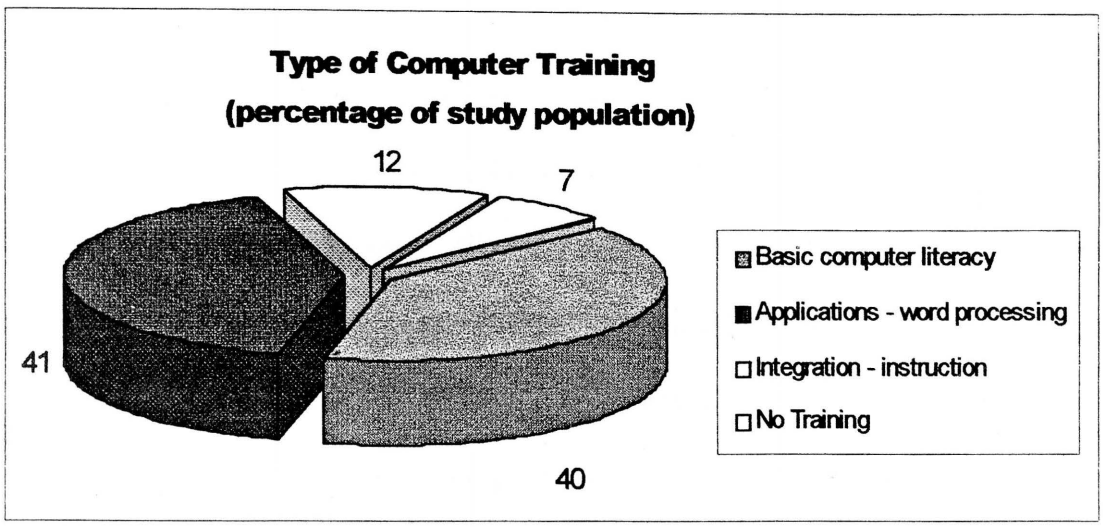

Figure 4. Type of computer training.

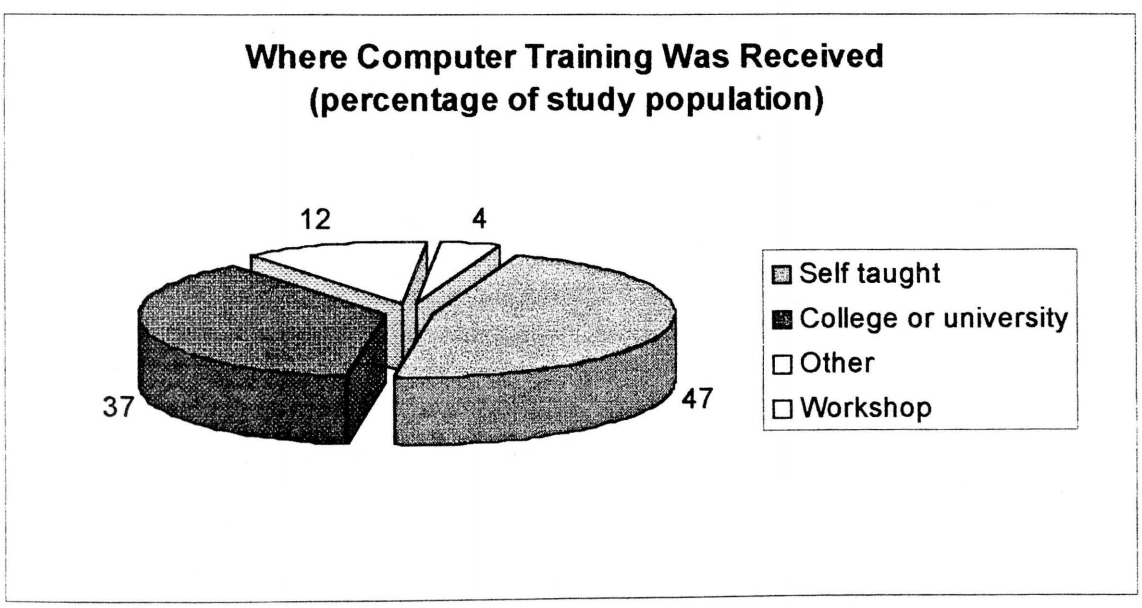

Figure 5. Venue of computer training.

Statistical Analysis

A multivariate analysis of covariance was performed on the pooled dependent variables of computer anxiety and hours spent per week on the computer in the classroom at three months post intervention. Pre-test scores on anxiety and hours spent in computer instruction per week were used as covariates in the analysis. The multivariate analysis revealed a significant difference between the two groups (AR and CS) on the pooled dependent variable ($F[4, 31] = 3.84$, $p = .045$). Therefore, univariate analyses were performed on each of the two dependent variables.

Hypothesis I

The first hypothesis stated that no significant differences would be found on computer anxiety scores between the anxiety-reduction (AR) group and cognitive-support (CS) group. This hypothesis was rejected ($F[1, 33] = 6.854$, $p = .015$). The AR group had significantly lower post-test anxiety scores than the CS group (see Table 1).

Hypothesis II

The second hypothesis stated that no significant differences would be found in the number of hours per week spent using the computer in classroom instruction between the AR and CS groups. This hypothesis failed to be rejected ($F[1.33] = .077$, $p = .784$). The AR and CS groups showed no significant difference in the number of hours spent using the computer in the classroom (see Table 1).

Table 1

Anxiety Scores and Hours of Computer Use for Anxiety-reduction and Cognitive-support groups.

Group	Anxiety				Hours of Computer Use			
	Pre-test		Post-test		Pre-workshop		Post-workshop	
	M	SD	M	SD	M	SD	M	SD
AR	148.5	31.6	136.5*	28.7	3.1	5.8	3.1	4.7
CS	139.7	27.5	148.5*	31.7	1.5	5.1	1.7	4.8

Note: AR = Anxiety-reduction; CS = Cognitive-support.

* significant difference at $p < .05$

Hypothesis III

This hypothesis was not evaluated statistically for a number of reasons. Primarily, there was very little variability in responses to the satisfaction question to perform a meaningful analysis. When asked to rate the overall value of the workshop, on a score of 1 - 4 (low to high), 16 (59.2 %) rated it a 4, 9 (33.3 %) rated it a 3, and 2 (7.4 %) rated it a 2 (see Table 2). Secondly, a self-selection bias by participants completing the workshop evaluation severely threatened the validity of the data.

Table 2.

Workshop Evaluation Responses

	Overall Rating			
	1 (lowest)	2	3	4 (highest)
N	0	2	9	16
%	0	7.4	33.3	59.2

Note: N = number of respondents; % = percentage of those who completed the evaluation

Twenty-eight participants responded to the Workshop Evaluation questionnaire. In response to the question, "what were the most useful aspects of the workshop?", ten participants listed "making a web page and links" and ten participants wrote "hands-on section." A scattering of participants listed resources, Internet, problem-solving, access to instructor, discussion, and raising comfort level. In response to a question about the least effective aspects of the workshop, 11 participants stated "too long," and 6 listed "too much time spent on lecture about attitudes, fears, barriers, and pedagogy." Twenty-four out of 28 participants responded that the handouts were useful. Topics participants indicated that they would like to see future programs include: 1) More hands-on section with computers; 2) more applications on making websites; 3) continuation of hands-on course; 4) building tests; 5) efficient Internet searching; and 6) review of information learned/follow-up for learning. Participants' comments about the overall effectiveness of

the speaker presentations were enthusiastic, knowledgeable, highly effective, bright, energetic, good, entertaining, and non-threatening.

There were no significant correlations between the background variables of age, teaching experience, computer usage, and computer training and the measured variables of anxiety and computer usage (see Table 3). Only one significant correlation was found between background variables. Age was significantly correlated to teaching experience ($r = .62$, $p < .0001$).

Table 3

Correlations of Background Variables and Anxiety and Hours of Computer Use

Variable	HCT	Anxiety	Age	T Exp	Com Tr	Com Use
HCT		.008	.219	.288	.122	.244
Anxiety	.008		.112	.167	.297	.301
Age	.219	.112		.584*	.222	.220
T Exp	.288	.167	.584*		.311	.198
Com Tr	.122	.297	.222	.311		.274
Com Use	.244	.301	.220	.198	.274	

Note: HCT = hours spent per week using computers for instruction; T Exp = years of teaching experience; Com Tr = computer training; Com Use = computer use.

* significant at $p < .0001$.

CHAPTER V

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

The final chapter of this dissertation is really just a beginning, the first stepping stone through unknown yet exciting territory. A review of existing research into the area of instructional technology training and adoption among health instruction professionals revealed serious gaps in the body of knowledge. Computer training techniques are seldom examined with sufficient scrutiny or scientific rigor to formally identify specific training elements that are most and least effective in terms of reaching training goals. More research may be necessary in order to determine optimal training techniques in computer use among health professionals new to instructional technology.

Summary

This study employed a quasi-experimental design to determine the impact of instructional sequencing on individuals' anxiety and use of computers. Of the 44 adults who attended a day-long workshop about use of computers for instruction, 39 volunteered to participate in the study, and 33 completed the entire data collection process. One-half of the study participants received their instruction with the cognitive elements first and the anxiety-reduction elements second. The other half of the participants received their instruction with the anxiety-reduction elements first and the cognitive elements second. Other than the order in which they received the cognitive support and anxiety-reduction

elements, participants in both groups received identical treatment including opening and closing sessions. Participants completed a pretest instrument (TAT) with demographic items and computer anxiety items. During the closing session of the workshop, participants completed the post-test computer anxiety instrument (TAT) as well as a brief Workshop Evaluation questionnaire. Participants were also asked to complete and return a postcard stating their frequency of computer use at three months following participation in the workshop.

The following hypotheses were examined at the .05 level of significance:

1. There is no significant difference in computer anxiety scores between the anxiety-reduction group and the cognitive group following exposure to the intervention. REJECTED

2. There is no significant difference in the average number of hours spent using the computer per week between the anxiety-reduction group and the cognitive group at three month following exposure to the intervention. NOT REJECTED

3. There is no significant difference in reported workshop satisfaction between the anxiety-reduction group and the cognitive group. NO STATISTICAL ANALYSIS PERFORMED

Discussion

While the results of this study are encouraging, some methodological problems must be addressed. For example, study participants from one group could have contaminated participants from the other group during the open lunch session. The length

of time of the intervention (8 hours) may have been too short to derive much impact. Given that all of the workshop presenters knew the research hypotheses prior to conducting the intervention, some instructor bias seems likely. The small number of participants in each group made the unique dynamics of each group a powerful influence.

The third hypothesis was not evaluated statistically for a number of reasons. Primarily, the workshop evaluation instrument used was developed by the Office of Continuing Education for internal use and has not been tested for validity. Secondly, there was very little variability in responses to the satisfaction question to perform a meaningful analysis. When asked to rate the overall value of the workshop, on a scale of 1 - 4 (low to high), 16 (59.2%) rated it a 4, 9 (33.3%) rated it a 3, and 2 (7.4%) rated it a 2. Lastly, a self-selection bias by participants completing the workshop evaluation severely threatened the validity of the data.

According to Marcoulides (1988), for some individuals, computer anxiety can be present regardless of computer exposure. In the present study, participants had a wide variety of computer experience (see Figure 2) yet relatively high pre-workshop anxiety. This result is consistent with recent studies that indicated that experience alone will not eliminate anxiety (Rosen & Maquire, 1990). In fact, according to Rosen and Maquire, computer experience may in many instances exacerbate the problem. This conclusion seems to be supported, in part, by the results of the present study: the post-test anxiety scores for the group receiving the cognitive support (CS) first were actually higher than their pre-test anxiety scores. This result also lends credence to the main results of a study

by Hignite and Echternacht (1992) who inferred:

> that the relationship between computer attitudes and computer literacy is direct or simple...both positive attitudes toward computers and adequate computer literacy skills are critical to the successful incorporation of new technology into the classroom. (p. 386)

From this conclusion, it can be stated that the higher the level of computer anxiety, the lower the computer achievement. It follows that, in order to increase computer usage and overall computer literacy, reduction of users' computer anxiety is imperative. The reduction in anxiety experienced by the group receiving the anxiety-reduction element before the cognitive-support element may have identified an effective strategy to decrease computer anxiety and increase computer literacy.

In contrast to the results of the present study, Loyd and Gressard (1986b) found that limited computer experience was indeed a factor influencing anxiety. This discrepancy may have been the result of the wide range of computer experience of the participants in the present study. This variance makes it difficult to infer the effect of the participants' previous computer experience on anxiety.

Harris (1995) indicated that faculty move through several phases as they integrate the use of computers and instructional technology, suggesting that faculty should learn the technical aspects of the technology before moving on to the instructional applications. The findings of the present study would appear to support this assertion. Three months after the workshop, faculty reported no significant increase in hours spent per week using

the computer in instruction. Thus, it may be necessary to provide more than one session of computer instruction before faculty begin to use the computer in instruction.

Finally, the present study found no significant correlations between background variables (age, teaching experience, computer experience, and computer training) and computer anxiety or use of computers in instruction. This is contrary to the findings of Levine and Cooper (1991) who concluded that prior computer exposure (in particular, having a computer at home) had a strong influence on computer anxiety. The small sample size provided insufficient power to identify any relationship that may actually exist.

Conclusions

Health educators must become comfortable and efficient in the use of technology as a tool rather than as just another instructional fad or gimmick. One of many fears associated with use of instructional technology and computers by health education faculty is the specter of forced change from teacher-centered and student-centered instruction. The issue then becomes more about easing the process of a paradigm shift than about training in use of computers for teaching. The next research question to begin to address, then, is whether the resistance to using instructional technology among health education faculty is caused more by a fear of change or barriers to building new skills?

Recommendations

Based on the results of this study, there are several implications for further research. Limitations of the current study will be addressed first, followed by suggestions for further research. First, this study could be replicated after addressing some of its

weaknesses including: larger sample size, timing of the workshop within the school year, shorter, more frequent, and varied instructional segments, use of a less age biased instrument, and the inclusion of a control group. The recruitment of a larger number of study participants would increase power and perhaps strengthen results. Recruitment procedures were intact early, however the timing of the workshop may not have been optimal. Faculty may be more receptive to a training session scheduled during the semester, instead of before the official semester begins. Alternating the two instructional elements through-out the workshop, in shorter time segments, may hold participants' attention longer and possibly reduce the frustration that some participants experienced during the anxiety-reduction session.

A possible threat to the validity of the current study may be the exposure of participants in one group to participants in the other group during lunch. Another modification of the present study would include adding another study group to receive an intervention with no clear distinctions between cognitive-support and anxiety-reduction components. This additional group would serve as a control group for evaluating the sequencing of instruction. Use of another instrument to measure computer anxiety to avoid the ageist bias in the current instrument may also lead to more conclusive evidence of computer anxiety by age group. The current instrument only permitted collection of age data as a categorical variable with the final category being open ended.

Any further research might benefit from a comparison of the impact of allowing participants to select the order in which they receive the cognitive-support and anxiety-

reduction elements of instruction. A similar study with a longer period of intervention than a single day may better evaluate the impact of specific types of training on computer anxiety and use of computers in instruction. Use of qualitative methods such as a focus group discussion and/or in-depth interviews may assist to determine the basis of participants' fears of use of computers. Lastly, targeting K-12 grade teachers for the study as another population from which to sample may add to the body of knowledge.

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APPENDIXES

Appendix A

Subject Consent to Participate in Research

TEXAS WOMAN'S
UNIVERSITY
DENTON/DALLAS/HOUSTON

DEPARTMENT OF HEALTH STUDIES
College of Health Sciences
P. O. Box 425499
Denton, TX 76204-5499
Phone: 940/898-2860

TEXAS WOMAN'S UNIVERSITY
SUBJECT CONSENT TO PARTICIPATE IN RESEARCH

Reducing Resistance to Instructional Technology Among Health Educators

Listed below are the names and phone numbers of the investigators involved in this study who are available to you should you have any questions regarding this study:

Lisa Clark, MPH, Investigator	940-898-2862
Mary Walker-Shaw, Ph.D., Research Advisor	940-898-2865

You are being asked to participate in a research project to determine the most effective sequencing of instruction for reducing anxiety and increasing the average hours of computer use per week among health profession instructors. If you agree to participate, you will be asked to complete a pre-test/post-test instrument, attend skill building sessions and a one month follow up post-test instrument. The estimated time for study participation is seven hours.

Paper generated data will be stored for one year following data collection. Only the investigator will have access to the data which will be stored in a locked cabinet in the Department of Health Studies at Texas Woman's University. After one year, paper generated data will be shredded and computer data deleted immediately upon completion of data analysis.

RISKS

Potential risks of participation in this study may include: 1) embarrassment from personal identification and 2) embarrassment for improper release of the data. A description of the possible discomfort or risks reasonable to expect from participation in the study have been discussed with me. I understand that I may quit at any time; and, that participation in the study and my responses to the questions will be kept confidential. Consent forms will be forwarded to the Office of Research and Grants.

PARTICIPATION

I understand that my participation in this study is voluntary and that I may withdraw from the study at any time. My refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled. I understand that I will be not be compensated for my participation. An offer has been made to answer all of my questions and concerns about the study. I will be given a copy of the dated and signed consent form to keep.

We will try to prevent any problem that would happen because of this research. Please let us know at once if there is a problem and we will help you. You should understand, however, that TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

If you have any questions about the research or about your rights as a subject, we want you to ask us. Our phone number is at the top of this form. If you have questions later, or if you wish to report a problem, please call us or the Office of Research & Grants Administration at 940-898-3375.

I hereby give permission for the investigators to perform the above procedures. I also give permission for other qualified personnel to assist the above mentioned procedures.

_____ _____
Participant's Signature Date

_____ _____
Witness Date

Please record the address where you would prefer the study follow-up to be sent:

Appendix B

Take the First Step Workshop Brochure

Take the First Step

A Faculty Development Workshop on Instructional Technology for the Rest of Us

8:00 a.m.–5:00 p.m.
Friday, August 21, 1998
Administration Conference Tower
Texas Woman's University
Denton, Texas

Hosted by
Texas Woman's University
Department of Health Studies,
College of Health Sciences
Office of Continuing Education

www.twu.edu/hs/hs/workshop/FirstStep.htm

Take the First Step

A Faculty Development Workshop on Instructional Technology for the Rest of Us

8:00 a.m.–5:00 p.m.
Friday, August 21, 1998
Administration Conference Tower
Texas Woman's University
Denton, Texas

Hosted by
Texas Woman's University
Department of Health Studies,
College of Health Sciences

Office of Continuing Education

Purpose

This conference is intended for health faculty relatively new to the use of computers in teaching. Attendees will be guided in the process of joining the instructional technology age. Teaching effectiveness and productivity will be emphasized in a faculty-friendly environment.

Participants will have access to a personal computer for their skill-building activities. Sessions will focus on building skills in the use of contemporary teaching methods and tools.

Objectives

Upon completion of the workshop, participants will be able to:

- Contribute to the creation of a health-related web page suitable for posting on the Internet;
- Make effective use of instructional technology;
- Use instructional technology to enhance professional development;
- Identify instructional technology resources and techniques;
- Identify course delivery strategies and systems;
- Utilize software that will help the instructional; technology decision-making process, and
- Gain insight into implementing the latest technology.

Benefits of attending

As a group, participants will be led through the process of contributing to and developing a web page. The group-developed web page will then be posted on the Internet for viewing at the closing session.

Those attending will also receive a take-home instructional technology survival kit consisting of: a disk with copies of workshop activities and the group-developed web site; means for ongoing interaction with other participants; a permission slip to explore student-centered instruction, and online presence as a contributing web page author.

TWU Presenters

Judy Baker, Ph.D.
Professor, Health Studies & Graduate Program Coordinator
- Chairs the University's Task Force on Emerging Instructional Technologies
- Received Innovative Excellence in Teaching, Learning and Technology Award
- Developed Department of Health Studies web site.

Lisa Clark, M.P.H.
Teaching Assistant, Health Studies
- Acts as instructional technology consultant to Health Studies faculty
- Presented on resistance to instructional technology at the Eighth National Conference on College Teaching, Learning and Technology
- Has used instructional technology in her teaching for three years

Kathy Ludwig, M.S.
Visiting Professor, Kinesiology
- Revised the Department of Kinesiology web site
- Developed online course materials for the Internet
- Coordinated the XVth International Symposium of Biomechanics in Sport

Credit

Application for CHES Category I Continuing Education contact hours (CECH) has been made to the National Commission for Health Education Credentialing, Inc. (NCHEC)

Schedule

8:00–9:00 a.m.	Opening Session
9 a.m.–noon	Session 2: Skill-building
noon–1:00 p.m.	Lunch (included)
1:00–4:00 p.m.	Session 3: Skill-building
4:00–5:00 p.m.	Wrap-up, Evaluation, Closing Remarks

Topics

- Fears and barriers to the use of technology
- Best and worst experiences with technology
- Shortcuts and tips for teachers using the Internet for instruction
- Efficient Internet searching for health information
- How to run an effective forum and chat room for students
- Internet adventures and discoveries for classroom use
- Electronic networking
- Case studies in the use of instructional technology for health studies
- All-you-can-eat buffet phenomenon on Internet / information explosion
- Love-hate relationships with computers/technology
- Cognitive mapping of the Internet, computers, and technology
- Brainstorming: What would you change about computers
- What do you already know that you can share?

Refunds/Cancellations

If you find it necessary to cancel your registration, you may receive a refund, less a $10 processing fee, by submitting written notification at least seven days before the program. Substitutions may be made at any time. Continuing Education reserves the right to cancel this course if sufficient enrollment is not met. In the event of cancellation, TWU's liability is limited to the program fee.

Appendix C

Demographic Information and Teachers Attitudes Toward Computers Questionnaire (TAT) Used in the Study

Background Information

1. How long have you been teaching?

   _____ 0-1 years _____ 2-5 years _____ 6-10 years

   _____ 11-15 years _____ 15+ years

2. How would you rate your experience with computers? (Check all that apply)

   _____ I have never used a computer and I don't plan to anytime soon.

   _____ I have never used a computer but I would like to learn.

   _____ I use applications like word processing, spreadsheets, etc.

   _____ I use computers for instruction in the classroom.
   How often?

   _____ Daily

   _____ Weekly

   _____ Occasionally

3. Currently I use the computer approximately _____ hours per week in the classroom.

4. At the beginning of this school year, I used the computer approximately _____ hours per week in the classroom.

5. If you do use computers, what type of training have you received? (Rank order all that apply).

   _____ No training

   _____ Basic Computer Literacy (on/off operations, how to run programs)

   _____ Computer applications (word processing, spreadsheets)

   _____ Computer integration (how to use in classroom curriculum)

6. Where did you receive your training? (Rank order all that apply).

   _____ Self-taught

   _____ School district

   _____ College or university

   _____ Other- please specify _____

Do you have a computer at home? ___Yes ___No Gender: ___M ___F

Age: ___ 18-25 ___ 26-30 ___ 31-35 ___ 36-40 ___ 41-45 ___ 46+

Part 1

Instructions: Please read each statement and then circle the number which best shows how you feel.

SD = Strongly Disagree D = Disagree A = Agree SA = Strongly Agree

from Computer Attitude Questionnaire, Knezek & Miyashita, 1994		SD	D	A	SA
(1)	I enjoy doing things on a computer.	1	2	3	4
(2)	I am tired of using a computer.	1	2	3	4
(3)	I will be able to get a good job if I learn how to use a computer.	1	2	3	4
(4)	I concentrate on a computer when I use one.	1	2	3	4
(5)	I enjoy computer games very much.	1	2	3	4
(6)	I would work harder if I could use computers more often.	1	2	3	4
(7)	I think that it takes a long time to finish when I use a computer.	1	2	3	4
(8)	I know that computers give me opportunities to learn many new things.	1	2	3	4
(9)	I can learn many things when I use a computer.	1	2	3	4
(10)	I enjoy lessons on the computer.	1	2	3	4
(11)	I believe that it is very important for me to learn how to use a computer.	1	2	3	4
(12)	I think that computers are very easy to use.	1	2	3	4
(13)	I feel comfortable working with a computer.	1	2	3	4
(14)	I get a sinking feeling when I think of trying to use a computer.	1	2	3	4
(15)	Working with a computer makes me nervous.	1	2	3	4
(16)	Using a computer is very frustrating.	1	2	3	4
(17)	I will do as little work with computers as possible.	1	2	3	4
(18)	Computers are difficult to use.	1	2	3	4
(19)	Computers do not scare me at all.	1	2	3	4
(20)	I can learn more from books than from a computer.	1	2	3	4

Instructions: Mark one space between each adjective pair.

from The Computer Attitude Measure (CAM), Kay, 1993

Part 2

Computers are:

21.	Unlikable	____ ____ ____ ____ ____ ____ ____	Likable	(41)
22.	Unhappy	____ ____ ____ ____ ____ ____ ____	Happy	(42)
23.	Bad	____ ____ ____ ____ ____ ____ ____	Good	(43)
24.	Unpleasant	____ ____ ____ ____ ____ ____ ____	Pleasant	(44)
25.	Tense	____ ____ ____ ____ ____ ____ ____	Calm	(45)
26.	Uncomfortable	____ ____ ____ ____ ____ ____ ____	Comfortable	(46)
27.	Artificial	____ ____ ____ ____ ____ ____ ____	Natural	(47)
28.	Empty	____ ____ ____ ____ ____ ____ ____	Full	(48)
29.	Dull	____ ____ ____ ____ ____ ____ ____	Exciting	(49)
30.	Suffocating	____ ____ ____ ____ ____ ____ ____	Fresh	(50)

Part 3

Instructions: Please read each statement and circle the number that best describes how you feel about that statement.

1 = Strongly Disagree (SD)
2 = Disagree (D)
3 = Undecided (U)
4 = Agree (A)
5 = Strongly Agree (SA)

Computer Attitude Scale, Loyd & Gressard, 1984

			SD	D	U	A	SA
31.	Computers do not scare me at all.	(51)	1	2	3	4	5
32.	I'm no good with computers.	(52)	1	2	3	4	5
33.	I would like working with computers.	(53)	1	2	3	4	5
34.	I will use computers many ways in my life.	(54)	1	2	3	4	5
35.	Working with a computer would make me very nervous.	(55)	1	2	3	4	5
36.	Generally I would feel OK about trying a new problem on the computer.	(56)	1	2	3	4	5
37.	The challenge of solving problems with computers does not appeal to me.	(57)	1	2	3	4	5
38.	Learning about computers is a waste of time.	(58)	1	2	3	4	5

Computer Attitude Scale, Loyd & Gressard, 1984 (Cont.)

Part 3

			SD	D	U	A	SA
39.	I do not feel threatened when others talk about computers.	(59)	1	2	3	4	5
40.	I don't think I would do advanced computer work.	(60)	1	2	3	4	5
41.	I think working with computers would be enjoyable and stimulating.	(61)	1	2	3	4	5
42.	Learning about computers is worthwhile.	(62)	1	2	3	4	5
43.	I feel aggressive and hostile toward computers.	(63)	1	2	3	4	5
44.	I am sure I could do work with computers.	(64)	1	2	3	4	5
45.	Figuring out computer problems does not appeal to me.	(65)	1	2	3	4	5
46.	I'll need a firm mastery of computers for my future work.	(66)	1	2	3	4	5
47.	It wouldn't bother me at all to take computer courses.	(67)	1	2	3	4	5
48.	I'm not the type to do well with computers.	(68)	1	2	3	4	5
49.	When there is a problem with a computer run that I can't immediately solve, I would stick with it until I have the answer.	(69)	1	2	3	4	5
50.	I expect to have little use for computers in my daily life.	(70)	1	2	3	4	5
51.	Computers make me feel uncomfortable.	(71)	1	2	3	4	5
52.	I am sure I could learn a computer language.	(72)	1	2	3	4	5
53.	I don't understand how some people can spend so much time working with computers and seem to enjoy it.	(73)	1	2	3	4	5
54.	I can't think of any way that I will use computers in my career.	(74)	1	2	3	4	5
55.	I would feel at ease in a computer class.	(75)	1	2	3	4	5
56.	I think using a computer would be very hard for me.	(76)	1	2	3	4	5
57.	Once I start to work with the computer, I would find it hard to stop.	(77)	1	2	3	4	5
58.	Knowing how to work with computers will increase my job possibilities.	(78)	1	2	3	4	5
59.	I get a sinking feeling when I think of trying to use a computer.	(79)	1	2	3	4	5
60.	I could get good grades in computer courses.	(80)	1	2	3	4	5
61.	I will do as little work with computers as possible.	(81)	1	2	3	4	5
62.	Anything that a computer can be used for, I can do just as well some other way.	(82)	1	2	3	4	5
63.	I would feel comfortable working with a computer.	(83)	1	2	3	4	5

Computer Attitude Scale, Loyd & Gressard, 1984 (Cont.)

			SD	D	U	A	SA
64.	I do not think I could handle a computer course.	(84)	1	2	3	4	5
65.	If a problem is left unsolved in a computer class, I would continue to think about it afterward.	(85)	1	2	3	4	5
66.	It is important to me to do well in computer classes.	(86)	1	2	3	4	5
67.	Computers make me feel uneasy and confused.	(87)	1	2	3	4	5
68.	I have a lot of self-confidence when it comes to working with computers.	(88)	1	2	3	4	5
69.	I do not enjoy talking with others about computers.	(89)	1	2	3	4	5
70.	Working with computers will not be important to me in my life's work.	(90)	1	2	3	4	5

Appendix D

Three Month Follow-up Postcard

How many hours per week are you using a computer? _____

Describe below any changes in computer anxiety since attending the Workshop.

TAKE THE FIRST
STEP WORKSHOP
FOLLOW-UP

Lisa Clark
TWU Health Studies
Email: g_3clark@twu.edu

Thank You for your participation in the study.

Take The First Step Workshop
Follow-up

PLEASE
PLACE
STAMP
HERE

Lisa Clark
Department of Health Studies
Texas Woman's University
PO Box 425499
Denton, TX 76204

Appendix E

Author's Permission to Use the Teachers Attitudes Toward Computers Questionnaire (TAT)

University of North Texas
College of Education
Department of Technology & Cognition

July 28, 1998

Lisa Clark
1706 Broadway St.
Denton, TX 76201

Dear Ms. Clark:

This letter is to confirm permission for your use of the Teachers Attitudes Toward Computers (TAC) Questionnaire version 3.0, in your dissertation study. Dr. Christensen and I are most pleased that you are considering its use.

Please let us know the results of your study.

Sincerely,

Gerald A. Knezek

Gerald A. Knezek, Ph.D.
Associate Professor of Technology and Cognition

cc: Dr. Rhonda Christensen

P.O. Box 13857 • Denton, Texas 76203-6857
(817)565-2093 • TDD (800)735-2989

Appendix F

Teachers Attitudes Toward Computers Questionnaire (TAT)

Internal Consistency Reliability for the Teachers Attitudes Toward Information Technology (TAT) Questionnaire

Texas Center for Educational Technology
Telecommunications and Informatics Laboratory

Technical Report 97.1

Gerald Knezek, Matthews Chair for Research in Education
Rhonda Christensen, Research Associate

July 20, 1997

Overview

The Teachers Attitudes Toward Information Technology Questionnaire (TAT) was developed during the second phase of the 1995-97 Matthews Chair for Research in Education Project at the University of North Texas. During Phase I (1995-96) activities focused on developing a more parsimonious instrument to assess the areas covered by 14 previously validated computer attitude scales. The result of that effort was the Teachers Attitudes Toward Computers questionnaire (TAC) (Christensen & Knezek, 1996, 1997). During 1996-97 construction of the TAT was begun to address areas not covered by the TAC. These were primarily what have come to be know in Europe as the New Information Technologies (NIT) -- multimedia, electronic mail, and the World-Wide Web (WWW). In addition to the NITs, other areas, such as the use of information technology to improve teacher productivity, were also included, and two well-validated subscales from the TAC (semantic perception of computers and classroom learning via Email) were included for comparison purposes. Refinement of the TAT is ongoing. In this document internal consistency reliabilities are reported for the first large-scale pilot test of the instrument.

Subjects

The subjects in this study were 147 teachers from six schools in the a large urban public school distric in northern Texas. TATs were completed during May of 1997. This was the last month of the 1996-97 school year in Texas.

Data Acquisition, Preparation, and Analysis

Data were gathered for 10 separate indices from the teachers responding. Nine of these ten subscales were composed of semantic differential items (see Appendix). Semantic items were hand coded with a number from 1-7, representing the particular space the respondent marked between the adjective pairs, then keypunched by the University of North Texas Computation Center data entry staff. Cronbach's Alpha was produced for each subscale using SPSS on a Macintosh computer.

Internal Consistency Reliabilities

As shown in Table 1, internal consistency reliabilities for the ten TAT subscales ranged from a low of .91

to a high of .98 (These reliabilities are based on responses from 74 subjects who furnished complete data). According to the guidelines provided by DeVellis (1991), this is excellent reliability for a research instrument. Additional strength is added to this conclusion because the two subscales carried over from the TAC exhibited internal consistency reliabilities quite comparable to the .93 (Kay's Semantic) and .95 (D'Souza's Classroom Email) found for these indices in the previous study of TAC reliabilities (Christensen & Knezek, 1997). The earlier study involved a much larger and diverse sample.

Table 1.
TAT Reliabilities for 1996 public school teacher data

Scale	# cases	# items	Alpha
Kay's Semantic (CAM)	74	10	.91
Email (teacher)	74	10	.93
Email (student)	74	10	.95
WWW (teacher)	74	10	.95
WWW (student)	74	10	.96
Multimedia (teacher)	74	10	.96
Multimedia (student)	74	10	.98
Productivity (teacher)	74	10	.96
Productivity (student)	74	10	.96
D'Souza's Email	74	11	.95

Future Work on Validity

Content validity for the TAT is believed to be quite high due to the way the instrument was constructed. Subscales were selected precisely because various scholars and practitioners in the field had identified these areas as important but not measured by previously-existing questionnaires. Construct (factor) validity needs to be checked through confirmatory factor analysis to determine if some of the ten current subscales are not in fact duplicates of another. Criterion-related validity, such as the ability of the instrument to separate (discriminate between) groups thought to be different on one or more attributes, or the ability to measure pre-post change in a single group, needs to be established as well. Future research is planned in these areas.

References

Christensen, R. & Knezek, G. (1996). Constructing the Teachers' Attitudes toward Computers (TAC) Questionnaire. Paper presented to the Southwest Educational Research Association Annual Conference, New Orleans, Louisiana.

Christensen, R. & Knezek, G. (1997). Internal consistency reliabilities for 14 computer attitude scales. in Willis, J. et al. (Eds.) Technology in Teacher Education Annual, 1997, 877-880.

DeVellis, R. F. (1991). *Scale Development*. Newbury Park, NJ: Sage Publications.

Background Information

1. How long have you been teaching?

   _____ 0-1 years _____ 2-5 years _____ 6-10 years

   _____ 11-15 years _____ 15+ years

2. How would you rate your experience with computers? (Check all that apply)

   _____ I have never used a computer and I don't plan to anytime soon.

   _____ I have never used a computer but I would like to learn.

   _____ I use applications like word processing, spreadsheets, etc.

   _____ I use computers for instruction in the classroom.
   How often?
   _____ Daily
   _____ Weekly
   _____ Occasionally

3. Currently I use the computer approximately _____ hours per week in the classroom.

4. At the beginning of this school year, I used the computer approximately _____ hours per week in the classroom.

5. If you do use computers, what type of training have you received? (Rank order all that apply).

   _____ No training

   _____ Basic Computer Literacy (on/off operations, how to run programs)

   _____ Computer applications (word processing, spreadsheets)

   _____ Computer integration (how to use in classroom curriculum)

6. Where did you receive your training? (Rank order all that apply).

   _____ Self-taught

   _____ School district

   _____ College or university

   _____ Other- please specify _____

Do you have a computer at home? ___ Yes ___ No Gender: ___ M ___ F

Age: ___ 18-25 ___ 26-30 ___ 31-35 ___ 36-40 ___ 41-45 ___ 46+

Name: _____ **Date:** _____

Teachers' Attitudes Toward Information Technology

To the Educator:

This questionnaire is designed to assess your perceptions of the use of information technology for your own productivity as well as for the benefit of your students. It should require about 10 minutes of your time. Usually it is best to respond with your first impression, without giving a question much thought. Your answers will remain confidential.

Thank you for your cooperation!

Gerald Knezek & Rhonda Christensen, Texas Center for Educational Technology
University of North Texas

tcet
Texas Center for Educational Technology
P.O. Box 13857
College of Education
University of North Texas
Denton, Texas 76203
Phone: (817) 565-4433
Fax: (817) 565-4425

Instructions: Please read each statement and then circle the number which best shows how you feel.

SD = Strongly Disagree D = Disagree A = Agree SA = Strongly Agree

Part I

from Computer Attitude Questionnaire, Knezek & Miyashita, 1994		SD	D	A	SA
(1)	I enjoy doing things on a computer.	1	2	3	4
(2)	I am tired of using a computer.	1	2	3	4
(3)	I will be able to get a good job if I learn how to use a computer.	1	2	3	4
(4)	I concentrate on a computer when I use one.	1	2	3	4
(5)	I enjoy computer games very much.	1	2	3	4
(6)	I would work harder if I could use computers more often.	1	2	3	4
(7)	I think that it takes a long time to finish when I use a computer.	1	2	3	4
(8)	I know that computers give me opportunities to learn many new things.	1	2	3	4
(9)	I can learn many things when I use a computer.	1	2	3	4
(10)	I enjoy lessons on the computer.	1	2	3	4
(11)	I believe that it is very important for me to learn how to use a computer.	1	2	3	4
(12)	I think that computers are very easy to use.	1	2	3	4
(13)	I feel comfortable working with a computer.	1	2	3	4
(14)	I get a sinking feeling when I think of trying to use a computer.	1	2	3	4
(15)	Working with a computer makes me nervous.	1	2	3	4
(16)	Using a computer is very frustrating.	1	2	3	4
(17)	I will do as little work with computers as possible.	1	2	3	4
(18)	Computers are difficult to use.	1	2	3	4
(19)	Computers do not scare me at all.	1	2	3	4
(20)	I can learn more from books than from a computer.	1	2	3	4

Part 2

Instructions: Mark one space between each adjective pair.

from The Computer Attitude Measure (CAM), Kay, 1993

Computers are:

21.	Unlikable	___	___	___	___	___	___	___	Likable	(41)
22.	Unhappy	___	___	___	___	___	___	___	Happy	(42)
23.	Bad	___	___	___	___	___	___	___	Good	(43)
24.	Unpleasant	___	___	___	___	___	___	___	Pleasant	(44)
25.	Tense	___	___	___	___	___	___	___	Calm	(45)
26.	Uncomfortable	___	___	___	___	___	___	___	Comfortable	(46)
27.	Artificial	___	___	___	___	___	___	___	Natural	(47)
28.	Empty	___	___	___	___	___	___	___	Full	(48)
29.	Dull	___	___	___	___	___	___	___	Exciting	(49)
30.	Suffocating	___	___	___	___	___	___	___	Fresh	(50)

Part 3

Instructions: Please read each statement and circle the number that best describes how you feel about that statement.

1 = Strongly Disagree (SD)
2 = Disagree (D)
3 = Undecided (U)
4 = Agree (A)
5 = Strongly Agree (SA)

Computer Attitude Scale, Loyd & Gressard, 1984

			SD	D	U	A	SA
31.	Computers do not scare me at all.	(51)	1	2	3	4	5
32.	I'm no good with computers.	(52)	1	2	3	4	5
33.	I would like working with computers.	(53)	1	2	3	4	5
34.	I will use computers many ways in my life.	(54)	1	2	3	4	5
35.	Working with a computer would make me very nervous.	(55)	1	2	3	4	5
36.	Generally I would feel OK about trying a new problem on the computer.	(56)	1	2	3	4	5
37.	The challenge of solving problems with computers does not appeal to me.	(57)	1	2	3	4	5
38.	Learning about computers is a waste of time.	(58)	1	2	3	4	5

Part 3

Computer Attitude Scale, Loyd & Gressard, 1984 (Cont.)

			SD	D	U	A	SA
64.	I do not think I could handle a computer course.	(84)	1	2	3	4	5
65.	If a problem is left unsolved in a computer class, I would continue to think about it afterward.	(85)	1	2	3	4	5
66.	It is important to me to do well in computer classes.	(86)	1	2	3	4	5
67.	Computers make me feel uneasy and confused.	(87)	1	2	3	4	5
68.	I have a lot of self-confidence when it comes to working with computers.	(88)	1	2	3	4	5
69.	I do not enjoy talking with others about computers.	(89)	1	2	3	4	5
70.	Working with computers will not be important to me in my life's work.	(90)	1	2	3	4	5

Part 4

from Pelgrum & Plomp, 1989

71.	Computers can help me to learn things more easily.	(91)	1	2	3	4	5
72.	With computers it is possible to do practical things.	(92)	1	2	3	4	5
73.	Knowing how to use computers will help me do well in my career.	(93)	1	2	3	4	5
74.	Knowing how to use computers is a worthwhile skill.	(94)	1	2	3	4	5
75.	All students should have an opportunity learn about computers at school.	(95)	1	2	3	4	5
76.	It is important for students to learn about computers in order to be informed citizens.	(96)	1	2	3	4	5
77.	Having computer skills helps you get better jobs.	(97)	1	2	3	4	5
78.	I like to talk to others about computers.	(98)	1	2	3	4	5
79.	Computers can be exciting.	(99)	1	2	3	4	5
80.	I like reading about computers.	(100)	1	2	3	4	5
81.	A job using computers would be very interesting.	(101)	1	2	3	4	5
82.	Computer lessons are a favorite subject for me.	(102)	1	2	3	4	5
83.	I want to learn a lot about computers.	(103)	1	2	3	4	5
84.	I like to scan computer journals.	(104)	1	2	3	4	5
85.	When I pass a computer shop, usually I stop for a while.	(105)	1	2	3	4	5
86.	Computers interest me little.	(106)	1	2	3	4	5

Computer Attitude Scale, Loyd & Gressard, 1984 (Cont,)

			SD	D	U	A	SA
39.	I do not feel threatened when others talk about computers.	(59)	1	2	3	4	5
40.	I don't think I would do advanced computer work.	(60)	1	2	3	4	5
41.	I think working with computers would be enjoyable and stimulating.	(61)	1	2	3	4	5
42.	Learning about computers is worthwhile.	(62)	1	2	3	4	5
43.	I feel aggressive and hostile toward computers.	(63)	1	2	3	4	5
44.	I am sure I could do work with computers.	(64)	1	2	3	4	5
45.	Figuring out computer problems does not appeal to me.	(65)	1	2	3	4	5
46.	I'll need a firm mastery of computers for my future work.	(66)	1	2	3	4	5
47.	It wouldn't bother me at all to take computer courses.	(67)	1	2	3	4	5
48.	I'm not the type to do well with computers.	(68)	1	2	3	4	5
49.	When there is a problem with a computer run that I can't immediately solve, I would stick with it until I have the answer.	(69)	1	2	3	4	5
50.	I expect to have little use for computers in my daily life.	(70)	1	2	3	4	5
51.	Computers make me feel uncomfortable.	(71)	1	2	3	4	5
52.	I am sure I could learn a computer language.	(72)	1	2	3	4	5
53.	I don't understand how some people can spend so much time working with computers and seem to enjoy it.	(73)	1	2	3	4	5
54.	I can't think of any way that I will use computers in my career.	(74)	1	2	3	4	5
55.	I would feel at ease in a computer class.	(75)	1	2	3	4	5
56.	I think using a computer would be very hard for me.	(76)	1	2	3	4	5
57.	Once I start to work with the computer, I would find it hard to stop.	(77)	1	2	3	4	5
58.	Knowing how to work with computers will increase my job possibilities.	(78)	1	2	3	4	5
59.	I get a sinking feeling when I think of trying to use a computer.	(79)	1	2	3	4	5
60.	I could get good grades in computer courses.	(80)	1	2	3	4	5
61.	I will do as little work with computers as possible.	(81)	1	2	3	4	5
62.	Anything that a computer can be used for, I can do just as well some other way.	(82)	1	2	3	4	5
63.	I would feel comfortable working with a computer.	(83)	1	2	3	4	5

Part 5

from CAIN, Maurer, 1983

		SD	D	U	A	SA
106. Having a computer available to me would improve my productivity.	(146)	1	2	3	4	5
107. If I had to use a computer for some reason, it would probably save me some time and work.	(147)	1	2	3	4	5
108. If I used a computer, I could get a better picture of the facts and figures.	(148)	1	2	3	4	5
109. Having a computer available to me would improve my general satisfaction.	(149)	1	2	3	4	5
110. If I had a computer at my disposal, I would try to get rid of it.	(150)	1	2	3	4	5
111. Computers are probably going to be an important part of my life.	(151)	1	2	3	4	5
112. I sometimes get nervous just thinking about computers.	(153)	1	2	3	4	5
113. I will probably never learn to use a computer.	(154)	1	2	3	4	5
114. I sometimes feel intimidated when I have to use a computer.	(157)	1	2	3	4	5

Part 6

Comparison of Four Computer Attitude Scales, Woodrow, 1991

from Computer Use Questionnaire, Griswold, 1983

115. Computers will improve education.	(162)	1	2	3	4	5
116. If there was a computer in my classroom it would help me to be a better teacher.	(163)	1	2	3	4	
117. Someday I will have a computer in my home.	(164)	1	2	3	4	5
118. Computers can teach mathematics.	(165)	1	2	3	4	5
119. Computers are beyond the understanding of the typical person.	(166)	1	2	3	4	5
120. Computers could enhance remedial instruction.	(168)	1	2	3	4	5
121. Computers will relieve teachers of routine duties.	(169)	1	2	3	4	5
122. Computers can be used successfully with courses which demand creative activities.	(170)	1	2	3	4	5

from The Computer Survey Scale, Stevens, 1982

123. High school students should understand the role computers play in society.	(172)	1	2	3	4	5
124. High school students should have some understanding about computers.	(173)	1	2	3	4	5
125. Computers can be a useful instructional aid in almost all subject areas.	(175)	1	2	3	4	5

SD = Strongly Disagree D = Disagree A = Agree SA = Strongly Agree

Measurement of Computer Attitudes, Comparison by Gardner, Discenza & Dukes, 1993

Part 5

from BELCAT (Blomberg, Erickson, Lowery Computer Attitude Task), Erickson, 1987

			SD	D	U	A	SA
87.	Knowing about computers will help me earn a living.	(109)	1	2	3	4	5
88.	I get a sinking feeling when I think of trying to do something hard with a computer.	(110)	1	2	3	4	5
89.	A computer test would scare me.	(112)	1	2	3	4	5
90.	I'll need computers for my future work.	(113)	1	2	3	4	5
91.	I'm really going to need computer skills after I finish school.	(115)	1	2	3	4	5
92.	I'd be proud to be the outstanding student in a computer class.	(116)	1	2	3	4	5
93.	I'd like people to think I was smart with computers.	(121)	1	2	3	4	5
94.	I see the computer as something I will rarely use in my daily life as an adult.	(123)	1	2	3	4	5
95.	It would make me happy if people thought I was really good with computers.	(128)	1	2	3	4	5
96.	I don't like people to think I'm smart with computers.	(129)	1	2	3	4	5

from ATC (Attitudes Toward Computers), Raub, 1981

97.	Computers have the potential to control our lives.	(134)	1	2	3	4	5
98.	Our country relies too much on computers.	(135)	1	2	3	4	5
99.	I will use a computer in my future occupation.	(137)	1	2	3	4	5
100.	Computers dehumanize society by treating everyone as a number.	(138)	1	2	3	4	5
101.	Computers will create more jobs than they eliminate	(140)	1	2	3	4	5
102.	I feel apprehensive about using a computer terminal.	(141)	1	2	3	4	5
103.	Computers are changing the world too rapidly.	(142)	1	2	3	4	5
104	Computers isolate people by inhibiting normal social interactions among users.	(144)	1	2	3	4	5
105.	I hesitate to use a computer for fear of making mistakes I cannot correct.	(145)	1	2	3	4	5

Part 7

		SD	D	U	A	SA
146. Computers would increase my productivity.	(202)	1	2	3	4	5
147. Computers would save me time.	(203)	1	2	3	4	5
148. Computers would help me learn.	(204)	1	2	3	4	5
149. Computers would help me organize my finances.	(205)	1	2	3	4	5
150. Computers improve the overall quality of life.	(207)	1	2	3	4	5
from CARS, Chu & Spires, 1991						
151. I look forward to using a computer on my job.	(209)	1	2	3	4	5
152. The challenge of learning about computers is exciting.	(211)	1	2	3	4	5
153. Learning to operate computers is like learning any new skill - the more you practice, the better you become.	(214)	1	2	3	4	5
154. I am afraid that if I begin to use computers I will become dependent upon them and lose some of my reasoning skills.	(215)	1	2	3	4	5
155. I am sure that with time and practice I will be as comfortable working with computers as I am working with a typewriter.	(216)	1	2	3	4	5
156. I dislike working with machines that are smarter than I am.	(218)	1	2	3	4	5
157. I feel apprehensive about using computers.	(219)	1	2	3	4	5
158. If given the opportunity, I would like to learn about and use computers.	(224)	1	2	3	4	5
159. I have avoided computers because they are unfamiliar and somewhat intimidating to me.	(225)	1	2	3	4	5
160. I feel computers are necessary tools in both educational and work settings.	(226)	1	2	3	4	5
from CASS, Jones & Clarke, 1994						
161. Computers intimidate and threaten me.	(227)	1	2	3	4	5
162. Working with a computer makes me feel tense and uncomfortable.	(230)	1	2	3	4	5
163. Computers are difficult to understand.	(231)	1	2	3	4	5
164. I feel important when others ask me for information about computers.	(236)	1	2	3	4	5
165. Using the computer has increased my interaction with other students.	(237)	1	2	3	4	5

Part 6

		SD	D	U	A	SA
126. Use of computers in education almost always reduces the personal treatment of students.	(176)	1	2	3	4	5
127. I feel at ease when I am around computers.	(177)	1	2	3	4	5
128. Teacher training should include instructional applications of computers.	(179)	1	2	3	4	5
from Attitude Toward Computer Scale, Francis, 1993						
129. Learning about computers is boring to me.	(180)	1	2	3	4	5
130. I like learning on a computer.	(181)	1	2	3	4	5
131. Working with a computer would make me very nervous.	(182)	1	2	3	4	5
132. The challenge of solving problems with computers does not appeal to me.	(185)	1	2	3	4	5
133. I think working with computers would be enjoyable and stimulating.	(186)	1	2	3	4	5
134. Learning about computers is interesting.	(187)	1	2	3	4	5
135. Computers are boring.	(189)	1	2	3	4	5
136. Computers are not exciting.	(191)	1	2	3	4	5
137. Studying about computers is a waste of time.	(192)	1	2	3	4	5
138. It is fun to figure out how computers work.	(193)	1	2	3	4	5
139. I enjoy learning how computers are used in our daily lives.	(195)	1	2	3	4	5
from CAM (Computer Attitude Measure), Kay, 1993						
140. Computers would motivate students.	(196)	1	2	3	4	5
141. Computers would significantly improve the overall quality of my students' education.	(197)	1	2	3	4	5
142. Computers would help students improve their writing.	(198)	1	2	3	4	5
143. Computers would stimulate creativity in students.	(199)	1	2	3	4	5
144. Computers would help students work with one another.	(200)	1	2	3	4	5
145. Computers would help me organize my work.	(201)	1	2	3	4	5

Part 7

		SD	D	U	A	SA
166. Anything that a computer can be used for, I can do just as well in another way.	(239)	1	2	3	4	5
167. Working with computers makes me feel isolated from other people.	(241)	1	2	3	4	5
168. Working with computers will not be important to me in my career.	(242)	1	2	3	4	5
169. I would like to spend more time using a computer.	(243)	1	2	3	4	5
170. If I can, I will take subjects that will teach me to use computers.	(246)	1	2	3	4	5
171. People who work with computers sit in front of a computer screen all day.	(248)	1	2	3	4	5
172. I would like to learn more about computers.	(249)	1	2	3	4	5
173. Working with computers means working on your own, without contact with others.	(251)	1	2	3	4	5
174. If I need computer skills for my career choice, I will develop them	(252)	1	2	3	4	5
175. Working with a computer makes me feel very nervous.	(256)	1	2	3	4	5
176. Using a computer prevents me from being creative.	(257)	1	2	3	4	5
177. Computers are confusing.	(259)	1	2	3	4	5
178. Computers make me feel uncomfortable.	(260)	1	2	3	4	5
179. You have to be a "brain" to work with computers.	(261)	1	2	3	4	5
180. Not many people can use computers.	(262)	1	2	3	4	5
181. I get a sinking feeling when I think of trying to use a computer.	(263)	1	2	3	4	5
182. Computers frustrate me.	(264)	1	2	3	4	5

from Attitudes Toward Computers Scale, Reece & Gable, 1982

183. I will use a computer as soon as possible.	(266)	1	2	3	4	5
184. I will take computer courses.	(267)	1	2	3	4	5
185. Computers can be used to save lives.	(268)	1	2	3	4	5
186. I enjoy computer work.	(270)	1	2	3	4	5
187. I would never take a job where I had to work with computers.	(272)	1	2	3	4	5

Part 8

Instructions: Please circle the appropriate number to indicateyour agreement or disagreement with each statement.

1 = Strongly Disagree (SD)
2 = Disagree (D)
3 = Undecided (U)
4 = Agree (A)
5 = Strongly Agree (SA)

from D'Souza, 1992		SD	D	U	A	SA
188. Electronic mail (E-mail) is an effective means of disseminating class information and assignments.	(274)	1	2	3	4	5
189. I prefer E-mail to traditional class handouts as an information disseminator.	(275)	1	2	3	4	5
190. More courses should use E-mail to disseminate class information and assignments.	(276)	1	2	3	4	5
191. E-mail provides better access to the instructor.	(277)	1	2	3	4	5
192. The use of E-mail creates more interaction between students enrolled in the course	(278)	1	2	3	4	5
193 The use of E-mail creates more interaction between student and instructor	(279)	1	2	3	4	5
194. The use of E-mail increases motivation for the course.	(280)	1	2	3	4	5
195. The use of E-mail makes the course more interesting.	(281)	1	2	3	4	5
196. The use of E-mail makes the student feel more involved.	(282)	1	2	3	4	5
197. The use of E-mail helps the student to learn more.	(283)	1	2	3	4	5
198. The use of E-mail helps provide a better learning experience.	(284)	1	2	3	4	5

(End)

Thank you!

TAC Ver 3.0
2/98

Appendix G

Workshop Participants' Webpage

Take the First Step:

A Faculty Development Workshop on

Instructional Technology for the Rest of Us

Welcome To...

Workshop Participants' Webpage

Workshop Website:

http://www.twu.edu/hs/hs/workshop/firststep.htm

Contents

- Uses of Instructional Technology in Professional Settings
- Obstacles or Barriers to Using Instructional Technology
- Ways to Overcome Obstacles to Using Instructional Technology
- Webpage Contributors

Workshop participants submitted the contents of this webpage during the Hands-On Skills Session.

Uses of Instructional Technology in Professional Settings

- To put on workshops. We are trying to build some medical school courses on the web. I am the associate director of the Practice of Medicine course which teaches interviewing and communication as well as ethics and humanities, physical examination skills, communitiy health and preventive medicine. It is difficult to figure out what can be taught using the computer. It's hard to build an interviewing type course. I would like to build patients' cases but having students ask questions that can be discrimitory is difficult. I have a web site at http://meds1.utmb.edu/pom which has our syllabus etc. but no interaction. I would like to make it more interactive using video so the patients seem more real.
- Uses: good resources, communicating with the whole world, make teaching more interesting
- Ability to provide education and training in remote, rural areas.
- Continuing education opportunities that can be completed at the learners convenience any time - which is particularly useful for nurses who work shift work.

- Self-paced instruction so fast learners can progress faster.
- Class projects or group projects.
- An on-line course in project management
- Meetings on line with clients or health studies alumni officers through net meeting.
- Guided instruction for using a budgeting spread sheet
- Data collection and analysis from clients who use an Access database to collect staff competency information
- File transfers to students or clients
- Continuing education classes
- Instructional technology will help communicate changing nutrition information for students from a distance.
- Having links to government sources on nutrition reduces the cost of print materials for class.
- I want to use the Nursing Dept.'s website to put the questionnaire that we have developed for osteoporosis to collect data via the internet. How do we do that? Where do we start?
- We need a web page for outreach in recruitment of students. We would like to include our application.
- Another use is for the Dental Hygiene Orientation course to be an on-line course. This course is an introductory course, explaining the career of dental hygiene.
- All of the dental hygiene instructors would like to have their syllabi on-line for the students to access.
- It is my wish to be able to communicate with students, provide interesting strategies for learning information and exploring feelings and attitudes.
- I hope to encourage their interest and skill development in the use of technology.
- Reviewing and critiqueing tests/evaluations that are used in the field of O.T.
- Allowing the students to ask questions and relate clinical experiences with testing experiences
- Get feedback from clinicians out in the field.
- Uses: Presently, ASU is developing on-line course instruction. Therefore, in the very near future I think every department will be required to use this type of technology. We also have a brand new computer science building which is supposedly state-of-the-art.
- I WOULD LIKE TO USE I.T. FOR COMMUNICATING INFORMATION TO STUDENTS OF CLASS ASSIGNMENTS, RESOURCES, CHANGES, ETC.
- Instructional technology can be useful for class instruction and to keep in contact with students.
- Creating slides for classroom lectures and presentations
- Finding "critical" Internet sites
- Adding new and "interesting" information to lecture content
- Creating a personal Web Page for students to access when in classes--especially for student teachers who are off-campus and want to get into a chat room (if this is possible), etc.
- The uses of instructional technology in the field of nursing education are multiple. The foremost use would be to support the presentation of theory, principles and concepts. The development of critical thinking in the utilization of the nursing process lends itself to the interactive component of web technology. The rapidly changing environment in nursing is perfect for web surfing.
- Simplifies, yet enhances the basic elements of communication.
- Removal of paradigm paralysis and embrace the quest for change.
- Views learning in terms of individual perceptions and diversity in rates of comprehension.
- Ability to provide education and training in remote, rural areas.
- Continuing education opportunities that can be completed at the learners convenience any time -which is particularly useful for nurses who work shift work.

- Self-paced instruction so fast learners can progress faster.
- Class projects or group projects.
- I use power point presentation in two of my classes. I'm a novice, but I'd love to learn to be more effective.
- We can use this for all of our Health foundation courses because the classes are so large.
- The Project INSPIRE staff has a commitment to the federal government to promote inclusion in physical education for students with disabilities. We plan to meet that commitment by having a Project INSPIRE web page for adapted physical educators, regular physical educators, and parents of students with disabilities. Part of that outreach effort includes the development of a ListServe so we can address questions from the field. TWU's Adapted Physical Education program also needs to offer courses at the masters and doctoral level across the country and in foreign countries.
- Easy to make changes as I go, student involvement, low continuing costs
- Instructional technology can used supplement the classroom presentations.
- I can see documents from the internet being used to support and reinforce the concepts being discussed in the classroom.
- To make a web site for the department
- Students can "tune in" to the class from anywhere. I have students who are often working out of town.
- Set up an online course or develop lessons on Powerpoint for presentation.
- Case studies for nutritional care on line, communication between faculty and student while student is in clinical settings
- Would like to use instructional technology for long-distance learning with graduate students in nursing. This would be supplementary to classroom sessions. Such uses as communication between students, sending students to online resources, providing course syllabus.
- Uses of instructional technology: can be used to facilitate interaction between the nursing students in the course or in the specific clinical group; can be used to access information on specific topics; may be used to direct students to the process of obtaining and evaluating information; can be used to provide a discussion group or to allow sending of class information to a class account.
- To be able to each a course in spring '99
- Use for client/family education on health related issues
- Diet analysis
- Evaluating nutritional fads
- I plan to work on putting a course online next Fall.

Obstacles or Barriers to Using Instructional Technology

- Time and technology and money
- Number 1 is time. I need 48 hours every 24 and also money.
- not enough experience
- Lack of knowledge about cgi language
- Need practice on Telnet and FTP
- Need to practice using Netmeeting for synchronous conferencing
- Technology is changing quickly
- People I need to communicate with do not have necessary technology (e-mail, computers),

or do not have the skills to use the technology.

- Learning how to do all the things that I need to know to do the instruction.
- Equipment without the video and audio capabilities.
- Outdated equipment.
- Time to develop the new training materials.
- Time to develop the course and support material is the major problem.
- Obstacles: Nobody in the nursing dept. has done any data collection via the web. Personally, I don't know where to start, who to contact, or what kind of software we need.
- One of the disadvantages is the having the knowledge to do this.
- Obstacles include coming from behind, anxiety, lack of time, and lots of other things that must be done.
- Student access to the internet
- Availability of test critiques for testing
- Although we have a new building, I think scheduling problems will occur in needing computer labs at the same time of other departments.
- SLOW LEARNING CURVE...AGE AND TIME RELATED
- Support for this new technology is not adequate.
- Not able to do much else with a computer other than word-processing.
- The issue of obstacles is related to the clinical or "hands on" component.
- The minimal computer technology skills will be of concern. The faculty and students share equally in these issues.
- Learning how to do all the things that I need to know to do the instruction.
- Equipment without the video and audio capabilities.
- Outdated equipment.
- Time to develop the new training materials.
- Time limitation is the primary obstacle. In order to learn, I have to do, and to do, I have to have time. Working at my university is not conducive to excessive time.
- The problem would be the lack of equipment.
- Money (high up-front costs)
- Not all faculty agree with the need for technology in the classroom
- One obstacle that I seem to be encountering is a machine which is not capable of doing what I need it to do.
- No knowledge and courage
- Lack of equipment.
- Different levels of computer technology by students
- Time to construct materials, with time including the learning necessary for me to learn how to use the technology.

Ways to Overcome Obstacles to Using Instructional Technology

- Ability to know the software and hardware is problem. Possible ways to overcome the time obstacles are to have a university wide support system or hire student assistants to assist.

- Currently trying to convert to a Compaq from a Mac---argh!!!
- Keep searching for the answers!
- Attend every workshop available.
- Brainstorm with students.
- I have tried to implement a Plan B, by ordering Pagemill, but I need to learn FTP processes to "upload" my materials onto the University's server. I need to complete a FTP tutorial to allow me to develop this capability.
- Divide content into small units
- Giving an assignment that gives incentive to become acquainted with Internet and e-mail and providing assistance at that time.
- Lack of accessiblility to computers can be overcome by utilizing computers in public library system
- Walk through technology the first time
- Make time for discussion about fears of using technology
- Make yourself accessible to students

Webpage Contributors

Pat Fallon	F_Fallon @ TWU.edu
Grassin	grassin@utmb.edu
Nahid Shiarbahadori	Dr.nahid@aol.com
Cyndi Lepley	clepley@iadfw.net
Shirley N. Conrad	conrads@uthscsa.edu
Betty Alford	f_alford@twu.edu
Terri White	white2@airmail.net
Jan Schoen	f_schoen@twu.edu
Jo Ann Engelbrecht	JEngelbrecht@twu.edu
Rebecca E. Palmer	f_palmer@twu.edu
Susan Keith	susan.keith@angelo.edu

E. ELYA NAXON	DF_NAXON@VENUS.TWU.EDU
Vicky Imrhan	f_imrhan@twu.edu
Paula L.Scott	F_Scott@Twu.edu PLScott@airmail.net
Deborrah Wegmann	F_Wegmann@twu.edu
Josh Thompson	joshethomp@aol.com
Shirley N. Conrad	conrads@uthscsa.edu
Carolyn Ray	F_Ray@TWU.edu
Calvin White	Lifejoy@swbell.net
Carol Huettig	f_huettig@twu.edu
Kristin Wiginton	kwigintn@flash.net
Ron Fannin	F_fannin@twu.edu
Kyeong-Hwa Park	G_6PARK@TWU.EDU
Claudia Coggin	ccoggin@hsc.unt.edu
Don Ciulla	dciulla@iglobal.net
Linda Cashman	HF_Cashman@twu.edu
Gail Davis	f_2davis@twu.edu
Grace Gotoski	ggotoski @GTE.NET df_gotoski@TWU.EDU
Andie Hsueh	F_Hsueh@twu.edu
Pat Aneff	hconnect@camalott.com

Harold Aukema haukema@twu.edu

Linda Ludovico Llud@TJC.Tyler.edu

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Department of Health Studies
College of Health Sciences
Texas Woman's University
Denton, Texas
Last updated August 22, 1998

Appendix H

Take the First Step Workshop Web Page

Take the First Step: **A Faculty Development Workshop on** **Instructional Technology for the Rest of Us** **Friday, August 21, 1998** **8:00 a.m.- 5:00 p.m.**	 Participant Developed Webpage http://www.twu.edu/hs/hs/workshop/group.htm Opening Hands-On Skills Session Anxiety Reduction Session Closing

Why attend?

What topics will be covered?

Who will be presenting?

When will it be held?

Where will the Workshop be held?

How do I register?

What else do I need to know?

Why attend?

Purpose

This conference is intended for health faculty relatively new to the use of computers in teaching. Attendees will be guided in the process of joining the instructional technology age. Teaching effectiveness and productivity will be emphasized in a faculty-friendly environment Participants will have access to a personal computer for their skill-building activities. Sessions will focus on building skills in the use of contemporary teaching methods and tools.

Benefits of Attending

As a group, participants will be led through the process of contributing to and developing a web page. The group-developed web page will then be posted on the Internet for viewing at the closing session.

Those attending will also receive a take-home instructional technology "survival kit" consisting of:

- disks with copy of "Multimedia Decision Guide for Instructional Technology" shareware
- website addresses of workshop activities and the group developed website
- means for on-going interaction with other participants
- a "permission slip" to explore student centered instruction
- an online presence as a contributing web page author

Objectives

Upon completion of the workshop, participants will be able to:

1. Contribute to the creation of a health-related web page suitable for posting on the Internet;
2. Make effective use of instructional technology;
3. Use instructional technology to enhance professional development;
4. Identify instructional technology resources and techniques;
5. Identify course delivery strategies and systems;
6. Utilize software that will help the instructional; technology decision-making process, and
7. Gain insight into implementing the latest technology.

What in the world will be covered?

TOPICS

- Fears and barriers to the use of technology
- Best and worst experiences with technology
- Shortcuts and tips for teachers using the Internet for instruction
- Efficient Internet searching for health information
- How to run an effective forum and chat room for students
- Internet adventures and discoveries for classroom use
- Electronic networking
- Case studies in the use of instructional technology for health studies
- All-you-can-eat buffet phenomenon on Internet / information explosion
- Love-hate relationships with computers/technology
- Cognitive mapping of the Internet, computer, technology
- Brainstorming: What would you change about computers
- What do you already know that you can share?

Who will be presenting?

TWU Presenters

Judy Baker, Ph.D.

- Professor, Health Studies & Graduate Program Coordinator
- Chairs the University's Task Force on Emerging Instructional Technologies
- Received Innovative Excellence in Teaching Learning and Technology Award

Lisa Clark, M.P.H.

- Teaching Assistant, Health Studies
- Serves as instructional technology consultant to faculty
- Presented on the Eighth National Learning and Conference on College Teaching

Kathy Ludwig, M.S.

- Visiting Professor, Kinesiology
- Revised the Department of Kinesiology website
- Developed online course materials for the Internet

When will it be held?

Friday, August 21, 1998

8:00 a.m. - 5:00 p.m.

Schedule

8:00 - 9:00 a.m.	Opening Session
9 a.m. - 12:00 p.m.	Session 2: Skill-building
12:00 - 1:00 p.m.	Lunch (included)
1:00 - 4:00 p.m.	Session 3: Skill-building
4:00 - 5:00 p.m.	Wrap-up, Evaluation, Closing Remarks

Where?

Administration Conference Tower
Texas Woman's University
Denton, Texas

Hosted by
Department of Health Studies
College of Health Sciences
Office of Continuing Education
Texas Woman's University

How do I register?

To register, contact the Office of Continuing Education by email at ContEd@TWU.EDU or phone: (940) 898-3408 or fax: (940) 898-3416 to request a registration form.

Fees:
$59 Early Bird Registration
$69 Regular Registration (after August 13, 1998)

What else do I need to know?

CHES Credit

Application for CHES Category I Continuing Education contact hours (CECH) has been made to the National Commission for Health Education Credentialing, Inc. (NCHEC). You may earn up to 6 CHES Credits for a total of $15.

Refunds/Cancellations

If you find it necessary to cancel your registration, you may receive a refund, less a $10 processing fee, by submitting written notification at least seven days before the program. Substitutions may be made at any time. Continuing Education reserves the right to cancel this course if sufficient enrollment is not met. In the event of cancellation, TWU's liability is limited to the program fee.

Invitation

You are invited to participate in a research study designed to determine the effectiveness of faculty development on instructional technology. You may volunteer to participate in the study when you arrive at the Workshop.

Workshop Website: http://www.twu.edu/hs/hs/workshop/firststep.htm
Website provided as a courtesy by
Department of Health Studies
College of Health Sciences
Texas Woman's University
Denton, Texas
Developed and maintained by
Judy Baker, Ph.D.
Last updated August 22, 1998

Take the First Step: A Faculty Development Workshop on Instructional Technology for the Rest of Us Skills Session Presented by Lisa Clark, M.P.H.	 Workshop Website: http://www.twu.edu/hs/hs/workshop/firststep.htm

TOPICS

- Fears and barriers to the use of technology
- Best and worst experiences with technology
- All-you-can-eat buffet phenomenon on Internet / information explosion
- Love-hate relationships with computers/technology
- Cognitive mapping of the Internet, computer, technology
- Brainstorming: What would you change about computers
- What do you already know that you can share?

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Judy Baker, Ph.D.
Last updated August 9, 1998

Take the First Step:

A Faculty Development Workshop on

Instructional Technology for the Rest of Us

Closing Session

4:00 p.m. - 5:00 p.m.

Workshop Website:
http://www.twu.edu/hs/hs/workshop/firststep.htm

Participant Developed Webpage
http://www.twu.edu/hs/hs/workshop/group.htm

- Opening
- Hands-On Skills Session
- Anxiety Reduction Session
- Closing

Workshop Outcomes

- Teacher's Attitudes Toward Technology Questionnaire
- Group Developed Webpage
- Where Do We Go From Here?
- Brainstorm
- Suggestions
- Networking with Workshop participants
- Workshop Evaluation
- Raffle

http://www.twu.edu/hs/hs/workshop/closing.htm
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Denton, Texas
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Judy Baker, Ph.D.
Last updated August 22, 1998

Appendix I

Human Subjects Review Committee Aproval

TEXAS WOMAN'S
UNIVERSITY
DENTON/DALLAS/HOUSTON

HUMAN SUBJECTS
REVIEW COMMITTEE
P.O. Box 425619
Denton, TX 76204-5619
Phone: 940/898-3377
Fax: 940/898-3416

June 26, 1998

Ms. Lisa Clark
2517 Quail Ridge Drive
Denton, TX 76201

Dear Ms. Clark:

Your study entitled "Reducing Resistance to Instructional Technology Among Health Educators" has been reviewed by a committee of the Human Subjects Review Committee and appears to meet our requirements in regard to protection of individuals' rights.

If applicable, agency approval letters obtained should be submitted to the HSRC upon receipt. **The signed consent forms and an annual/final report (attached) are to be filed with the Human Subjects Review Committee at the completion of the study.**

This approval is valid one year from the date of this letter. Furthermore, according to HHS regulations, another review by the Committee is required if your project changes. If you have any questions, please feel free to call the Human Subjects Review Committee at the phone number listed above.

Sincerely,

Jerry D. Wilkerson

Chair
Human Subjects Review Committee

cc. Graduate School
Dr. Eva Doyle, Department of Health Studies
Dr. William Cissell, Department of Health Studies

Appendix J

Outline of Skill Building Session
Dr. Judy Baker

Take the First Step: **A Faculty Development Workshop on** **Instructional Technology for the Rest of Us** Workshop Website: http://www.twu.edu/hs/hs/workshop/firststep.htm **Hands-On Skills Session** **Presented by** **Judy Baker and Kathryn Ludwig** **with assistance from** **John D'Angelo and Sue Webb**	 Participant Developed Webpage http://www.twu.edu/hs/hs/workshop/group.htm ■ Opening ■ Hands-On Skills Session ■ Anxiety Reduction Session ■ Closing

Internet Usage for Health Purposes

- **Quick Starts**
- **Instructional Technology and Distance Learning**
- **Electronic Networking Communication: Email, Listservs, Forums**
- **Group Developed Workshop Webpage**
- **Case Studies of Instructional Technology**
- **Internet Adventures and Discoveries for Instructional Use**
- **Put Your Course Online**

Quick Starts

- **Teamwork: Pair up with someone who knows how to use Netscape**
- Teachers.Net Homepage Maker

- Multimedia Decision Guide for Instructional Technology [Shareware disks included in your "Survival Kit"]

Instructional Technology and Distance Learning

- Distance Learning: A Faculty FAQ
- Faculty, Instruction, and Information Technology
- Promise and Pitfalls of Distance Education
- How Information Technology will Revolutionize Health Education
- Top Ten Distance Learning Sites

- Evaluation of Instructional Technology
  - Evaluation Guidelines for Instructional Technology Projects
  - Evaluation of Education and Training Technologies
  - Online Instructional Resource Evaluation Guidelines

Electronic Networking Communication: Email, Listservs, Forums

- Learning through Online Interaction
- Effectively Using Electronic Conferencing
- "15 minute modules" on Internet basics

- Networking Tools
  - Access to Email with Mail Start TM
  - Get JUNO™ JunoTM Juno Online Services Free Email Accounts from Juno
  - HotMail
  - GeoCities Free E-mail Account
  - Windows: Telnet & FTP
  - Interaction Web Server Companion
  - Microsoft's NetMeeting

- Listservs, Forums
  - Web Discussion Forums in Teaching and Learning
  - Health Education Professional Resources
  - E-Mail Services for Health Educators
  - Health Education And Technology (HEAT) Listserv

Workshop Website: Group Developed Webpage

- Send me the following information using email
  - Your name (and email address if you know it)
  - Describe some possible uses of instructional technology in your professional setting.
  - Describe ways to overcome obstacles to using instructional technology in your professional setting.

- Edit the webpage yourself
  - Workshop Group Webpage
  - Netscape Tools
    - Netscape Navigator Editor
    - Netscape Web Page Design Assistant
    - Netscape Web Page Templates
      - A starting point to allow you to create your own web pages using Netscape
      - Netscape Page Wizard

Case Studies of Instructional Technology

- Slide Show
  - Computer-Based Lectures Using PowerPoint
- Online
  - Incorporating Electronic Technology into a Distance Learning Course
  - Guided Web Exploration: Women's Health Advocacy
- CD-ROM Software Displayed
  - Empower
    - An interactive planning process that provides expert assistance in the design, implementation, and evaluation of breast cancer health promotion programs.
    - Grounded in the needs and cultural realities of specific populations and is driven by the collective knowledge and experience of over 350 published applications of a model called PRECEDE / PROCEED.
    - Software available with a textbook
  - HealthQuest CD-ROM
  - NutriQuest CD-ROM
  - Sim Health
- Video-telecourse Instruction
  - Healthy Living: Road to Wellness Telecourse Series

- Convenient
- Private
- Inexpensive
- Global

- Disadvantages
  - Quality and accuracy of information inconsistent
  - Confusing and overwhelming
  - Time consuming to locate specific information
- Paradigm Shift
  - Survey of Faculty Attitudes Toward Information Technology
  - Thinking about enrolling in a course or program at WGU?
  - Reflections on Constructivism and Instructional Design
    - WWW Constructivist Project Design Guide
  - A Year of Web Pages for Every Course
  - Overcoming Obstacles to Change
  - Introducing Students to Technology
  - Encouraging Students to Use Technology

Put Your Course Online

- "Quick and Dirty" Approaches
  - Online Forms and Wizards
    - Course Home Page Maker
    - Faculty Home Page Builder
  - Templates
    - Course Syllabus Template
    - Create a Course Website with Templates
    - Taking Your Course Online
    - How to Offer a Course Over the Internet
    - Guides and Workshops
    - Teaching & Learning on the WWW
    - Templates for Online Course Material
    - A Template for Converting Classroom Courses to Distributed, Asynchronous Courses
    - Your Course Syllabus Template
- Courseware Tools
  - Tools for Developing Interactive Academic Web Course
  - Comparing Software for Online Teaching
  - Comparative Analysis of On-line Educational Delivery Applications
  - Compare Web Tools for Course Authoring
  - Flax makes it easy to create sequences of Web pages
  - Tools Available for Web Based Training
  - Tools for Developing Interactive Academic Web Courses
  - Features/Tools/Learner Tools: Web Browsing, Learning Space, Virtual-U,WebCT, CourseInfo

- Distributed Course Delivery for Problem Based Learning
- Courseware Clearinghouse
- Courseware Vendors
  - Using FrontPage to Develop a Website
  - Tools for Putting Your Course Online
  - Nicenet's Featured Project: The Internet Classroom Assistant
  - CyberProf
  - Web Course in a Box
  - CBinfo
  - Socrates
  - WebCT
  - ToolBook II
- Online Course Management Vendors
  - Evaluate and Select Online Delivery Software
  - Coursewise Publishing, Inc.
  - Convene
  - Real Education
  - McGraw-Hill Learning Architecture
  - McGraw-Hill OnLine Learning
  - Simon & Schuster's Distributed Learning Network
  - Sixth Floor Media, Houghton Mifflin Co.
  - WBT Systems

- "Do It Yourself" Shoestring Approaches
  - Developing Courses for the World Wide Web
  - Managing Courses on the World Wide Web
  - What a Website!
  - Resources
    - Get Started
    - Teaching with Instructional Technology Resource Guide for Faculty in Higher Education
    - Getting Started with Online Learning Projects
    - Tips for Teaching Health and Fitness on the Internet
    - Using the Web in Teaching: Links
    - The Learning Tree
    - Web Authoring with Netscape
    - WWW Resources for Teaching and Learning
    - Netscape Communicator: Download
    - Instructional Technology Development Project
    - Geo Cities Free Homepage
    - BOOKS ON-LINE
    - WWW Resources for Teaching and Learning
    - Workshops - Rachel Wilson
    - Using the Web in Teaching: Starting Points
  - Design Guidelines
    - Designing Your Course for the Web
    - Special Considerations for Designing Internet Based Instruction
    - Tips for Teaching with Technology
    - Guerrilla Instructional Design or Design Methods for the Busy Instructor
    - Using Instructional Design Principles To Amplify Learning On The World Wide

Web
- WWW Constructivist Project Design Guide
- Publishing Web-based Instructional Materials
- Online Workshop on Internet Authoring
- KillerSites
- Webpages That Suck

- Course Development Guides
  - How to Create Your Own Website to Support an On-line Course
  - Practical Strategies for Using IT
  - Using the WWW in Your Course
  - Building the Syllabus
  - Delivering Instruction on the World Wide Web
  - Teachers' CyberGuide
  - Teaching with Technology Home Page
  - Teacher's Distance Education Handbook
  - Features of Development Systems
  - Restructuring Large Introductory Courses
  - WWW Resources for Teaching and Learning
  - Workshops - Rachel Wilson
  - Using the Web in Teaching
  - Using the Web in Teaching: Starting Points

Self Assessment

- Learning With Technology Profile Tool: Assess Your Readiness

---

http://www.twu.edu/hs/hs/workshop/baker.htm
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Denton, Texas
Developed and maintained by
Judy Baker, Ph.D.
Updated August 22, 1998

Outline of Skills Session
Presented by J. Baker

---

* Instructional Technology Lecture/tsophe presentation
  - o Def.
    - + Teacher's Homepage Creator
  - o Adv.
    - + Immediate
    - + Convenient
    - + Private
    - + Inexpensive
    - + Global
  - o Disadv.
    - + Quality and accuracy of information inconsistent
    - + Confusing and overwhelming
    - + Time consuming to locate specific information
  - o Examples
* Case Studies of Use of Instructional Technology
  - o Software/CDROMm CAI: Decision-making (on display at computer lab)
  - o PowerPoint
  - o GWE
  - o Web Quest
  - o Problem Based Instruction
  - o Electronic Networking Communication: email, listservs, forums, chat
* How to Put Your Course online
  - o Paradigm shift
  - o Faculty Development Presentation
* Web Authoring Made Simple
  - o Netscape Web Wizard
  - o Template
* Group created online instruction webpage.
  - o Your name, title, residence, employer and/or school
  - o Describe some possible uses of instructional technology in your professional setting.
  - o Describe ways to overcome obstacles to using instructional technology in your professional setting.
  - o List any professional organizations to which you belong.
  - o List your email address if you are willing to have it posted on the Internet
* Display of Software Products (at separate computers in lab)
* Display of Vendor Literature

Appendix K

Anxiety Reduction Session Outline
Ms. Lisa Clark, M.P.H.

Outline of Anxiety-Reduction Session
Presented by L. Clark

* Introduction/Ice Breaker
    - o Cartoon on "Change"
    - o Definition of computer resistance and anxiety
    - o Write adjectives that describe yourself
    - o Personal introductions with adjectives

* Group Exercise
    - o 4 people in a group: Open envelop and with shapes build a perfect square
    - o No talking or gesturing to others
    - o This activity relates to working styles and individual frustration levels

* Working Styles
    - o Discussion of how working styles effect our emotions, attitudes and behaviors

* Pile and Sort Exercise on Computer Attitudes and Anxiety
    - o Interactivity on how individuals "pile/sort" ideas of computer anxiety

* Cartoon–Jargon used in computer technology and innovation literature.

* Exercise on how to apply information technology to areas of responsibility
    - o Concept of constructivism/change in pedagogy
    - o Information literacy dimensions
    - o Paradigm shift to online learning

* Order Game
    - o Cards with how information travels on computer lines
    - o Participants asked to line up in order
    - o Creates atmosphere of confusion, what to do, how to do it.
    - o Participants end up realizing they know more than they think they do

* Question posed, "computers are threatening?"
    - o Participant discussion
    - o Key words written on board
    - o Cognitive map created

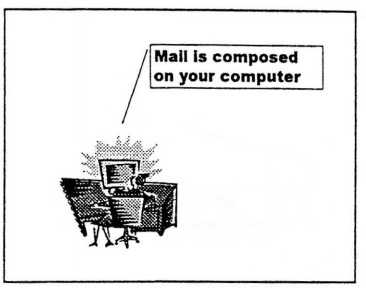
* Best/Worst Computer Experiences on Index Cards

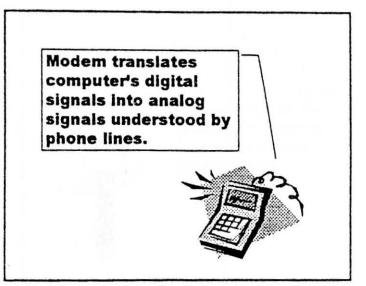
* What is Technology and All-you-can-eat- Hypothesis?
    - o The role of instructional technology
    - o Overload
    - o Four components of Learning Environment
* Closing

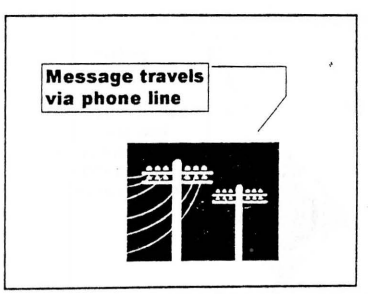
o Tips for Technology
o Comments/Discussion

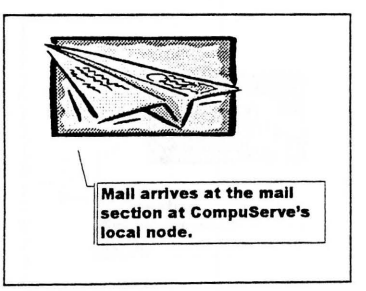
Appendix L

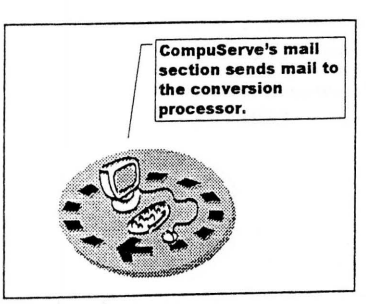
Anxiety-Reduction Session Game

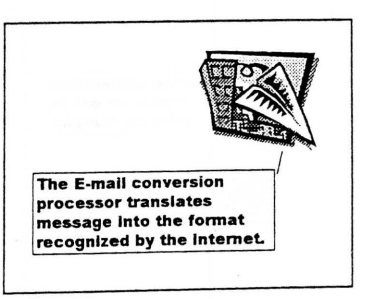

Mail is composed on your computer


Modem translates computer's digital signals into analog signals understood by phone lines.

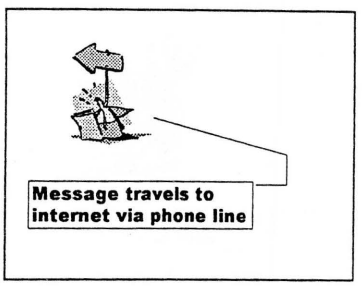

Message travels via phone line

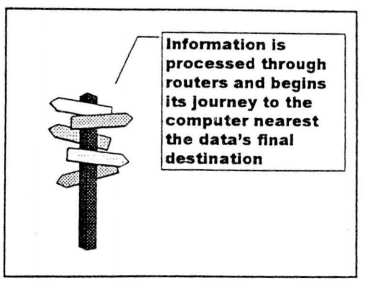

Mail arrives at the mail section at CompuServe's local node.

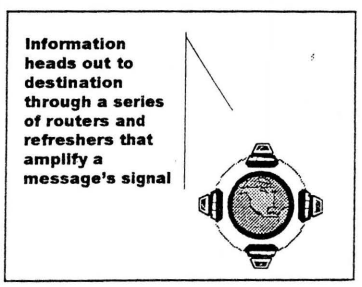

CompuServe's mail section sends mail to the conversion processor.

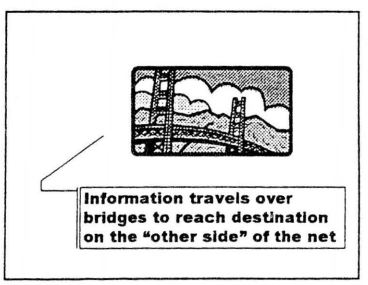

The E-mail conversion processor translates message into the format recognized by the Internet.

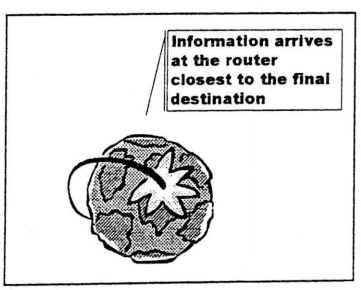
1

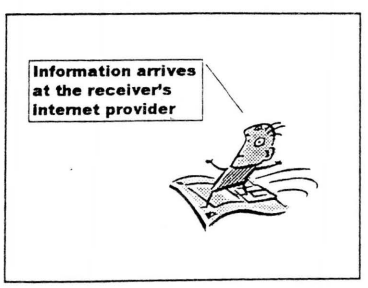

Message travels to internet via phone line

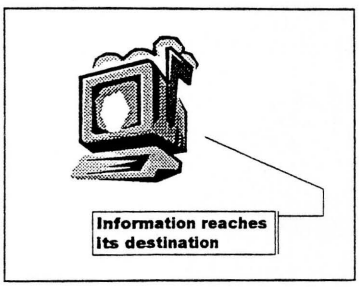

Information is processed through routers and begins its journey to the computer nearest the data's final destination


Information heads out to destination through a series of routers and refreshers that amplify a message's signal


Information travels over bridges to reach destination on the "other side" of the net


Information arrives at the router closest to the final destination


Information arrives at the receiver's internet provider


Information reaches
its destination