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Enhancing physical therapy students' attitudes toward telecommunication technology by using a demonstration model

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ABSTRACT OF THE THESIS

Enhancing Physical Therapy Students' Attitudes Toward Telecommunication Technology by Using a Demonstration Model

by

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Florida International University, 1993

Miami, Florida

Professor Leonard Elbaum, Major Professor

The purpose of this study was to assess and enhance the attitudes and knowledge of physical therapy students toward telecommunication technology.

A questionnaire was given to appraise the attitudes and knowledge of 156 physical therapy students toward telecommunication technology. The intervention was a one hour presentation on applications relevant to physical therapy practice.

The majority of students expressed interest in telecommunication before the presentation, and felt that expanded use of telecommunication was important to the profession. However, only a minority of students demonstrated knowledge about specific medical telecommunication applications.

The post-intervention questionnaire showed the presentation to be effective in changing students' attitudes toward telecommunication, and increasing their knowledge relevant to the practice of physical therapy. If physical therapy curricula were to include exposure to telecommunication, perhaps physical therapists will be more inclined to use the technology in the future.

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Miami, Florida

Enhancing Physical Therapy Students' Attitudes Toward Telecommunication Technology by Using a Demonstration Model

A thesis submitted in partial satisfaction of the requirements for the degree of Master of Science in Physical Therapy

by

Steven R. Bernstein

1993

To Professors: Leonard Elbaum
Jennifer Lander
Carlos Alvarez

This thesis having been approved in respect to form and mechanical execution, is referred to you for judgement upon its substantial merit.

_____

Dean William J. Keppler
College of Health

The thesis of Steven R. Bernstein is approved.

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Introduction

The use of the personal computer has increased since the 1970's. Today it is part of almost everyone's lifestyle. Utilizing the computer within the medical sciences is no exception to technology explosion.

Telecommunication contributes to the practice of physical therapy in many ways. Some examples are education, research, billing, new product information, legislation, medical records, and providing independence for the physically impaired.

Physical Therapy education is ongoing and must continue after graduation. Continuing education needs are generally met through journals, colleague experiences, and formal classes. Since the number of journals published and articles written are numerous, keeping up with journal reading is difficult. Narrowing this selection of literature to read is more critical then ever before. The personal computer and telecommunications make journal searching and research manageable. With abstracts and full text articles readily available, it is not an exaggeration to say the library can be right in your home or office.

Billing, medical records are transferred thousands of miles accurately and within seconds with this technology. Information on legislation and sharing colleague ideas and

clinical solutions are remarkably efficient with telecommunication. The convenience of home shopping, banking, and entertainment with voice activated keyboards contributes so much to the physically impaired.

The review of literature is scarce on telecommunications for physical therapists. But, a lot is written about online medical data bases and their applications. The literature, however, suggests a strong need for telecommunication awareness and training. The medical and health care universities have been criticized for not providing medical telecommunication training (Albright, p 249-256, 1988).

This study determined student attitudes, provided input on the value of formal telecommunication education and enlightened students to telecommunication technology.

Statement of the Problem

The problem is student attitudes and opinions concerning the applications of telecommunication technology for physical therapists are unknown. If these student opinions and attitudes were to be known, it may contribute to the development of courses, and units in telecommunication for the physical therapist student.

Three categories of attitudes were assessed. They were (1) respondents' feelings about technology, (2) opinions regarding the value of telecommunication in education, and (3) attitudes toward specific telecommunication applications.

Purpose of Study

The purpose of this investigation was to study student physical therapists' attitudes toward computer telecommunication. A questionnaire determined telecommunication attitudes and opinions before and following the presentation of a model introductory demonstration program.

Definitions for Purposes of this Study

Telecommunication - the procedure of connecting computers via phone lines to share medical information.

Personal Computer - a computer that is affordable and used in office or home (as opposed to a larger institutional mainframe computer).

Modem - an electrical device or computer accessory that allows computer data to transfer between distant computers through phone lines.

Software - a set of written computer instructions that allow the computer to carry out the operator's commands. Example: To use a modem, you need communication software.

Online - data that is available to modem callers after computers have connected.

Database - a collection of information particular to a subject. Example: A journal database may have journal abstracts of 150 medical journals.

Bulletin Board or BBS - computers that allow modem callers to access online databases and the sharing of computer information.

Electronic Mail - sharing of information via computer from one caller to another via stored message(s).

Menu driven - a list of options which the caller chooses to navigate the different features of the computer system.

Baud - the rate of speed capability that the modem has capable for exchanging data, generally seen as 1200, 2400, 9600 to 38,400 bits per second.

Download - the process of receiving data to a file area that you request.

Upload - the process of sending data from a file area to another computer.

File Area - a location of stored files that are available to modem callers to download or upload.

Capture - a procedure that records or copies all information displayed on the screen to a file area.

Review of Literature

History of Telecommunications

The Greek defined the meaning of "Tele" as far off or distant. The term "phone" meant sound or speech, and "graph" was described as writing. The common terms television (seeing at a distance), telephone (speaking at a distance) and telegraph (writing at a distance) then emerged into our vocabulary. In 1875 Alexander Graham Bell developed a theory to electronically transmit sound waves thus creating the beginning of the modern day telephone (Academic American Encyclopedia, 1991). In the 1940's the first electronic computers were developed (Francis, 1987). But, it was not until 1958 that the Bell system started marketing modems (Bingham, 1988). The telephone, modem and mainframe computer were linked at this point in history. Although it was not until the late 1970's, that personal computers were introduced (Academic American Encyclopedia, 1991).

General Telecommunication Services

General telecommunication services are online services that offer a large variety of informational subjects and topics that appeal to the general public. However, specific areas of interest that pertain to that business, professionals and educators are available. Today, the major online services are CompuServe[1], Prodigy[2], GEnie[3], America Online[4], Delphi[5], and Byte information exchange[6]. The online industry is a so-called "hot" industry. The online industry revenues reached 9 billion dollars in 1990. These 1990 figures show 4.2 million online subscribers, an 88 per cent increase from 1985, and this does not include the smaller and free online users. In Just one year, there were 800,000 new customers in 1990. In addition, it was reported there are over 12,000 bulletin boards categorized to include 400 different subject groups (K. McCabe, 1992; Weisman, 1992).

Banks (1992, p. 123) had this to say, "personal computers have become an integral element in the daily lives of almost everyone in the U.S. and most other industrial

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[1] CompuServe is a registered trademark of CompuServe, Inc

[2] Prodigy is a trademark of Prodigy Services Company

[3] GEnie is a trademark of General Electric Company

[4] America Online is a trademark of Quantum Computer Services

[5] Delphi is a trademark of General Videotex Corporation

[6] Byte is a trademark of Information Exchange Bix

nations, on-line services promises to touch almost everyone". During the 1970's and early 1980's the only people who used online services were the technically oriented and researches. The big databases and information retrieval services were the major services.

Today, modem callers access many on-line services. These include: shopping, banking, newswires, job searching, the stock market and educational information. Online callers may even file a flight plan with the FAA, receive travel information, weather forecasts, make airlines reservations, and obtain automobile related services. Entertainment is also a popular area; there are online games, inter-user chatting, and computer software programs that are readily available.

Legal services, patent information, business services, government access, credit information, real estate data, census data, environmental and private corporation information are available online to almost anyone with a modem and computer. The number of computers one can access is growing daily as is the number of modem users (Banks, 1992; Delfino, 1992; K. McCabe, 1992; and Oster, 1989).

Medical Telecommunication Services

Oster (1989) wants to convince the medical and health care professionals that this is the information age and the world of telecommunication. He describes telecommunication as the window to the outside, allowing your computer to link to commercial and noncommercial databases. The important

telecommunication benefits to the general medical profession are medical databases, sharing information with distance colleagues and accessing hospital computers (Oster, 1989). The major databases are the National Library of Medicine, Dialog, BRS Information Technologies, The Mead Corporation and US Healthlink.

Continuing education is one of the most obvious advantages of medical telecommunication. Wagner and Wagner (1992) report on the importance of validating clinical procedures and journal reading. Health professionals are finding it much more difficult to remain up-to-date in medical literature with the increase in the number of journals and articles written. In the 1990 Cumulated Index Medicus, Wagner found 98 different journals that pertain to head and neck surgery. This only included English-language journals related to plastic surgery, dentistry, otolaryngology and anesthesia. Wagner and Wagner (1992, p. 163) concluded "If each journal contained fifteen articles, and the clinician reviewed two articles per day, in twelve months he/she would fall 24 years behind!" The preferred choice of continuing education lists journals above other means including textbooks, clinical rounds, continuing education courses, newsletters and college conversation.

Medical databases.

The following are descriptions of medical databases in use today.

National Library of Medicine: one of the first major medical applications of telecommunications started in 1971 with the National Library of Medicine. Remember, at this time the personal computer was not yet financially affordable. At first, these online services were restricted to larger institutions like libraries. It was required that online users completed mandatory training prior to use. It was not until 1986 that mandatory training was removed, allowing use by the public sector (Albright, 1988).

Dialog: another large medical database that originated in 1972. Like the National Library of Medicine it was mainly for trained librarians and the experienced until about 1987. Health care professionals then began to use it efficiently without the complexities that were previously present (Albright, 1988).

BRS Information Technologies: began its commercial service in 1977. It differed slightly from the others by offering some full-text journals, textbooks, an Aids database, and a bulletin board. In 1987 BRS initiated, the first service to offer a menu driven system for

medical information, as a joint venture with W.B. Saunders, publishing company (Albright, 1988).

Mead Data: a division of the Mead Corporation entered the telecommunication information early in the 1970's. They started offering a full text legal system called Lexis. A competitor of Lexis called Westlaw from West Publishing, had also entered the market in the mid 1980's. Mead Data offers Nexis, a full text library of news related entities. Around 1982 Medis was introduced for physicians and the allied health care professionals. At that time they maintained an exclusive agreement with the Journal of the American Medical Association. Albright (1988) views Mead Data as the Rolls Royce of electronic medical databases. Yet, Mead Data is expensive and the full-text data base is only for selected file areas.

US HealthLink: one of the newer major online medical database services. Their President William Yasnoff, MD, PhD. was the previous director of AMA/NET that was formerly part of the American Medical Association operations. US HealthLink differs from the other medical online companies by offering several different services.

The following is a short list of some of these extra services:

- A Fax clipping service tags and faxes articles of interest.
- DXplain is a clinical message and answer board.
- Full text documents are also available through EMPIRES, a clinical related database.
- Online continuing education credits
- Medication interaction section
- Coagulation and hepatitis advisor.

(USHealthLink, 1992)

HealthCare InfoNet: went online June, 1992; this is an electronic database with the potential of 10,000 health care providers, which makes information and prices available to the members about the health care provider. They have physical therapy provider information online, but mainly home health care industry data at this time. The future plan is to expand the database to doctors, rehabilitation, nursing homes and hospitals. Searching the database, the consumer and larger insurance companies would be allowed to shop around for their best financial arrangement (Garner, 1992; and R.McCabe, 1992).

Black Bag Medical BBS: was established by Edward Del Grosso M.D. He maintains a list of most national and international medical bulletin board services. The list specifies phone numbers and health care specialty. The medical boards are called and verified periodically and updated as needed (DelGrosso, 1992).

Medical computer/telecommunication associations.

Mattiello (1989) writes about the Computers in Medicine committee that was established in Maryland. The purpose of the committee is to learn how to best relate the influence of computer technology on the medical and allied health care profession. Some of their objectives are to introduce and assist with new computer products, telecommunications, electronic billing and medical software.

Another organization is the American Medical Informatics Association. The association originated during the 1950's. There main focus and to help with the applications of computers to medicine (Collen, 1989).

Physical therapy telecommunication.

While the telecommunication field is rapidly growing, the literature on online services directly related to physical therapy is scarce. Telecommunication technology for physical therapists is expanding in the 1990's. At the end of 1991 the American Physical Therapy Association went online with APTA-NET. This electronic mail/bulletin board

was not a new idea. It originally attempted the online service three to four years ago; however, it was discontinued. Presently the objectives of APTA-NET are to electronically exchange information and to share knowledge and interlink the state chapters, sections, assemblies, and the national office. Now there are 52 component state chapters, 17 special interest sections and two assemblies. APTA-NET is in the process of researching and developing a wide range of new online services for physical therapy profession.

APTA-NET offers a wide variety of information and databases from BRS. The databases include Medline, Cumulative Index to Nursing, Allied Health, ERIC and many more. The network is menu driven and the main menu areas are:

- legislative alerts
- high priority issues
- state chapter legislation issues
- federal legislation issues
- federal grants
- association government affairs
- many other useful resources.

Differing from APTA-NET, PTON or Physical Therapy Online is a private bulletin board which started in 1989 as a service of Therasys, Inc. In 1990, Dennis Gyllenhaal, a physical therapist started an improved program after further research. Today PTON is very informative and dedicated to online technology for practicing physical therapists. Through this bulletin board practicing physical therapists contribute to a message base and share information on many topics. Some of the topics are pediatrics, reimbursement issues, software review, distance education, industrial medicine and marketing. The messages contain very practical brain storming questions and answers directly related to current practice issues that frequently occur and are too recent to be published in literature.

PTON does not have access to the large databases like APTA-NET at this time. Medline and the other large journal databases are not present. However, there are two databases available; literature searching and therapy resources. The literature searching uses keyword searching and allows abstract file downloading. The therapy resource database is vendor oriented with keyword search features. Manufacture and product information is displayed with address and phone numbers.

PTON's file area is divided into sections like the message areas. Clinical management, industrial medicine, library resources, ADA, forms, shareware and computer tools are some of the subject file categories. One file area

called demo programs has The Back Care Program[7] by Saunders, Marathon[8] physical therapy software, and PTEX[9], which contained computerized exercise programs. The demo files are samples of the programs that are seen advertised in many journals (Gyllenhaal, 1992).

An administrative feature of telecommunication for practitioners is electronic claims submission. This paperless billing system saves money, speeds up claims processing, and promotes faster payment. The money is automatically deposited in the practice's bank account. No mail, paper carbons, or hard copies are needed. At this time electronic claims make up 25 percent of four billion dollars of annual federal claims. About 70 per cent of the hospitals and 20 per cent of the doctors file electronically with Medicare. Medicaid is catching up, and six to eight per cent of private carriers' claims are also electronically submitted.

The claims system also permits two-way electronic communication via the modem and computer. Questions about eligibility, coverage, claims status and payment can be settled in minutes or days, as opposed to the traditional paper processing time of weeks. Telecommunication technology

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[7]The Back Care Program: H. Duane Saunders, 7750 West 78th Street, Minneapolis, Minnesota 55435

[8]Marathon: Precedent Systems, P.O. Box 75239, Seattle, Washington 98125

[9]PTEX: Physical Therapy Exercise System, 211 Manchonis Road, Wilbraham, MA 01095 1-800-334-5814.

may even be financially forced upon the leery, because there is some talk that carriers in the future may charge a fee for paper claims (Rice, 1992).

In addition to electronic claims, the exchange of messages via telecommunication called electronic mail is another useful service. There are variety of methods or networks that pass these messages over long distances very efficiently. Many networks offer reduced phone rates for computer connections and data transfer (Francis, 1987).

Moran and Brimer (1991) write about distance online education via these messages. In particular they refer to these interaction possibilities with APTA-NET and PTON. Their views suggest that message interaction can be an active learning process, as contrasted to journal reading, which is more passive learning.

There are other ways the physical therapist can use telecommunication technology knowledge. Patients that are mobility impaired can be taught how to use adaptive computer equipment and learn telecommunication. The literature suggests many vendors support computer use for the impaired and some medical bulletin boards list these products and distributors online. Telecommunication can even be voice operated, so persons with disabilities can utilize banking, shopping, and all the larger online service technology (Kluck, 1992).

Telecommunication/Database Attitudes

Although some authors (Albright 1988; Bonham and Nelson 1988; Francis 1987; and K. McCabe 1992) elude to positive benefits to online health care uses, little has been written about the usefulness to the physical therapy profession. The literature about physical therapy opinions and attitudes of physical therapists toward professional telecommunication is also non-existent.

However, there are several studies reflecting general attitudes toward telecommunication and computer use. These attitude studies include: business management, students, practicing physicians, and medical students. Other studies included: telecommunication fees, reasons for using telecommunication, software systems for searching, and satisfaction with services.

Bell, Martin, and Mehta (1989) investigated management attitudes toward personal computer use and productivity. The results indicated the personal computer was a valuable management tool. Management felt their performance quality and quantity increased and improved. They concluded personal computer use should be encouraged, suggested in-house education and not other educational settings.

Livieratos (1990) surveyed telecommunication students and noted that students with demanding schedules and family responsibilities find telecommunication classroom courses popular. The students used VCRs to record the telecourse, however, more than half showed an interest in using

modems to respond to instructors and take exams online. Yet, less than 30 per cent had modems available for use.

A medical attitude survey on user fees and Medline use was conducted by Haynes, Ramsden, McKibbon, and Walker (1991). The quantity and quality of Medline searches using Grateful Med software was studied. It was found that paying users decreased the quantity of online time, when compared to the no pay users. The quality of their searches were not different among the pay or no pay user groups. It was suggested that decreased user fees may increase the quantity of Medline searches, as well as, insurance reimbursement for online searches.

Medline is a common medical database on many electronic access systems. Bader and Piemme (1991) studied four different Medline search systems among faculty and medical residents. The residents reported "patient care" reasons for performing searches and the faculty listed "research" as their primary reason for searching. A set of characteristics for using a particular system was not determined. Regardless of the type of system used, the study showed expectations regarding the number of citations retrieved had significant effects on user satisfaction. They suggested training and knowledge of system use needs development. The authors thought lack of equipment access raised questions because personal computers are proliferating, but they are useless unless access is available.

Bonham and Nelson (1988) did a study to evaluate four medical software systems for medical searching. PaperChase[10], Grateful Med[11], Med-Base[12], and Compact Cambridge[13] were evaluated for accessing Medline database. Retrieval capability was the most important factor in selecting a system. PaperChase performed the best. But, the costs were greater than using Grateful Med. Compact Cambridge was easiest, but due to high subscription fee it was not a practical alternative. The authors found the Grateful Med program was the best all around choice.

Abate, Shumway, Jacknowitz, and Sinclair (1989) studied physician use of electronic access using general communication software in lieu of Grateful Med, PaperChase or another special program system. However, to make it easier to use, it was set up for automatic dialing and logon. The system worked well and was successfully used without supervision.

Ludwig, Mixter, and Emanuele (1988) surveyed attitudes of telecommunication callers. Five major reasons for searching were helpfulness, convenience, time saving, rapid

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[10]PaperChase: Division of Computer Medicine, Beth Israel Hospital, 330 Brokline Avenue, Boston, MA

[11]Grateful Med: National Technical Information Services, 5285 Port Royal, Springfield, VA

[12]Med Base: Online Research Systems, Inc., 2901 Broadway, Suite 154, New York, NY

[13]Compact Cambridge: Cambridge Scientific Abstracts, 5161 River Road, Bethesda, MD

feedback, and presentation of information. The study showed Medline database was preferred over full text choices. Subjects' attitudes supported the need for searching systems. Subjects with general computer knowledge without telecommunication/database experience recognized the need for education in system use. Even though the systems become more user-friendly, online users will still need to be taught retrieval techniques, and vocabulary in Medline.

Telecommunication Training Attitudes

Woolf and Benson (1989) showed that physicians were enthusiastic about using computers in medicine. The subjects recognized the potential usefulness of online retrieval and 24-hour convenience. However, many physicians who are aware of online services were hesitant to give up manual retrieval. Respondents were more likely to obtain information from textbooks, colleagues or browsing journals. Older physicians admitted to computer apprehension and lack of formal computer training. The study also mentioned the amount of learning time to use computers as a disadvantage.

The review of literature on attitudes shows training and education are important issues for the online telecommunication industry. Several authors indicated training was needed to decrease computer apprehension and promote user satisfaction (Abate et al. (1989); Bader and Piemme (1991); Bonham and Nelson (1988); Haynes et al. (1991); Ludwig et al. (1988); and Woolf and Benson, 1989).

Training methodologies varied in these studies. Ludwig et al. (1988) included a two hour Medis course Abate et al. (1989) provided a one hour instructional review. Haynes et al. (1991) provided a three hour training program. Bonham and Nelson (1988) also supported the need for training. Bader and Piemme (1991) suggest that no matter what system is used, the searcher satisfaction is measured by his/her expectation of retrieval. Initial training and additional advance education will help maintain user satisfaction.

Shoenfelt (1991) studied ten training methods and their effectiveness on six training objectives. The ten training methods assessed were computer assisted instruction, programmed instruction, lecture (with questions), movies, TV lecture, sensitivity training, case study, conference/discussion, role playing, and simulation/games. The learning objectives were knowledge acquisition, knowledge retention, attitude change, development of interpersonal skills, development of problem solving skills, and participant acceptance.

Attitude change was most effectively accomplished with sensitivity training, less with role playing, conference, simulation/games, case study, and least with computer assisted instruction. Knowledge acquisition was assessed in effectiveness and showed the following (in order of importance): computer assisted instruction, programmed instruction, conference, case study, and simulation/games.

Dennis Gyllenhaal (1992), a physical therapist operator of PTON writes, "The greatest barrier I face is education. Few therapists know how to use their systems, and need a lot of help getting started. Once they get started, things go great." It seems quite evident that telecommunication training for higher education is a means to fill the knowledge gap. A demonstration method with multi-media aides and supplemental handouts is a sound technique to meet these educational needs.

Statement of the Hypothesis

The literature on physical therapy attitudes toward telecommunication is non-existent. The literature does, however, suggest that education and training is important in improving attitudes toward telecommunication. Therefore, it is hypothesized that Dade County, Florida, physical therapy students will initially exhibit little knowledge and poor attitudes toward telecommunication which will favorably change following a telecommunication knowledge and information demonstration.

Method

Subjects

The sample for this study was selected from the total population of physical therapy students at Barry University, Florida International University and the University of Miami in Dade County, Florida. The subjects were volunteers and represented both undergraduate and entry-level graduate students. The total sample, a convenient cluster, consisted of 156 students which made up one subject group.

Instrument

A twenty item questionnaire was developed and used as the measuring instrument for this study (Appendix A). It consisted of self-report items measuring attitudes and knowledge that apply to computers and telecommunication. The questionnaire ranked attitude and opinion choices in gradations of responses from Strongly Agree to Strongly Disagree (Likert scale: 5) with other nominal and dichotomous choices. The last item was for written comments.

Since no standard instrument was available for this specific type of data collection, the validity and reliability of this instrument is unknown. However, the questionnaire was examined for content validity, clarity and problem identification by colleagues and found to be acceptable for this specific study.

Four subject areas were considered: (a) respondents' characteristics, (b) respondents' feelings about computer technology, (c) education attitudes and opinions, and (d) specific online application opinions.

Respondents' Characteristics

The respondents' characteristics were obtained by answers to four questions to ascertain their age, gender and home computer accessories. The age responses were recorded into five categories and described by groups.

Respondents' Feelings about Computer Technology

The respondents' feelings about computer technology were assessed in four areas. The students gave their general opinion on how comfortable they felt with computers. Secondly, they expressed their feelings and opinions on the use of online databases. Thirdly, students responded, hypothetically, if they were willing to share online information between their colleagues after they graduated. Lastly, feelings were ascertained on student attitudes regarding modem applications for the physically impaired.

Educational Attitudes and Opinions

The items regarding educational attitudes and opinions gathered information on the use of computer technology and telecommunication directly to assess students' needs. Students were asked if they want to use a modem in

conjunction with their classroom assignments, tests, professor communication, and continuing education. They also commented on a computer course specifically for the physical therapy curriculum.

Specific Online Application Opinions

This part of the survey measured the students' knowledge, feelings, and familiarity with general, medical and physical therapy online services. Specific local, state and national online library databases were included in survey. Students were also to express their attitudes regarding their desire to use these services at present or in the future.

The same instrument was administered before and after the model demonstration. The testing time for it was approximately 10 minutes.

Procedure

The three physical therapy programs were approached to obtain permission to utilize their students for this study. The faculty was given specific instructions regarding the research project, purpose and significance, anonymity of responses, and administrative procedure for questionnaire.

Each school provided a classroom for the survey and the demonstration. The study was administered and repeated at each universities in the same manner.

The following is the one hour procedure:

- 0:00 - 0:10 Faculty administered pre-intervention questionnaire to students
- 0:10 - 0:50 Introduction and demonstration (Script and Handouts Appendices B & C)
- 0:50 - 1:00 Administration of post-intervention questionnaire.

The presentation was a 40 minute lecture and multi-media presentation including 35mm slides and an online modem demonstration which was projected on a screen. A video of the online demonstration was utilized in lieu of the actual modem demonstration at the University of Miami where telephone lines were not available.

The subject matter of the presentation included a basic model demonstration to familiarize subjects with telecommunication as it relates to physical therapy. The slides introduced online library services, medical databases, and basic equipment needs. The online demonstration introduced the APTA-NET online service, the Grateful Med Software and ancillary educational uses of telecommunication. The demonstration concluded with a review of printed handouts and a short question and answer period.

Results

The pre-and post-intervention questionnaires were identical. The twenty item questionnaire was measured and recorded. The results of the questionnaires are divided into four main topics. The four main topics of the questionnaire were (a) RESPONDENTS' CHARACTERISTICS, (b) RESPONDENTS' FEELINGS ABOUT TECHNOLOGY, (c) EDUCATIONAL OPINIONS, and (d) ATTITUDES TOWARD SPECIFIC ONLINE APPLICATIONS.

Respondents' Characteristics

The respondents' characteristics were obtained by answers to four questions to ascertain subjects' age, gender and home computer accessories. The age responses were recorded into five categories and described by groups. Home computer accessories indicated the number of subjects with home computers and/or a modem.

The respondents were classified into five age categories. The largest number of respondents were in the 20 through 25 age category (42.3%). The least number of respondents were in the 40 and up category (3.2%) (Appendix D, Table 1). It is interesting to note almost 75% were under thirty years old.

The majority of the subjects 109 were females (69.9%); males 47 represented less than a third (30.1%) of the sample.

Seventy-five students (48.1%) indicated that they had personal computers. Twenty-one of those with computers had modems (28.0%). The distribution of home personal computers among the different age categories was similar, and a chi-square statistical analysis revealed a non-significant association between age and personal computer ownership (P=.70) (Appendix D. Table 2).

Respondents' Feelings about Computer Technology

The results of the respondents' feelings about computer technology were assessed in four areas: (a) The students gave their general opinion on how comfortable they felt with computers, (b) expressed their feelings and opinions on the use of online databases, (c) responded if they were willing to share online information with their colleagues after they graduated, and (d) indicated attitudes regarding modem applications for the physically impaired.

Are students comfortable using computers? Prior to the demonstration over half of the students (59.6%) felt comfortable with computers by responding with AGREE or STRONGLY AGREE answers. About a third of the students (32.1%) DISAGREE or STRONGLY DISAGREE with feeling comfortable.

After the demonstration slightly more students (61.4%) indicated that they felt more comfortable by responding with AGREE or STRONGLY AGREE responses. The DISAGREE or STRONGLY DISAGREE answers decreased to (27.4%) (Appendix D, Table 3 and Figure 1).

Prior to the demonstration over one third of the students (35.3%) responded with AGREE or STRONGLY AGREE to the question "I do not feel comfortable accessing databases via a modem". Many students had NO OPINION (43.5%) but those comfortable represented 21.2% of the group.

After the demonstration there was a shift toward being less uncomfortable. It was noticeable in several areas. Those with no opinion decreased (11.4%). There were fewer students who STRONGLY AGREEd with being uncomfortable (decrease of 11.5%) and more students indicated a higher level of comfort by responding with DISAGREE (increase of 18.8%). (Appendix D, Table 4 and Figure 2).

In response to the question "When I graduate I will exchange treatment protocols, share mail, messages, and information with colleagues by modem", 52.6% of the students had NO OPINION, 34.6% AGREEd or STRONGLY AGREEd that they would use the technology, and 12.9% would not use the technology.

After the demonstration there was a major change in attitude and more students were interested in using modem applications. The significant changes were increased STRONGLY AGREE and AGREE responses (30.1%) and decreased NO OPINION responses (-25.1%) (Appendix D, Table 5 and Figure 3).

In response to item 16, "I think our physically impaired patients should be introduced to online telecommunication, i.e. shopping, banking, disability products, mail to Congress, friends, entertainment, and computer products, etc.", prior to the demonstration many students (91.0%) thought that physically impaired patients should be introduced to online telecommunication. After the demonstration there was a slight positive shift, increasing the AGREE and STRONGLY AGREE to 94.7% (Appendix D, Table 6 and Figure 4).

Educational Attitudes and Opinions

The items in this section assessed the attitudes and opinions on the use of computer technology and telecommunication directly relating to the students' educational needs. Students were to respond to items in the use of a modems in conjunction with their classroom assignments, tests, professor communication, and continuing education. They were to express their opinion on the need for a computer course specifically within the physical therapy curriculum.

Before the demonstration 60.7% of the students responded with either AGREE or STRONGLY AGREE to the statement "I would feel comfortable at my home, completing classroom assignments, projects, and tests with a modem." After the demonstration 76.5% of the students felt comfortable completing school assignments via modem (Appendix D, Table 7 and Figure 5).

Prior to the demonstration students were asked if they would utilize a modem to discuss classroom matters with their professors. Half the students (52.6%) responded with either AGREE or STRONGLY AGREE. After the demonstration 73.8% returned AGREE or STRONGLY AGREE responses (Appendix D, Table 8 and Figure 6).

In response to the item, "We need more educational telecommunication involvement in the physical therapy profession, i.e. the offering of continuing education and classes online for modem use", 76.9% of students AGREEd or STRONGLY AGREEd before the demonstration. After the demonstration 89.5% AGREEd or STRONGLY AGREEd (Appendix D. Table 9 and Figure 7).

Prior to the demonstration a large number of students 82.7% felt there was a need for a computer course specifically designed for the physical therapy curriculum. After the demonstration there was not a major change. The AGREE and STRONGLY AGREE increased to 86.2% (Appendix D, Table 10 and Figure 8).

Physical therapy students indicated an interest in attending a telecommunication program that offers continuing education contact hours. Prior to the demonstration a large majority (85.2%) replied AGREE or STRONGLY AGREE. After the demonstration the interest level increased to 87.2% (Appendix D, Table 11 and Figure 9).

Specific Online Application Opinions about Knowledge, Familiarity and Modem Applications.

Six items in the survey measured the students' knowledge, feelings, and familiarity with general, medical, and physical therapy online services. Even though specific local, state, and national online library databases were included in the survey, the specific local library databases were naturally better known to some of the university students.

Prior to the demonstration, respondents were asked to circle only the terms that were familiar. The terms were not defined but represented the names of general, medical and physical therapy online telecommunication services. Medline was the most familiar response 85.3%. All the other services received less than a 30% familiar response. After the demonstration familiarity increased dramatically for all of the medically oriented services (>50% each). The greatest changes were in the medical oriented services and the increases were Grateful Med (74,6%), APTA-NET (63.7%) and PTON (62.1%) (Appendix D, Table 12).

Respondents were asked, "Assuming you have a modem, please circle the services that you would use:" Prior to the demonstration, the majority of the students indicated they did not want to use these online services. Among the services the students would use, Medline was ranked the highest (41.0%): each of the other services followed with less than a 20% response.

After the demonstration many opinions changed. The Medline response was still the highest, increasing to (70.6%). The other medical related services also increased; their post-intervention responses were APTA-NET (66.7%), PTON (45.8%), and the Grateful Med (61.4%) (Appendix D, Table 13).

Prior to the demonstration 14.1% of the students did not feel comfortable using the Grateful Med Software and 76.9% indicated NO OPINION. After the demonstration major changes occurred, and greater than 60.0% of the students felt comfortable using this software (Appendix D, Table 14 and Figure 10).

Prior to the demonstration 29.5% of the students were pleased to know that APTA-NET and PTON services were available and 69.2% of the students had NO OPINION. After the demonstration 94.5% of the students AGREEd or STRONGLY AGREEd (Appendix D, Table 15 and Figure 11).

Prior to the demonstration 69.0% of the students indicated NO OPINION on the item "I would not feel comfortable using a modem with LUIS, ERIC or Caldernet library services, 21.9% of the students felt comfortable. After the demonstration 55.6% of the students felt comfortable and responded with DISAGREE or STRONGLY DISAGREE (Appendix D, Table 16 and Figure 12).

Prior to the demonstration a majority of students (69.4%) felt comfortable using Medline by modem. After the demonstration more students (75.2%) felt comfortable and 9.1% of the students felt uncomfortable using Medline by modem (Appendix D, Table 17 and Figure 12).

Student Narrative Comments after the Demonstration

Item 20:
"Briefly add any additional comments on today's demonstration."

The students had the opportunity to write a few statements or comments concerning the demonstration. Most comments were positive. The most frequent answers were that the program was informative and interesting. Many students expressed the desire to purchase a computer and modem. Some students commented that they were unaware that these online services were available or even existed. A few stated that they wish this presentation was given earlier in their curriculum.

The negative comments were mostly financial. Some students thought a computer was too expensive and they could not afford one at this time. Similar expressions were noted about the cost of the modem and online service charges. A few students thought it was not for them, because they did not understand computers. Some students even admitted to being technophobic. A few commented that they preferred to have the library search done for them.

Discussion

The study was undertaken to determine student attitudes regarding computer telecommunication technology and to enhance these attitudes by providing an educational demonstration.

The data revealed that the student attitudes changed showing more interest in telecommunication applications following the demonstration. The major changes that are attributed to the demonstration are discussed below.

The majority of students signified that after graduation they would share mail, messages and information by modem. Many students showed an interest in seeing more telecommunication involvement in the profession. A large majority of the students revealed that they were interested in furthering their telecommunication education. They indicated their interest in attending a continuing educational course on this technology.

Albright (1988) expands on this further and basically criticizes the health care universities for not providing medical telecommunication training. The students implied that a general computer course specifically designed for physical therapy applications was needed for the curriculum. The students acknowledged that they would feel comfortable completing classroom assignments and tests by modem.

Other data supporting the hypothesis were the students' knowledge and opinions concerning the online services. The students' knowledge of telecommunication services did expand and the students acknowledged an increased desire to use the online services. Both of these areas were measured in pre-test and post-test differences.

Students were not very familiar with online services and their knowledge in this area greatly improved following the demonstration. Medline was the only exception to this statement because most students were already familiar with Medline. After the demonstration, students' knowledge and familiarity of medical online services also dramatically increased with the Grateful Med increasing the most.

There was a dramatic pre/post-intervention difference relative to the use of medical applications. The students' willingness to use APTA-NET, Medline, Grateful Med. and PTON increased after the demonstration. The students also showed increased desires to use the online library services, but to a lesser extent.

Expected Outcomes

The general results of the survey were predictable and anticipated. The respondents' age groupings and gender, mostly female, were not different than expected.

The respondents' feelings about computer technology pre-intervention were not different than expected. The demonstration was designed with the intention of educating the students to enhance their attitudes and increase their

knowledge and willingness to use the technology. After the demonstration there was an overall acceptance of the online benefits which was expected.

Unexpected Outcomes

The author predicted a larger representation of home computers due to the affordability of new personal computers, and the availability of previously-owned computers. It was also thought that the secondary education system created a technological need. There was an expectation that there would be more modem owners solely because many computers when purchased today include a modem accessory.

There were some results that were unexpected and not anticipated. These unexpected results were in three categories: 1) the students' age demographics, 2) computer ownership, 3) opinions about educational applications, and 4) opinions regarding computer technology for the benefit of patients.

The age of the students at the University of Miami (UM) were a younger group. Unexpected were the lack of students in either the "35-39" and the "40-up" age groups. In comparison Barry University (BU) and Florida International University (FIU) had 22.3% and 15.9%, respectively, of their students represented in the 35 and up categories. The age differences at the UM are possibly due to student financial obligations.

The high level of interest concerning educational applications was unexpected. A large majority of students affirmed that they would also attend a continuing educational course on telecommunications. This was unexpected because the author presumed there would be a stronger interest in clinical continuing education rather than telecommunication education. However, the 90's student may want to stay abreast of technology or possibly be more research oriented.

Many of the students were interested in seeing more telecommunication involvement in the profession. This may be due to the strong educational desire of physical therapy students searching for global clinical solutions.

Many students indicated that a general computer course specifically designed for physical therapy applications was needed in the curriculum. This high percentage of interest in a specific computer course for physical therapists was not expected. It seems to imply inadequate computer knowledge from previous formal education or a strong desire to learn physical therapy and medically related computer applications.

An overwhelming number of students, both pre- and post-intervention, indicated that physically impaired patients should be taught to utilize online services. This response was surprising. The author anticipated objections that students might perceive telecommunication as an insensitive, non-therapeutic approach to helping. The

interest that the students showed globally in telecommunication provides insight for future telecommunication development.

Other Interesting Outcomes

The sample distribution among the schools (Appendix D, Table 18) is interesting when related to the age group distributions (Appendix D, Table 19). Barry University's largest group was the "26-30" group. Both, Florida International University's largest group "43.2%" and the University of Miami's largest group "67.3%" were among the "20-25" age group. A Chi-squared statistical analysis revealed a significant association ($P<.05$) between school and age.

It should be noted that each of the students responded differently to familiar online services due to individual universities supported databases (Appendix D, Table 20). Student responses to the services they would use also reflect the services readily available at their respective universities (Appendix D, Table 21). Services supported by FIU are LUIS, ERIC, and Medline. UM supports Caldernet, and Medline. At the time of the study BU was not yet online.

Differences were noted between the students who own computers and modems to the other students who do not. In general, the students with modems and computer were most knowledgeable and indicated a greater willingness to use the

online services (Appendix D, Table 22). Ninety-five percent of the students with modems showed the highest response to attending a continuing telecommunication course (Appendix D, Table 23). These students also had the highest percentage of favorable responses to the item regarding the need for a specific computer course for physical therapists (Appendix D, Table 24).

Limitations and Problems

There were several limitations and problems with the study. A control group was not set up; therefore, it was not a cause and effect study. The before and after results were descriptive in nature, but it does not take away from the importance of the study. Since no standard instrument was available for this specific type of data collection, the validity and reliability of the instrument was unknown and considered a possible limitation.

There were several procedure differences with the demonstration presentation. UM was not equipped with a phone line for the online demonstration. In this situation a video was presented of the same screens that were utilized during the other demonstrations. Although the author tried to adhere to the script, additional comments were made during the presentation that differed from school to school.

Another problem was that the students' receptive abilities, motivation to focus on the topic, or frame of mind may have been affected by the timing of the lecture. BU received the lecture one week before finals. FIU and UM, however, attended their presentations the first week of the new semester.

In general, physical therapy students could be thought of as being in a homogeneous grouping. However, the general population in this area has a higher percentage of ethnic and culturally different individuals than in other parts of the country. Due to procedural and regional sample differences generalization of the results to a larger population could be erroneous.

Conclusions and Benefits of Study

This study supports the original hypothesis that Dade County, Florida physical therapy students will initially exhibit little knowledge and poor attitudes toward telecommunication which will favorably change following a telecommunication knowledge and information demonstration.

In addition to supporting the hypothesis. Technology, and more specifically computer use in physical therapy, need to be successfully utilized for education, patient care and professional growth. It appears apparent from this study that these students are interested in learning more about telecommunication and computers for the physical therapy profession. Physical therapy educators can supplement curriculum planning with these results in mind.

Equipment manufacturers might look at these results as a pilot study format to help incorporate students' attitudes towards computer technology and to better serve patients' needs. By understanding student attitudes, computer training and telecommunication education may enhance the cooperation of education and business. Results like these might be used in other studies to promote product development for the physically impaired and for the physical therapist.

Clinicians can view these results as an incentive to get more involved with sharing information and knowledge via telecommunication. Because the students supported the online library services in this study, perhaps the National Library of Medicine's online service could correlate the study with future ones.

It would be of interest to gather additional information on computer applications from other physical therapy programs to see how they incorporate computer technology and more specifically telecommunications into their curriculum. The physical therapy profession would benefit from a research clearinghouse to expand national and international ideas. A study on the feasibility of a telecommunication research clearinghouse might help promote physical therapy research and development. Furthermore, a study on the most effective and efficient means of educating students on telecommunication and computer use would help optimize this technology. Further telecommunications studies are needed by physical therapists to enhance the profession and society.

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Appendix A

Questionnaire

Telecommunication Questionnaire:

Please circle the most appropriate answer.
All results are confidential:

The Last four digits of your Social Security Number are ____

1. Circle your age group.

<1>----------<2>----------<3>----------<4>----------<5>-
20-25 26-30 31-34 35-39 40-up

2. Circle your gender.

<1>----------<2>-------
Male Female

3. Do you have a personal computer at home?

---<1>----------<2>-------
Yes No

4. My home computer equipment includes a modem.

---<1>----------<2>----------<3>----------
Yes No No Computer

5. Please circle only the terms that are familiar to you.

LUIS	APTA-NET	ERIC
Caldernet	Medline	PTON
Grateful Med	GEnie	CompuServe

6. I feel comfortable using computers.

---<1>----------<2>----------<3>----------<4>----------<5>--
strongly agree agree no opinion disagree strongly disagree

7. I do not feel comfortable accessing computer databases through a modem.

<1>	<2>	<3>	<4>	<5>
strongly agree	agree	no opinion	disagree	strongly disagree

8. Assuming you have a modem, please circle the services that you would use.

LUIS	APTA-NET	ERIC
Caldernet	Medline	PTON
Grateful Med	GEnie	CompuServe

9. I would not feel comfortable using The Grateful Med software at home by computer.

<1>	<2>	<3>	<4>	<5>
strongly agree	agree	no opinion	disagree	strongly disagree

10. I am pleased APTA-NET and PTON services are available because this technology is a good idea for our profession.

<1>	<2>	<3>	<4>	<5>
strongly agree	agree	no opinion	disagree	strongly disagree

11. I would not feel comfortable using a modem with LUIS, ERIC or Caldernet library services.

<1>	<2>	<3>	<4>	<5>
strongly agree	agree	no opinion	disagree	strongly disagree

12. I would feel comfortable using Medline (Index Medicus) by modem.

<1>	<2>	<3>	<4>	<5>
strongly agree	agree	no opinion	disagree	strongly disagree

13. When I graduate I will exchange treatment protocols, share mail, messages, and information with my colleagues by modem.

```
---<1>---------<2>---------<3>----------<4>---------<5>--
 strongly                    no                    strongly
  agree       agree       opinion      disagree    disagree
```

14. I would feel comfortable working at my home, completing classroom assignments, projects, and tests with a modem.

```
---<1>---------<2>---------<3>----------<4>---------<5>--
 strongly                    no                    strongly
  agree       agree       opinion      disagree    disagree
```

15. I would utilize a modem to discuss classroom matters with my professors.

```
---<1>---------<2>---------<3>----------<4>---------<5>--
 strongly                    no                    strongly
  agree       agree       opinion      disagree    disagree
```

16. I think our physically impaired patients should be introduced to online telecommunication, i.e. shopping, banking, disability products, mail to Congress, friends, entertainment, and computer products, etc.

```
---<1>---------<2>---------<3>----------<4>---------<5>--
 strongly                    no                    strongly
  agree       agree       opinion      disagree    disagree
```

17. We need more educational telecommunication involvement in the physical therapy profession, i.e. the offering of continuing education and classes online for modem use.

```
---<1>---------<2>---------<3>----------<4>---------<5>--
 strongly                    no                    strongly
  agree       agree       opinion      disagree    disagree
```

18. We need a computer course specifically designed for physical therapy applications in our curriculum. This course should include practice management, telecommunications, and computer basics for the inexperienced.

```
---<1>---------<2>---------<3>----------<4>---------<5>--
 strongly                    no                    strongly
  agree       agree       opinion      disagree    disagree
```

19. I am interested in attending a physical therapy telecommunication program that offers continuing education contact hours.

```
---<1>---------<2>---------<3>----------<4>---------<5>--
 strongly                    no                    strongly
  agree       agree       opinion      disagree    disagree
```

20. Briefly add any additional comments on today's demonstration.

Appendix B

Demonstration Lecture Script

Demonstration Lecture Script

INTRODUCTION

Thank you for the introduction and I especially want to thank all of you for helping me complete my study. The purpose of my study is to introduce telecommunication to you and to show how it relates to physical therapy, and in addition, to survey your opinions.

I have a short slide presentation, an online demonstration, and handouts for future reference. If you see an interesting online service, you will not need to jot down any phone numbers as the handouts include this information. The program is informal and not quite as academic as you might expect.

Before we get started I would like to tell you a little about myself, I graduated from FIU in 1978 and since then have been mainly in private practice and self employed.

My hobby, as you might expect, is telecommunication and I am pleased to be able to combine the two today.

Now I would like to learn about you.

Question:

In order to give me a better idea of your experience, would you please raise your hand if you have a personal computer at home?

Question:

How many of you have modems?

Question:

How many of you use your modem once a week?
Thanks, that gives me a good picture of your computer background. I will now start with the slide presentation.

Presentation

Slide (Telecommunications for Physical Therapy)

I have limited telecommunication in my study to mean the connecting of a personal computer, like we have at home or office, to other computers

Slide (Data Transfer)
by using a standard phone line and modem for the purpose of obtaining data and sharing information.

Slide (Databases)

Computer information is generally stored in databases which are really nothing more than large electronic filing cabinets.

Slide (easy to learn)

For those of you not familiar with telecommunication, you can relax; it is simple, easy to learn, and painless. Regardless of what this poor guy may think.

Slide (cartoon)

Now, think for a moment of about your career and present situation. Where do you think you might be employed. Will it be sports medicine, home health, or private practice? The reason I ask is because I would like you to try to relate telecommunications to your particular needs.

Slide (library of medicine)

For students the advantages of telecommunication are obvious.

Slide (list library services)

We may access or connect our computers to encyclopedias, university libraries, LUIS, Medline, and many services right from our home.

Slide (Full text Journals)

Even full text journal articles are available and can be displayed on our screen without a journal subscription. The convenient use of telecommunication is available any time of the day or night and even in our bathing suit attire if we so desire. Just think of avoiding I-95, traffic jams and parking problems which cause stress and can be eliminated by using our computer and modem.

Slide (Neck Pain and Stress animation)

In the Clinical setting telecommunication has many benefits. I feel one strong point is the ability to share information such as treatment protocols with our colleagues and other therapists around the world.

Slide (download)

We may also obtain other data or download files and programs. Downloading is just the transferring of information from the computer we are calling to ours. To explain what I mean I would like to show you some programs I downloaded from PTON (Physical Therapy Online Network).

Slide (PTEX)

PTEX is a home exercise program designed to produce patient print outs and maintain patient programs and schedules.

Slide (PTEX Pictures)

As you can see it has some graphics.

Slide (Saunders Back Program)

The Saunders' Back Program, a demonstration model was also online at PTON.

Slide (anatomy and work station)

This work hardening computer program is also quite graphic with its screen displays as you can see.

Slide (GhostWRITER)

GhostWRITER is a computer note writing and evaluation software program. The parent company Precedent Systems also manufactures an electronic billing package for online use. The company is telecommunication oriented and has a program set up to help you with any software problems online via your modem.

Slide (Keith Blankenship FCE)

Keith Blankenship is also involved with utilizing telecommunication. After you complete the computerized work hardening evaluation you may Upload or send the results to his computer. He then, in turn, will compare it to his national database and send you the statistical results.

Another clinical feature to telecommunication is for our patients. We can teach our physically impaired patients to use modems and inform them of the many online services. Banking, shopping, electronic mail, support groups, disability product information and exposure to news, weather and help. Adaptive key boards, voice activated software and adaptive computer devices are available to aid in online calling for the disabled.

Slide (file listing)

This shows an example of how some of these programs look online because we see only file names and not the actual programs.

If you think you might be interested in private practice then telecommunication is of great benefit. We may submit the physical therapy charges to insurance carriers, medicare, medicaid, and even other 3rd parties for prompt payment without filing a paper return. This online service may soon be mandatory and there has been talk in Congress about even charging for paper claims. Online billing is faster, and payments are processed faster, too. Paying office bills online is also a feature that is available and checks don't even need to be written.

In the private practice setting, telecommunication is financially helpful. Treatment charges and billing claims can be electronically submitted. This eliminates paper claims, speeds up payments and produces neat and accurate accounting records. In addition, mandatory electronic claims submission is approaching. It may not be long until paper claim forms become obsolete

If you are interested in setting up your own private practice, one of your first decisions is site location. Hypothetically, if your interest is starting a sports medicine facility, you will of course study the demographics and locate in an area of younger age populations with industrial jobs. Demographics are important and available online via modem and CompuServe. It is reasonable and cost efficient.

Slide (demographics)

Now I would like to show you some of the other online services.

Slide (Black Bag)

Black Bag Medical which has medical information online, is an online service run by a medical doctor. He is especially known for his National and International online service list of 300 to 400 medical online services which he shares with his callers.

Other services include

Slide (IBM)

IBM has an online service

Slide (FDA)

The Federal Drug Administration for medication information,

Slide (APTA-NET)

The American Physical Therapy Association online service.

Slide (PTON)

The Physical Therapy Online Network where I downloaded most of the previous slide programs.

Slide (Equipment needs)

The necessary equipment includes any personal computer, telephone line, modem, and a communications software program:

THE COMPUTER

Any personal computer will do. An IBM compatible, Macintosh, even some Ataris and Amigas work.

THE MODEM

The modem does not have to be expensive. This Modem cost $49.00 and works great.

[Slide of Modem]

This modem costs $1300.00 you might ask what is the difference? Well, it is speed. The more expensive one operates at 16,800 baud and the other at 2400 baud. Speed is important when you call many long distance computers and use expensive databases. I suggest for those interested in buying to start with a reasonable $49.00 to $80.00 modem that will be adequate, but do not buy anything slower than 2400 baud.

THE PHONE LINE

The telephone line can be your house line. There is no need to install an additional or dedicated phoneline. Even call waiting can be temporarily disconnected so it won't interfere with outgoing online calls.

THE SOFTWARE

The communication software is an important issue. Generally, when you buy a modem, it comes with a software package. After you open the modem box, carefully take the communication disk out and THROW IT AWAY..... You will only spend lots of time learning how to use it and it probably will not have the features that you will want anyway. The features that we want will be explained later during the online demonstration. However, ease and not confusion is our primary goal so we look for phone number storage, automatic dialing, and simple settings.

Slide (Dinosaur)

This is to remind us we don't live in a dinosaur world.

Slide (space shuttle)

The technology exists, and we should use it to our potential.

Before we go into the live demonstration, I want to review the library and online services because previously I went over them quickly. LUIS is the State University Systems online library service. All state university library services are accessible. ERIC, an educational database, is also available on LUIS. Caldernet is the University of Miami School of Medicine card catalog system. I will explain Medline and the National Library of Medicine later. The physical therapy online services are

APTA-NET and PTON. APTA-NET is the online service of the American Physical Therapy Association. PTON is a private online service called Physical Therapy Online. PTON, by the way, was the primary source of the demonstration slides used today.

One more comment before we go online. I would like for you to imagine if I handed out six index cards and you were to write down a question pertaining to physical therapy.

Now, I will post this index card on this Bulletin Board and to save time, imagine if someone else was to come up and either write an answer to the question posted or write another question on the index card.

Well, you can see that in a short period of time if everyone participated, we could disseminate and share a lot of information.

We just created a bulletin board; and notice we all could read, write, or reply to any of the messages.

The reason I am showing you this is because most online services have bulletins, message areas, conferences, forums, sigs, and they are all based on this principle. In fact online services are many times called Bulletin Board systems or just BBS's.

Online Demonstration

Lets now go live and call APTA-NET. The screen you are looking at now is the communication software dialing directory. Notice the phone numbers, modem settings. All data needed to connect and logon is stored so we just <press enter>. Don't be overwhelmed with these settings because once they are stored, they rarely if ever need to be changed. (Student to press enter)

Listen carefully and you can hear the modems connect. The logon commands are now displayed on the screen and the main menu is next. The main menu lists the options as you can see Government Affairs, Calendar, Publications. I will now select the publication area and notice the sub-menu with more detailed descriptions. We can select monographs as you see. They are listed with price, description and we may even order any of these online while connected.

What you don't see clearly from the main menu is the BRS databases. They are selected with the go BRS command and they include 150 databases and many full text journals like the Journal of the American Physical Therapy Association.

I am going to play a little music while I switch software to call the National Library of Medicine. The music you heard was the Grateful Dead and the software projected on the screen is the Grateful Med. The Grateful Med was designed for the National Library of Medicine so one can access the 40 online databases including Medline.

Before I show you the program I would like to explain Medline. Back in the 1870's an individual decided to categories all the medical journals and articles in a text. This was done and called the Index Medicus. Today the Index Medicus continues and consists of 3500 different medical journals. The Index Medicus has been programmed into the National Library of Medicine's computer and called is Medline. But, in addition to the Index Medicus, Medline has combined another 682 medical journals from the health care, dental and nursing areas. So, medline is larger than the Index Medicus. It is important to recognize that Medline, however, is a bibliography reference and not a full text database. Abstracts, however, are included online, but only if the author submits them (Sainer, 1992; Pathways, 1989).

Medline also is available through many online services such as CompuServe, Dialog and others. But the Grateful Med Software provides several advantages. I will point out these advantages as we go along.

As we look at the main search screen, the Grateful Med allows direct connection with the National Library of Medicine so besides Medline there are about 40 other available databases, as you see now on the screen.

Let's now enter a subject search, I will select the terms because of time constraints. Hip, Gait and Rehabilitation will be the main subject areas. As you can see, we will further divide Hip into a sub category of arthroplasty and replacement. The rehabilitation term also

has a sub category of disease or surgery. The other options are English Only journals, and our search may also be limited to a selected specific journal or all 3700 medical journals.

Another great feature of the Grateful Med is that the search terms are easily saved for future reference. The search begins by <press enter> key and is automatic at this point. It is at the connection time when your charges begin. The above search costs thirty cents at the student rate, a 50% discount. You can see six articles were retrieved and additional search terms are even suggested. The data is also easily saved or printed.

The fact that your search cost is only determined after you connect makes the Grateful Med a very efficient program. This search preparation time is costly when using other sources such as CompuServe and Dialogue. The simplicity and ease of use is the advantage of the Grateful Med Software.

The Loansome Doc feature allows online ordering of documents. An ordered article will be sent to the Univ of Miami Calder Library and they in turn will either mail or fax it to you. For even faster service you can call the APTA-NET. If the journal is full text, just display it online to your terminal.

Lastly, I'd like to connect our computer to a Physical Therapy School application. I set up a demo program called Physical Therapy and need a volunteer to help.

This student is called Sally Smart and her password is Smart. The main menu presents itself with options and Sally, of course, would like to read her mail. Sally's first message is a note from her professor Doctor Pepper. He is informing Sally of her final grade since the professor was not available for her phone call. The next example is the professor sending Sally a file to help her with her additional information.

In this next example, which I think you will like, Sally is taking her exam online because she missed it due to illness. Lastly, I selected an administration situation where an applicant is requesting information about applying to the Physical Therapy School. The information about admission requirements and application can be downloaded and thus save secretarial time.

Conclusion

This completes my demonstration and I would like to review the handouts and then ask you to complete the post questionnaire. The handout gives information on the Grateful Med software and phone numbers to contact the National Library of Medicine. PTON information is listed, logon instructions for Calder Library, LUIS instructions, and miscellaneous phone numbers.

Thank you for your time.

Do you have any questions?

Bibliography For Lecture

Marathon Billing Software
GhostWRITER (notes)
Precedent Systems
P.O. Box 75239
Seattle, Washingtion 98125
1-800-488-5668

Functional Capacity Evaluation, FCE
The Blankenship System
4312 Interstate Drive
Macon, GA 31210
1-800-248-8846

QmodemPro Professional
Communication Software
Mustang Software Inc.
P.O. Box 2264
Bakersfield, CA 933303-9943

APTA-Net
American Physical Therapy Association
1111 North Forfeits Street
Alexandria, VA 22314-1488
1-800-999-APTA

PTON
Dennis Gyllenhaal
PO Box 9403
Shawnee Mission, KS 66201

Grateful Med
NTIS
5285 Port Royal Rd.
Springfield, VA 22161

National Library of Medicine
MEDLARS Service Desk
National Library of Medicine
8600 Rockville Pike
Bethesda, Maryland 20894
Phone 800-638-8480

US HealthLink
Modem number (no charge)
1-800-225-4652
Modem 7E1 Emulation is VT100

Caldernet
University of Miami
Tom Williams or
Mike Cuteral
Voice 305-547-5782

Dialog Information Services
3460 Hillview Avenue
Palto Alto, CA 94304

Black Bag Medical BBS
DelGrosso, E. (1992).
Wilmington DE
(302)-994-3772 Modem (8-N-1)

The FDA Electronic Bulletin Board
Food and Drug Administration
Parklawn Computer Center
(301) 443-7318

Mead Data Central
P.O. Box 933
Dayton, Ohio 45401

BRS/Colleague
BRS Information Technologies
1200 Route 7
Latham, New York 12110
1-800-468-0908

CompuServe Information Services
5000 Arlington Centre Boulevard
P.O. Box 20212
Columbus, Ohio 43220
1-800-848-8199

GEnie
GE Information Service
401 North Washington Street
Rockville, Maryland 30850
1-800-638-9636

The Back Care Program
H. Duane Saunders
7750 West 78th Street
Minneapolis, Minnesota 55435
1-800-654-8357

PTEX
Physical Therapy Exercise System
211 Manchonis Road
Wilbraham, MA 01095
1-800-334-5814

National Library of Medicine (1989). Pathways
17 minute video

Pournelle, J., & Banks, M. (1992). PC Communication Bible. Redmond, WA: Microsoft Press.

Smale, P. H. (1986). Introduction to telecommunication systems. Blue Ridge Summit, PA: Tab Books.

Veit, S. (1992, June). Low cost high speed modems update & combatting computer viruses. ComputerCraft.

Appendix C

Handout

Handout

Grateful Med Electronic Service Desk

Your SYSOP is: Dr. J. S. Billings

24 hrs
a day

GRATEFUL
MED
BBS

You may call the National Library of Medicine BBS at no charge without an account by modem.

The number is 1-800-525-5756 set your modem to 8-N-1 and just follow simple log on instructions.

11/30/92

T H E G R A T E F U L M E D

To obtain either the IBM format or Macintosh version of Grateful Med call NTIS. To set up an account with the National Library of Medicine call the information desk at MEDLARS.

The numbers are listed below:

Grateful Med distributor (NTIS) has an 800 number.
The National Technical Information Service (NTIS) which is part of the U.S. Dept. of Commerce provides the following services for the National Library of Medicine (NLM):

1) NTIS distributes NLM's Grateful Med.

2) NTIS is NLM's billing agent which means they bill you for charges incurred searching on our MEDLARS system.

3) NTIS is also the source for many of the publications NLM produces to assist MEDLARS searchers, e.g., the Annotated Alphabetic MeSH, and the List of Serials Indexed for Online Users.

The address for NTIS is: NTIS
5285 Port Royal Rd.
Springfield, VA 22161

The telephone number to place orders, check on the status of an order is:

800-553-NTIS
703-487-4650 in Virginia

Questions re: billing for MEDLARS searching has a different number:

800-423-9255 (Virginia callers also)

11/30/92

To obtain information about NLM products, order numbers, etc., please contact the MEDLARS Management Section at the National Library of Medicine:

MEDLARS Service Desk
National Library of Medicine
8600 Rockville Pike
Bethesda, Maryland 20894

Phone 800-638-8480

Software cost is $29.95
NLM also has student accounts 50% discount on online time.

11/30/92

PTON HAS AN 800 NUMBER FOR VOICE CALLS!!!

You can reach PTON using our 800 number. The number is
1-800-487-4944

If you would like to know how to use a feature of the network the best time to contact me is Monday through Friday between 8:00 and 4:00 p.m. CST. I look forward to hearing from you!

Dennis

CALL FOR PROTOCOLS

Several people have asked for specific treatment protocols during the past few months. I would like to devote a section of the File Cabinet to treatment protocols. This would allow people to share their expertise in treating different types of dysfunction.

Any form of treatment protocol would be welcome.
If you don't feel comfortable sending your protocol through PTON's File Cabinet, mail it to me at the following address:

PTON
PO Box 9403
Shawnee Mission, KS 66201

Please help support this part of the network. Your input will be appreciated.

Dennis Gyllenhaal

11/30/92

C A L D E R L I B R A R Y

Logon Procedure to Online Calder Library Catalog

Address any Questions to
Tom Williams or
Mike Cuteral
Voice 305-547-5782

Modem number 305-547-6060
Modem is 8-N-1
Emulation VT100

L O G O N P R O C E D U R E

Use lower case only item above in <bracket> is callers entry.

** press <enter>

** User ID: <sefain1>

** Password: <sefain1> (..... will show)

** Successful login. <Press <enter> twice>

Please type HELP if you need assistance

** local> <c>
** local> <c callcat>

** login: <caldernet>

RISC/os (UMIPS) 4.52 callcat
(C) Copyright 1986-1990, MIPS Computer Systems
All Rights Reserved
Please wait...

What kind of Terminal are you using?
V > VT100
W > WYSE emulating TVI925
Choose one (V,W) v

Please confirm: are you using a VT100 or compatible terminal? (y/n) y

Loading program you requested
Welcome to the Calder Online Catalog System. 11/30/92

* L U I S I N S T R U C T I O N S *

Electronic Access via Modem: 2400 7-E-1
Set Terminal Emulation VT100

Phone Numbers to call

Broward County	467-4690
Dade	226-1846
Boca Raton	395-0552
Palm Beach	969-3504

Logon Screens: item above in <bracket> is callers entry.
press <enter>

please type your terminal identifier < A >
For a menu of services, type MENU.

-2340:01-071-
please log in: < playlike >

SELECT TERMINAL TYPE:
0 DEC VT100 4 TVI 920-925 8 3101-CHAR MODE 12 TTY

1 DEC VT220 5 HAZELTINE 15XX 9 FTTERM-3101
2 DEC VT52 6 ADDS VP 60/90 10 TYMNET78
3 ADM 3A 7 ADDS VP 78 11 WYSE 50
Please input the number for your terminal: < 0 >

FIRN ASYNC TO 3270 TRANSLATOR (CMT/SNA) - NODE 2351 SLOT

NORTH WEST REGIONAL DATA CENTER (NWRDC)
NORTH EAST REGIONAL DATA CENTER (NERDC)
CENTRAL FLA REGIONAL DATA CENTER (CFRDC)
UNIV CENTRAL FLA-COMPUTER SERVICE (UCF-CS)
UNIVERSITY OF WEST FLORIDA (UWF)
UNIVERSITY OF NORTH FLORIDA (UNF)
< 2 >

11/30/92

```
LOGON IN PROGRESS NERDC VTAM IS ACTIVE

                                          < nerluis >


     SIGN-ON COMPLETE.  USERID=FCLXXX
     LUIS Menu02/19/92  22:42:53 TE11FN20  NERLUIS


1  Florida A&M University          16  Florida Times-Union
2  Florida Atlantic University     17  UF Alligator
                                       (Newspaper)

3  Florida International University
4  Florida State University             19  ERIC (Education)
5  University of Central Florida
6  University of Florida
7  University of North Florida
8  University of South Florida
9  University of West Florida
11  SUS Extension Library
12  Santa Fe Community College
13  Union Author/Title Index
29  LUIS Calendar of Events              30  Exit LUIS and
                                            sign off

Type the number of your choice and press the ENTER key:
     To return to the menu from any LUIS screen, type LUIS


To Logoff:
type <30 >

after you see logoff note
< CTRL-Z > (twice or three times) until you see garbage
letters.
```

11/30/92

US HealthLink
Modem number (no charge)
1-800-225-4652
Modem 7E1 Emulation is VT100

WE ARE PLEASED TO BE ABLE TO PROVIDE YOU WITH A PREVIEW OF THE US HealthLink PRODUCTS AND SERVICES. YOU WILL ALSO HAVE THE OPPORTUNITY TO SUBSCRIBE DURING THIS PREVIEW SESSION IF YOU WISH. THE PRODUCTS THAT YOU ARE ABOUT TO PREVIEW ARE AVAILABLE ON AN UNLIMITED INDIVIDUAL USAGE BASIC FOR $35 PER MONTH. SELECT PRICES ON THE MENU FOR COMPLETE DETAILS.

TO INTRODUCE YOU TO US HealthLink, YOU ARE INVITED TO SUBSCRIBE DURING THIS PREVIEW AND RECEIVE A *FREE* 15 DAY TRIAL OF THE NETWORK. IF, AFTER 15 DAYS OF FREE USAGE, YOU CHOOSE TO CANCEL, YOU MAY DO SO BY CALLING

US HealthLink
CUSTOMER SUPPORT AT
1-800-682-8770.

THANK YOU FOR THIS OPPORTUNITY TO SERVE YOU. IF YOU HAVE ANY QUESTIONS, OR WISH ASSISTANCE IN SUBSCRIBING, PLEASE CALL
CUSTOMER SUPPORT AT THE ABOVE 800 NUMBER.

ENJOY YOUR PREVIEW OF US HealthLink!

Additional Phone Numbers

APTA-Net	Voice 1-800-999-2782 extension 3210/3211
Barry-net	Voice 305-899-3600

Modem Phone Numbers

FDA	1-800-222-0185	7-E-1
Black Bag BBS	1-302-994-3772	8-N-1
McAfee Virus Software	1-408-988-4004	8-N-1
U.S. Dept of Education	1-800-222-4922	8-N-1

Communication Software

Macintosh -	Red Ryder
IBM-compatible	QModem Voice 1-805-395-0223
	BBS 1-805-395-0650
	Procomm Plus (available in stores 11/30/92

Appendix D

Data Tables and Figures

Table 1

Age Groups

Age Category	Subjects	Percent
20-25	66	42.3
26-30	50	32.1
31-34	19	12.2
35-39	16	10.3
40-up	5	3.2
TOTAL	156	100.0

Table 2

Ownership of Home Computers by Age Groups

Age Category	Students	Percent of group
20-25	31	47.0
26-30	24	48.0
31-34	10	52.6
35-39	9	56.3
40-Up	1	20.0

Table 3

Item 6: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	9.6	50.0	8.3	26.3	5.8
Post test	13.7	47.7	11.1	26.1	1.3
Change	4.1	(2.3)	3.0	(.2)	(4.5)

ITEM:
I FEEL COMFORTABLE USING COMPUTERS.

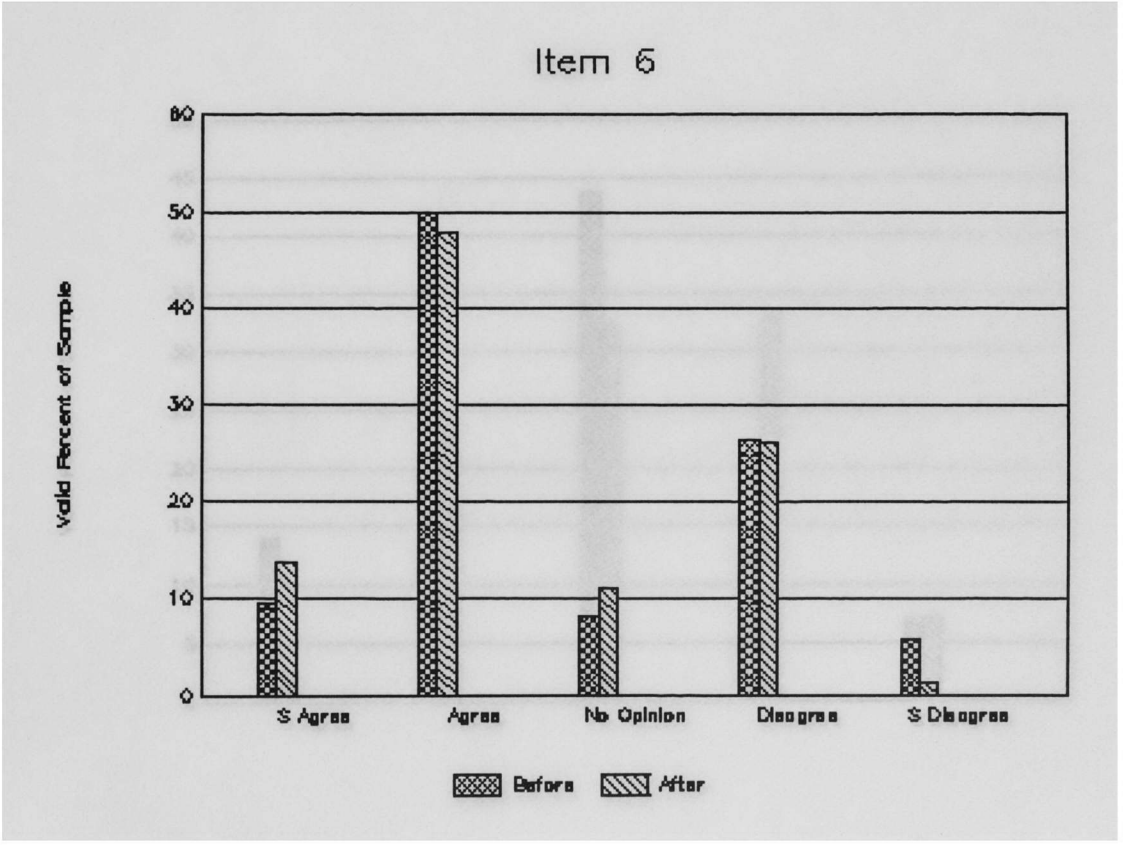

Figure 1. Changes in response to item 6.

Table 4

Item 7: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	14.1	21.2	43.6	14.1	7.1
Post test	2.6	35.0	32.2	32.9	7.2
Change	(11.5)	13.8	(11.4)	18.8	.1

ITEM:
I DO NOT FEEL COMFORTABLE ACCESSING COMPUTER DATABASES THROUGH A MODEM.

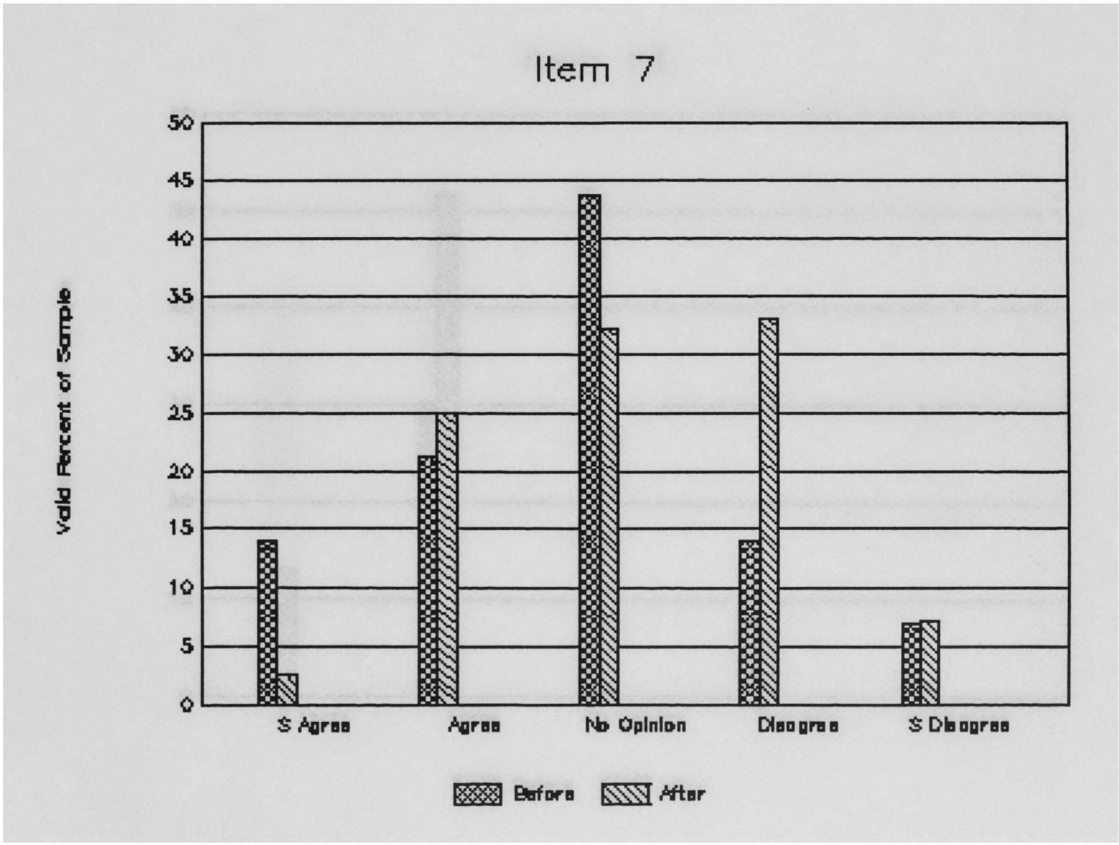

Figure 2. Changes in response to item 7.

Table 5

Item 13: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	4.5	30.1	52.6	10.3	2.6
Post test	13.1	51.6	27.5	6.5	1.3
Change	8.6	21.5	(25.1)	(3.8)	(1.3)

ITEM:
WHEN I GRADUATE I WILL EXCHANGE TREATMENT PROTOCOLS, SHARE MAIL, MESSAGES, AND INFORMATION WITH MY COLLEAGUES BY MODEM.

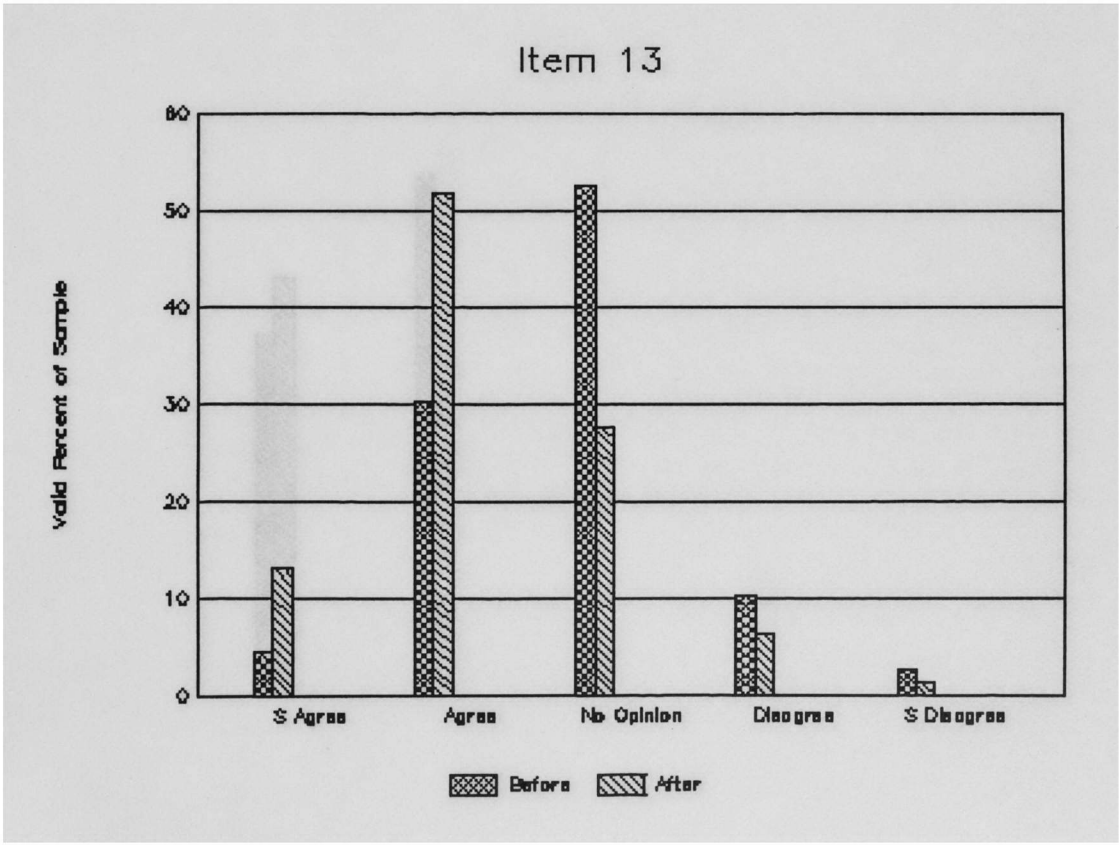

Figure 3. Changes in response to item 13.

Table 6

Item 16: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	37.2	53.8	7.7	1.3	
Post test	43.1	51.6	4.6	.7	
Change	5.9	(2.2)	(3.1)	(.6)	

ITEM:
I THINK OUR PHYSICALLY IMPAIRED PATIENTS SHOULD BE INTRODUCED TO ONLINE TELECOMMUNICATION, I.E. SHOPPING, BANKING, DISABILITY PRODUCTS, MAIL TO CONGRESS, FRIENDS, ENTERTAINMENT, AND COMPUTER PRODUCTS, ETC.

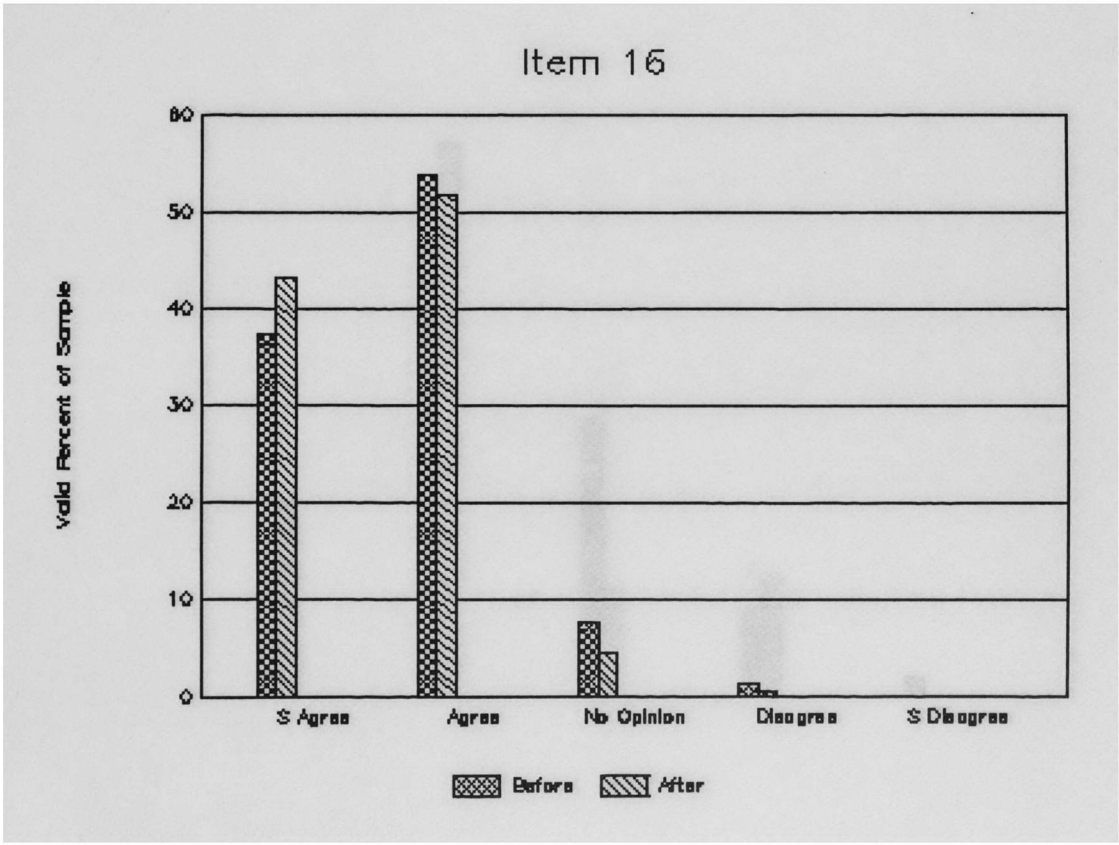

Figure 4. Changes in response to item 16.

Table 7

Item 14: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	14.2	46.5	28.4	9.0	1.9
Post test	19.6	56.9	11.1	12.4	0
Change	5.4	10.4	(17.3)	3.4	(1.9)

ITEM:
I WOULD FEEL COMFORTABLE WORKING AT MY HOME, COMPLETING CLASSROOM ASSIGNMENTS, PROJECTS, AND TESTS WITH A MODEM.

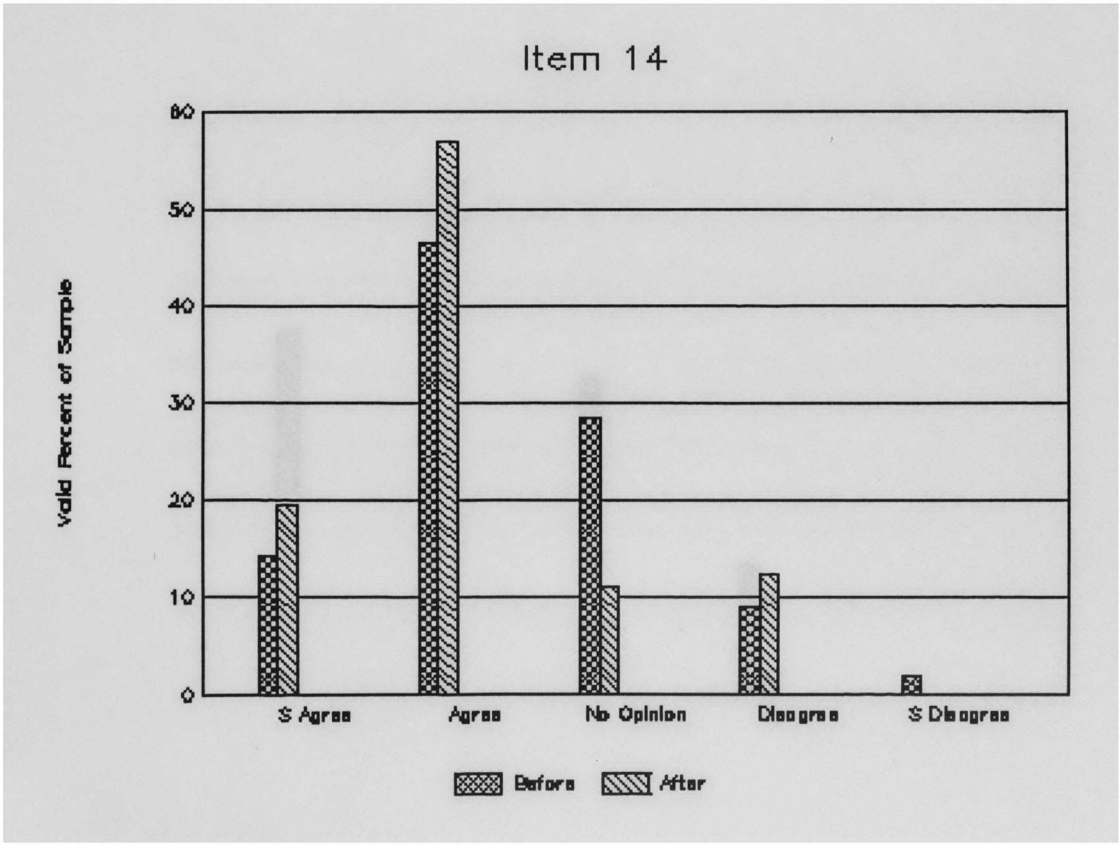

Figure 5. Changes in response to item 14.

Table 8

Item 15: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	12.2	40.4	32.7	13.5	1.3
Post test	13.7	60.1	13.7	12.4	0
Change	1.5	19.7	(19.0)	(1.1)	(1.3)

ITEM:
I WOULD UTILIZE A MODEM TO DISCUSS CLASSROOM MATTERS WITH MY PROFESSORS.

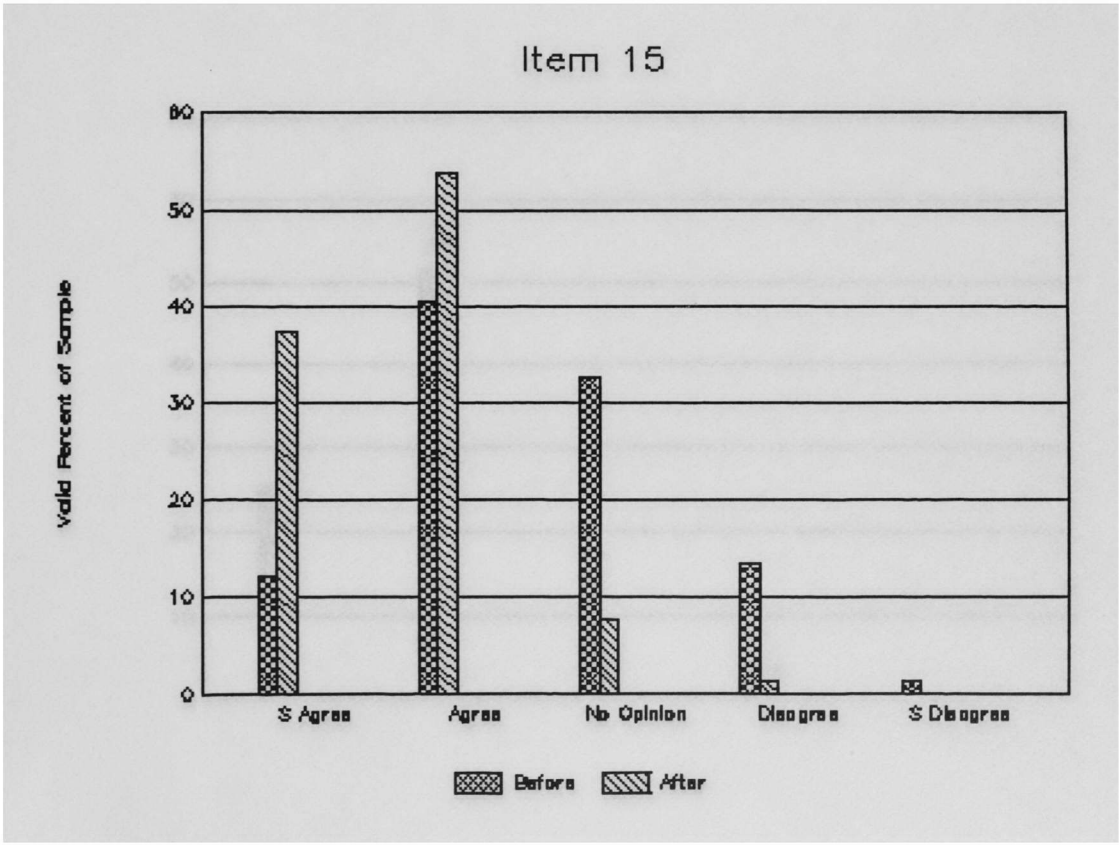

Figure 6. Changes in response to item 15.

Table 9

Item 17: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	25.6	51.3	17.9	4.5	.6
Post test	32.0	57.5	6.5	3.9	0
Change	7.4	6.2	(11.4)	(.6)	(.6)

ITEM:
WE NEED MORE EDUCATIONAL TELECOMMUNICATION INVOLVEMENT IN THE PHYSICAL THERAPY PROFESSION, I.E. THE OFFERING OF CONTINUING EDUCATION AND CLASSES ONLINE FOR MODEM USE.

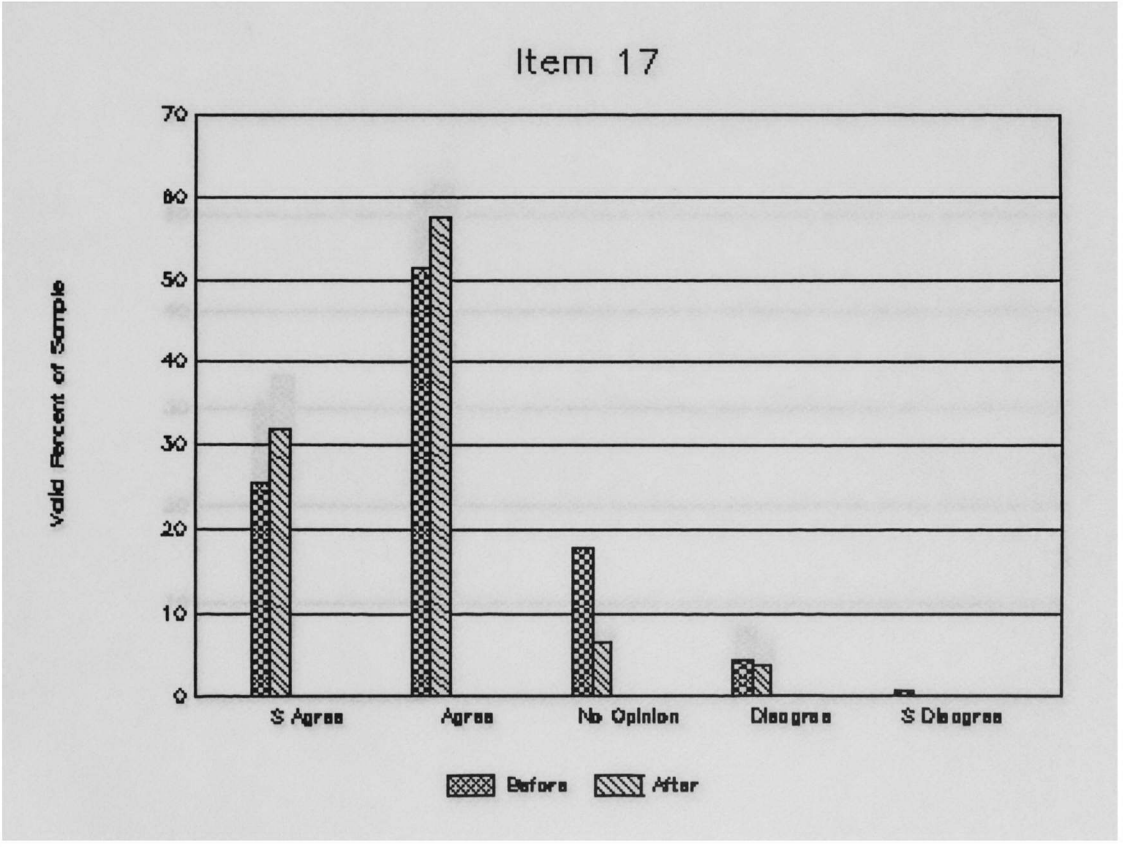

Figure 7. Changes in response to item 17.

Table 10

Item 18: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	30.8	51.9	9.6	7.7	0
Post test	33.3	52.9	7.2	6.5	0
Change	2.5	1.0	(2.4)	(1.2)	(0)

ITEM:
WE NEED A COMPUTER COURSE SPECIFICALLY DESIGNED FOR PHYSICAL THERAPY APPLICATIONS IN OUR CURRICULUM. THIS COURSE SHOULD INCLUDE PRACTICE MANAGEMENT, TELECOMMUNICATIONS, AND COMPUTER BASICS FOR THE INEXPERIENCED.

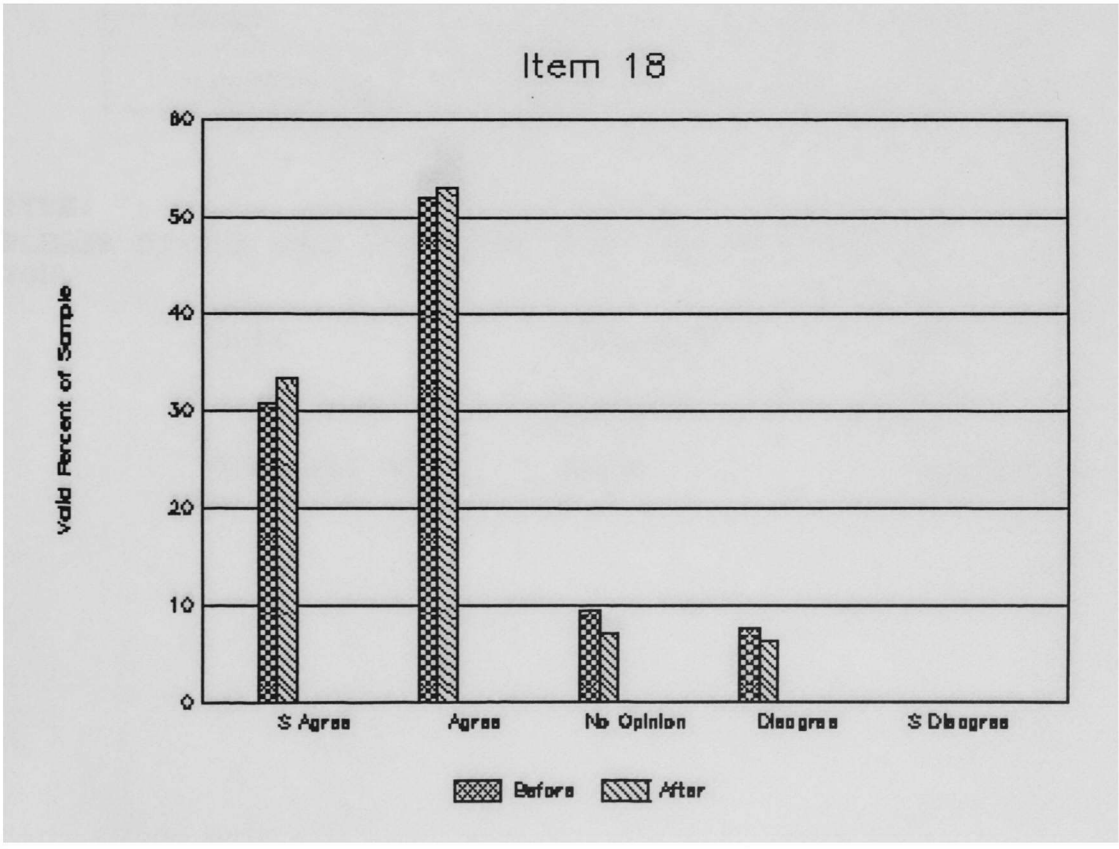

Figure 8. Changes in response to item 18.

Table 11

Item 19: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	31.0	54.2	9.0	5.8	0
Post test	32.1	55.1	7.7	2.6	0
Change	1.1	1.1	(1.3)	3.2)	(0)

ITEM:
I AM INTERESTED IN ATTENDING A PHYSICAL THERAPY TELECOMMUNICATION PROGRAM THAT OFFERS CONTINUING EDUCATION CONTACT HOURS.

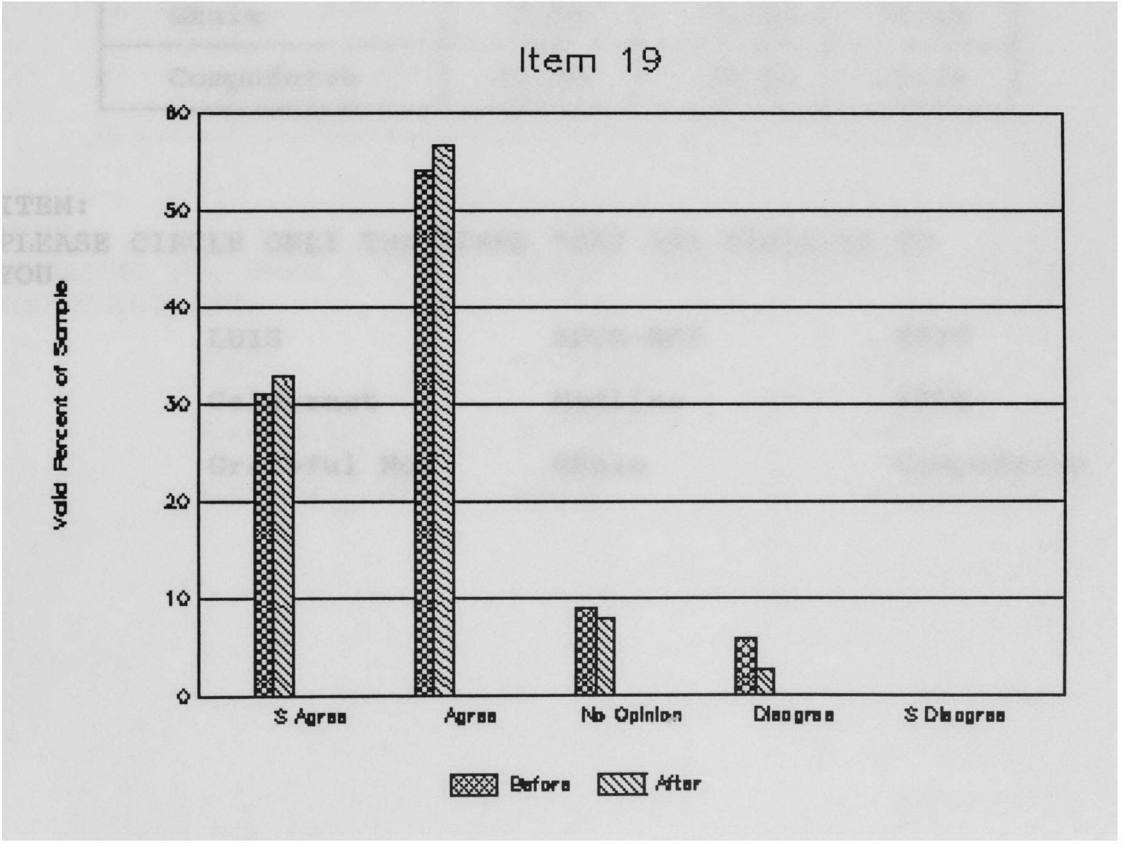

Figure 9. Changes in response to item 19.

Table 12

Item 5: Percentage Change in Responses Pre- to Post-Intervention.

Term	Before	After	Change
LUIS	27.6%	69.3%	41.7%
APTA-NET	17.3%	81.0%	63.7%
ERIC	19.2%	52.9%	33.7%
Caldernet	10.3%	54.9%	44.6%
Medline	85.3%	92.2%	6.9%
PTON	1.3%	63.4%	62.1%
Grateful Med	4.5%	79.1%	74.6%
GEnie	9.0%	21.6%	12.6%
CompuServe	11.5%	26.8%	15.3%

ITEM:
PLEASE CIRCLE ONLY THE TERMS THAT ARE FAMILIAR TO YOU.

LUIS	APTA-NET	ERIC
Caldernet	Medline	PTON
Grateful Med	GEnie	CompuServe

Table 13

Item 8: Percentage Change in Responses Pre- to Post-Intervention.

Term	Before	After	Change
LUIS	10.9%	38.6%	27.7%
APTA-NET	19.2%	66.7%	47.5%
ERIC	5.8%	19.6%	13.8%
Caldernet	6.4%	35.9%	29.5%
Medline	41.0%	70.6%	29.6%
PTON	2.6%	45.8%	43.2%
Grateful Med	4.5%	61.4%	56.9%
GEnie	3.8%	5.2%	1.4%
CompuServe	7.1%	13.1%	6.0%

ITEM:
ASSUMING YOU HAVE A MODEM, PLEASE CIRCLE THE SERVICES THAT YOU WOULD USE.

LUIS	APTA-NET	ERIC
Caldernet	Medline	PTON
Grateful Med	GEnie	CompuServe

Table 14

Item 9: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	6.4	7.7	76.9	6.4	2.6
Post test	.7	12.5	26.3	49.3	11.2
Change	(5.7)	4.8	(50.6)	42.9	8.6

ITEM:
I WOULD NOT FEEL COMFORTABLE USING THE GRATEFUL MED SOFTWARE AT HOME BY COMPUTER.

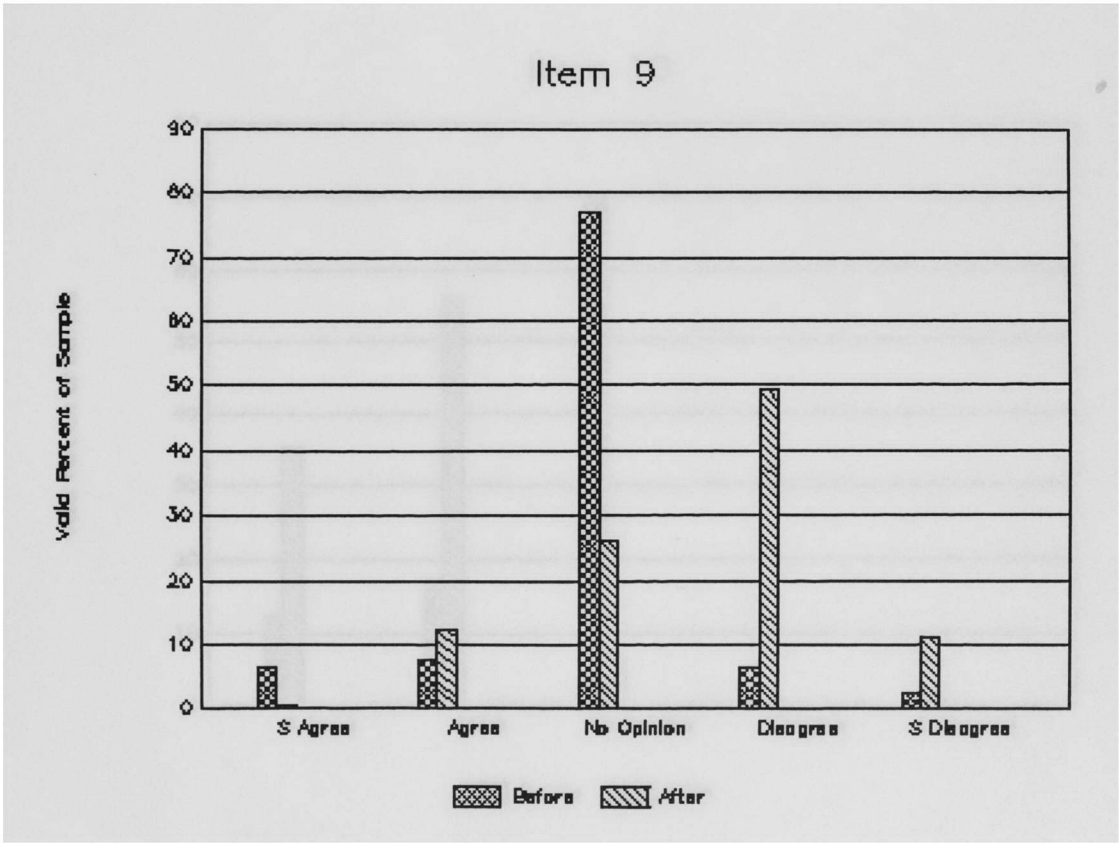

Figure 10. Changes in response to item 9.

Table 15

Item 10: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	12.2	17.3	69.2	.6	.6
Post test	35.3	56.2	7.2	.7	.7
Change	23.1	38.9	(62.0)	.1	.1

ITEM:
I AM PLEASED APTA-NET AND PTON SERVICES ARE AVAILABLE BECAUSE THIS TECHNOLOGY IS A GOOD IDEA FOR OUR PROFESSION.

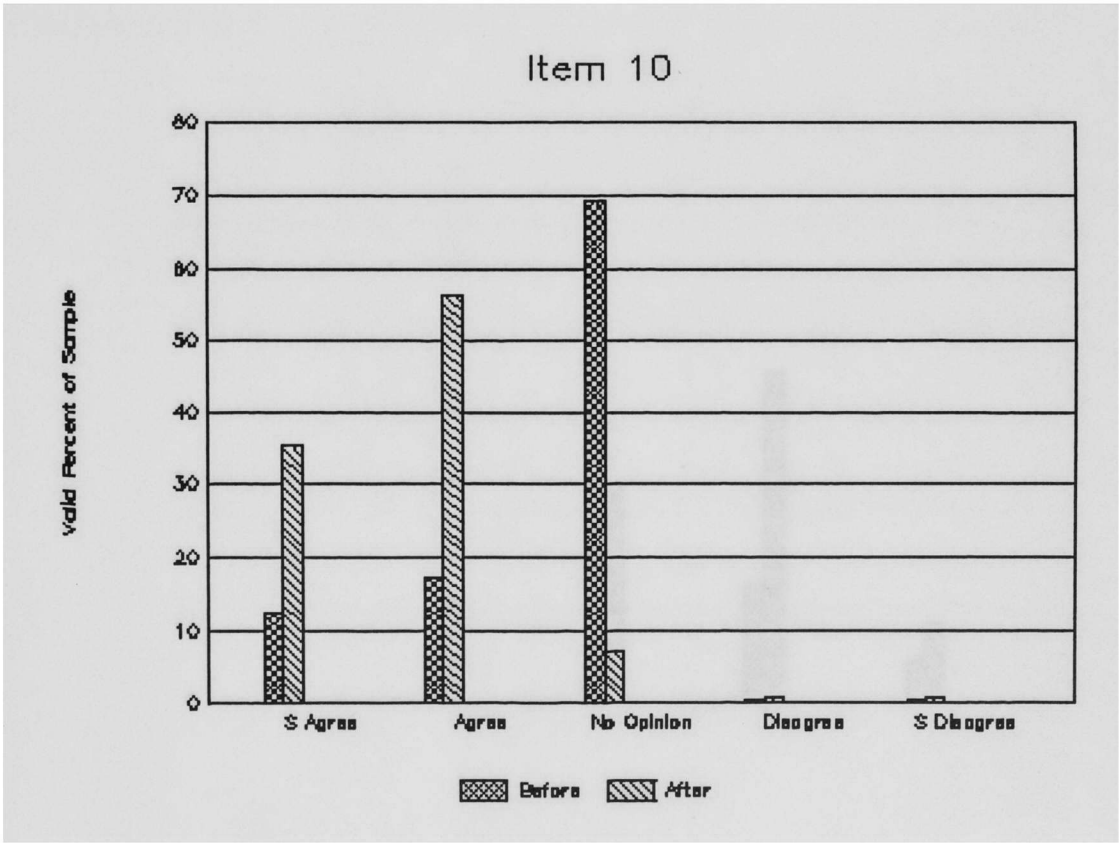

Figure 11. Changes in response to item 10.

Table 16

Item 11: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	2.6	6.5	69.0	16.1	5.8
Post test	.7	13.7	30.1	45.1	10.5
Change	(1.9)	7.2	(38.9)	29.0	4.7

ITEM:
I WOULD NOT FEEL COMFORTABLE USING A MODEM WITH LUIS, ERIC OR CALDERNET LIBRARY SERVICES.

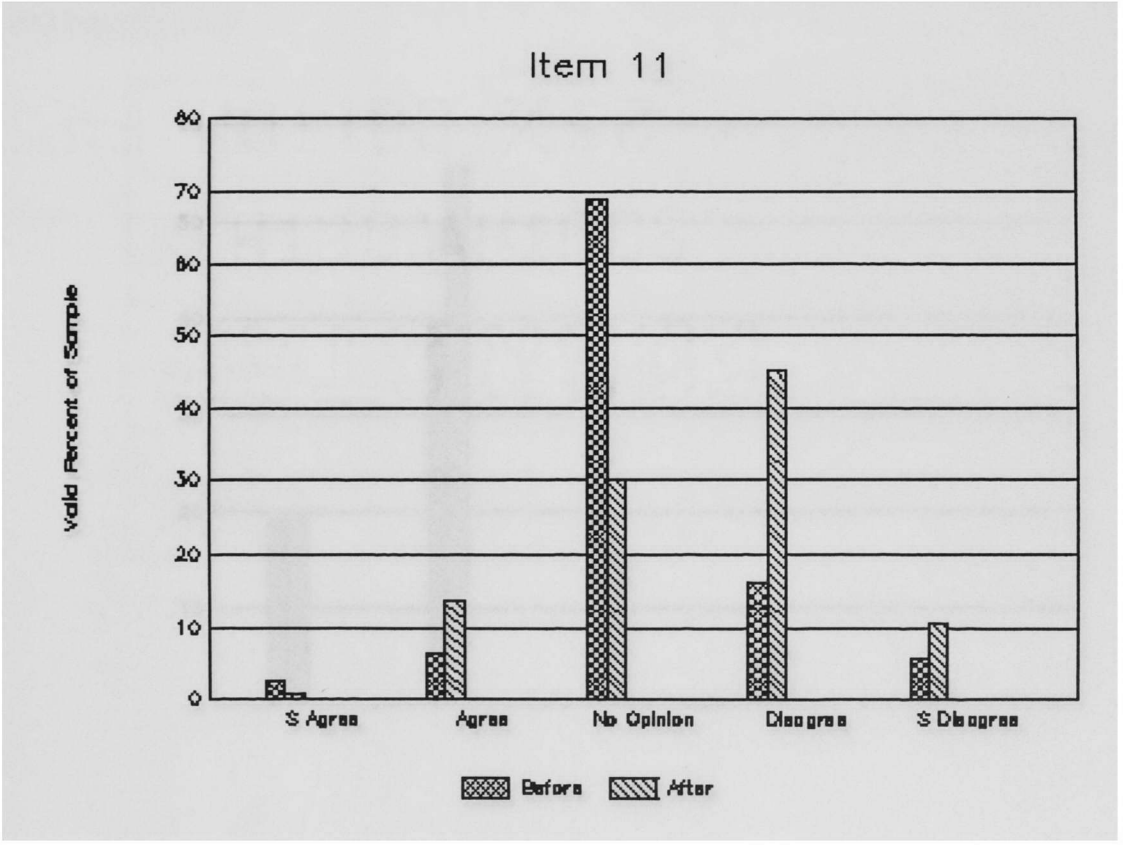

Figure 12. Changes in response to item 11.

Table 17

Item 12: Percentage Change in Responses Pre- to Post-Intervention.

Valid Percent	SA	A	NO	D	SD
Pre test	19.4	40.0	33.5	4.5	2.6
Post test	19.6	55.6	15.7	6.5	2.6
Change	.2	15.6	(17.8)	2.0	.0

ITEM:
I WOULD FEEL COMFORTABLE USING MEDLINE (INDEX MEDICUS) BY MODEM.

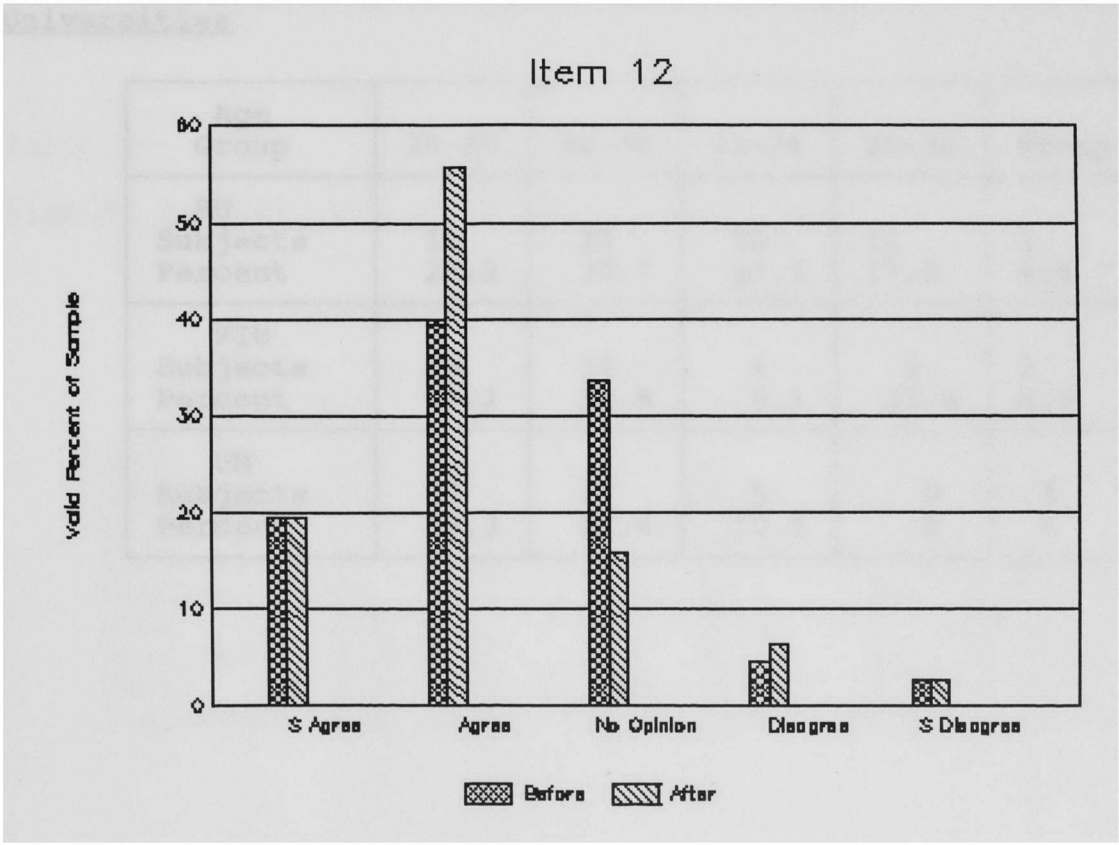

Figure 13. Changes in response to item 12.

Table 18

Subject Distribution per University

School	Subjects	Percent
BU	63	40.4
FIU	44	28.2
UM	49	31.4
TOTAL	156	100.0

Table 19

Subject Distributions in Age Categories Among Universities

Age Group	20-25	26-30	31-34	35-39	40-up
BU					
Subjects	14	25	10	11	3
Percent	22.2	39.7	15.9	17.5	4.8
FIU					
Subjects	19	14	4	5	2
Percent	43.2	31.8	9.1	11.4	4.5
UM					
Subjects	33	11	5	0	0
Percent	67.3	22.4	10.2	0	0

Table 20

Item 5: School Familiarity to Databases

Per Cent Responses per School

	BU		FIU		UM	
	Pre	Post	Pre	Post	Pre	Post
LUIS	17.5	61.3	63.6	88.6	8.2	61.7
APTA-NET	31.7	82.3	4.5	75	10.2	85.1
ERIC	15.9	45.2	36.4	61.4	8.2	55.3
Caldernet	0	38.7	0	40.9	32.7	89.4
Medline	90.5	91.9	72.7	88.6	89.8	95.7
PTON	1.6	59.7	2.3	52.3	0	78.7
Grat Med	7.9	75.8	0	72.7	4.1	89.4
GEnie	7.9	12.9	11.4	20.5	8.2	34
CompuServe	11.1	22.6	9.1	20.5	14.3	38.3

Table 21

Item 8: Possible Use of Databases Per School

Per Cent Responses per School

	BU		FIU		UM	
	Pre	Post	Pre	Post	Pre	Post
LUIS	3.2	33.9	29.5	50	4.1	34
APTA-NET	28.6	66.1	11.4	63.6	14.3	70.2
ERIC	3.2	17.7	11.4	25	4.1	17
Caldernet	0	22.6	2.3	25	18.4	63.8
Medline	46	66.1	31.8	68.2	42.9	78.7
PTON	3.2	50	4.5	38.6	0	46.8
Grat Med	4.8	59.7	4.5	59.1	4.1	66
GEnie	1.6	1.6	6.8	9.1	4.1	6.4
CompuServe	6.3	11.3	11.4	13.6	4.1	14.9

Table 22

Item 8: Computer and Modem Owner Responses to Possible Use of Databases

	Sample		Computers		Modems	
	Before	After	Before	After	Before	After
LUIS	10.9	38.6	17.3	43.8	28.6	40
APTA-NET	19.2	66.7	24	74	52.4	75
ERIC	5.8	19.6	6.7	24.7	14.3	25
Caldernet	6.4	35.9	6.7	43.8	4.8	30
Medline	41	70.6	45.3	74	71.4	75
PTON	2.6	45.8	4	46.6	9.5	55
Grat Med	4.5	61.4	4	67.1	14.3	65
Genie	3.8	5.2	5.3	2.7	19	5
CompuServ	7.1	13.1	10.7	13.7	23.8	25

Table 23

Item 19: Computer and Modem Owners Interested in Telecommunication Continuing Education.

	Sample		Computer Owners		Modem Owners	
	Before	After	Before	After	Before	After
S Agree	31	32.9	36.5	38.4	40	35
Agree	54.2	56.6	45.9	49.3	60	60
No Opinion	9	7.9	10.8	9.6	0	5
Disagree	5.8	2.6	6.8	2.7	0	
S Disagre	0	0	0	0	0	

Table 24

Item 18: Computer and Modem owners Interested in a Physical Therapy Computer Application Course.

	Sample		Computer Owners		Modem Owners	
	Before	After	Before	After	Before	After
S Agree	30.8	33.3	28	35.6	33.3	35
Agree	51.9	52.9	53.3	47.9	57.1	60
No Opinion	9.6	7.2	9.3	11	9.5	5
Disagree	7.7	6.5	9.3	5.5	0	0
S Disagre	0	0	0	0	0	0