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Interactive video (Level 1) as an alternative to lecture : a field test

Michael Lusk
University of Tennessee

To the Graduate Council:

I am submitting herewith a dissertation written by Michael Lusk entitled "Interactive video (Level 1) as an alternative to lecture : a field test." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Instructional Technology and Educational Studies.

Gregory Petty, Major Professor

We have read this dissertation and recommend its acceptance:

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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

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INTERACTIVE VIDEO (LEVEL 1)
AS AN ALTERNATIVE TO LECTURE:
A FIELD TEST

A Dissertation

Presented for the

Doctor of Education

Degree

The University of Tennessee, Knoxville

Michael Lusk

August 1988

DEDICATION

I would like to dedicate this dissertation to especially to my grandmother, Zelma Carrick and my wife, Linda Chandler and to all those family members and significant others who have influenced my life in a positive manner. My grandmother, who provided a extraordinary role model in every way possible. I thank her for her warmth, strength, genuine "Christian" life, and stoic spirit in the presence of overwhelming odds. She provided encouragement that one should strive to meet the challenge of life with courage, grace, and the knowledge that one's God given talents should be maximized. A truly unique individual who most people only meet once in life and I was and am (to date) blessed by knowing her over the long haul. My wife who provided support and encouragement in those dark days and in similar fashion has provided a quiet example of how it is possible to survive the trials of life with quiet solitude and grace. She provided comfort and gently pressed and aided me in my efforts. My parents, who provided encouragement only to "do the best you can" and who pushed a Tom Sawyer type of adolescent toward a tenacious adult. Thanks to you and others who have added to the essence of my being for having known you.

ACKNOWLEDGEMENTS

In the course of my graduate studies and dissertation research, a number of scholars have provided their academic expertise. Specifically I recognized the members of my committee, Professors Gregory Petty, Phyllis Huff, Walter Cameron, and George Wiegers, who served as my chairperson and committee respectively. Their efforts as my mentor resulted in the final product, although any errors that remain are solely my responsibility. Special acknowledgement to Professor Gregory Petty for his candid suggestions in my doctoral program and his repeated assistance in reviewing my dissertation.

In addition I would like to recognize Dr. Maureen Groer without whose help this study would not have been possible. Her breadth of knowledge and the ability to express that knowledge were an inspiration along with her hours of aid in the completion of the project. Dr. Sandra Thomas provided review and advice on the dissertation and shared her research expertise.

ABSTRACT

The development of a cost effective model for employing interactive video and its subsequent field test were the focus of this investigation. The purpose of the field test was to compare the methods in terms of achievement and satisfaction, in addition to determining if prior computer use was correlated with higher levels of satisfaction. A template for the educator or trainer in business was also developed to allow economical intervention with this method of instruction. This inquiry comparing interactive video with traditional lecture indicated that this alternative method of instruction can result in equal levels of achievement and self-expressed satisfaction scores.

The investigation involved twenty-nine graduate nursing students in their first year of the Master of Nursing program. There was no significant difference in achievement between the interactive video group and the lecture group. Satisfaction in both groups was comparable in positive scores. There was no relationship between prior use of computers and satisfaction. These field test results suggest that interactive video may have the capability of producing equivalent achievement scores when compared to

traditional lecture with no decrease in student satisfaction.

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CHAPTER 1

INTRODUCTION

Lecture is perhaps the oldest teaching method for group instruction and until some time after the printing press was invented was one of the few ways one became educated. As the cost of printing dropped, textbooks were employed more and lecture was used to supplement the readings.

Today the formal lecture still involves dependency upon the teacher as a primary source of information. In small classes some interchange occurs, but in larger classes the interaction is minimal. As Gayles (1966) stated " The lecture at its worst consists of transferring the notes of the teacher to the notebooks of the students without passing through the minds of either." The pace of learning is set in a "sink or swim" fashion. In the nursing profession the limitation of the lecture method is of particular consequence because of the large amount of time consumed by the clinical experiences in addition to the normal academic load. Instructor-student interaction after class may allow for some degree of clarification but must involve some degree of assertiveness on the part of the learner.

Business and the military have been experimenting in the use of new training advances for several years. For example paramedic instruction at the US Army Academy of Health Sciences was plagued with a high failure rate when attempting to learn intrusive nursing techniques (Manning,1983). Interactive video was employed in injection training to remediate this problem. Student achievement was not decreased and the instruction time was cut by one-third. Manning stated:

> The initial classroom studies of the impact of instructor-controlled, group-paced videodisc training programs on student performance and student satisfaction (such as described in this article) suggest that videodisc-based programs can be effective for training paramedical and basic nursing skills. Instructors were able to reduce teaching time with no loss in student achievement and with a highly significant degree of student satisfaction. Although it remains to be seen whether students will continue to prefer the videodisc-based programs, at least for certain tasks, the results after initial observations are promising.

Interactive video was successfully used in training for console operation by the US Army (Hull, 1982). The cost of training and time required for mastery of console operation was significantly reduced without the sacrifice of student satisfaction.

A study by Fishman (1983) used a computer-assisted video module to teach chemotherapy to nurses. This system incorporated the use of interactive video. Test results showed a significantly higher level of achievement on the posttest as well as on the retention test (Fishman, 1983).

Interactive video has been used in situations with limited numbers of instructors to supplement instruction and with less effective training methods. Several studies have proven interactive video can be effective as supplemental training or as a stand-alone teaching device.

Statement of the Problem

Few attempts have been made to investigate interactive video in the classroom. There is also a lack of information regarding the development of a cost effective, practical model for interactive video and little data to support its effectiveness as an instructional tool. Furthermore, technological changes in technical subjects such as nursing and a high turnover of students has created a need for alternative methods of instruction. This absence of information is the situational problem which provides the focal point for this investigation.

Importance of the Study

The dilemma created by the lecture method in nursing school could be alleviated by alternatives to lecture created by new technology. One such technological advance utilizes modular lectures paired with the interactive video medium.

If interactive video can produce achievement levels similar to the lecture medium without decreasing the affective domain of satisfaction, as perceived by the student, then the ramifications of use for the method of instruction can be considerably broadened.

Training in business is everchanging and predictions are that career changes in the near future will occur approximately six times in the lifetime of the individual worker. Concomitant with the changing career goals of workers is the rapid change of technology within industry producing a need for retraining for new equipment.

The United States is becoming less competitive in the international arena because of inadequately trained personnel. In terms of education, the levels of other countries' high schools are being compared to our first two years of college. These concerns came at a time when there is a decreasing number of educators teaching the practicing sciences.

Purpose of the Study

This field study focused on the process of developing a low cost method for using interactive video and the subsequent field testing of that method. Specifically the objectives of the study were to provide the professionals in education and business with specific procedures for incorporating an economically feasible interactive video module in classroom training and to field test the application of an interactive video module on a limited population to answer the following research questions:

a. Is there is a significant difference in the level of achievement in knowledge of concepts between nursing students taught by interactive video and those taught by lecture?

b. Is there a significant difference in the self-expressed level of satisfaction between students taught by interactive video and those taught by lecture?

c. Is there is a significantly positive relationship between prior use of computers and satisfaction?

Hypotheses

This field study investigated the following hypotheses:

Ho_1. There is no significant difference in the level of student achievement between the lecture and interactive video module groups.

Ho_2. There is no significant difference in the self-expressed level of student satisfaction between the lecture and interactive video methods of instruction.

Ho_3. There is a significant positive correlation between prior computer use and satisfaction with the learning mode.

Rationale

The results of this study can be used to aid the faculty member and the trainer in providing an effective alternative to the traditional mode of teaching by lecture. Remediation can occur with interactive video and is under the control of the learner. Financial costs as well as time costs can be offset by the utilization of this medium.

The "how to do it" list of procedures can be used in initiating interactive video and limit the problems created by a lack of hardware and software support. The hardware necessary for this method is outlined along with specific instructions for the set up of equipment. A software template eliminates the majority of labor involved for the neophyte programmer.

Assumptions

1. The technology used in interactive video does not detract significantly from the learning process.
2. Conditions that would negatively influence testing are similar in both the lecture and interactive video areas.

Limitations

1. The field test method was utilized because of the limitations of time, equipment, and available population.
2. The population was limited to the number of nursing students in an intact class at the University of Tennessee.
3. Additional outside reading by subjects may have affected the results. The short period of intervention may have lessened that possibility.
4. The type of hardware (videotape versus videodisc) necessitated a linear interactive video model rather than a branched model possible with videodisc.

5. The content of the interactive video module was limited to interaction with knowledge concepts rather than a psychomotor skills due to the limited sophistication of the hardware, and the current needs of the nursing students participating in the study.

Design

The field test population was an intact class of thirty-one students in the College of Nursing. The design is a quasi-experimental posttest only design with random assignment to control (15) and treatment (16) groups.

R__X__O (treatment)

R_____O (control)

Design of Study

Random assignment to the control and experimental group from this intact class was determined by using a table of random numbers.

The interactive module was composed of a linear rather than a branching format (Figure 1 and Figure 2) of

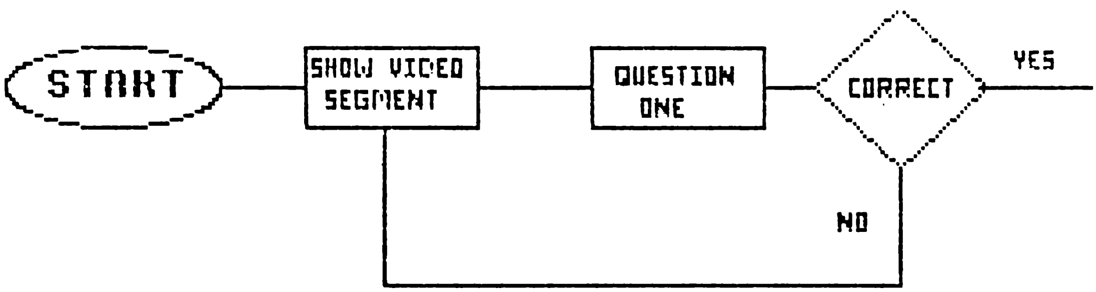

Figure 1

Linear Interactive Video

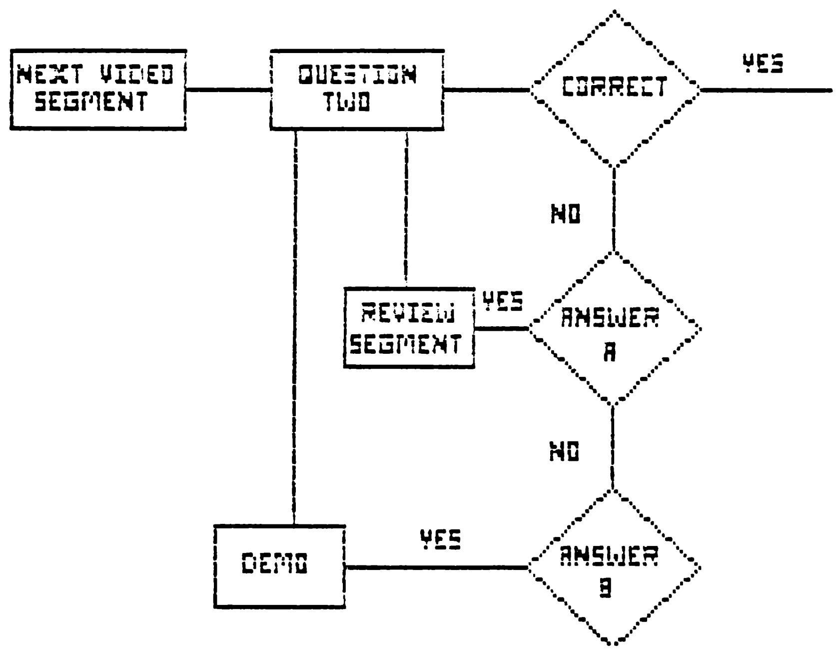

Figure 2

Branching Interactive Video

interactive videotape due to the constraint of not having random access to various parts of the media as one would have with the constant angular velocity format of videodisc technology.

Definition of Terms

Alzheimer's disease - An unremittingly progressive form of mental deterioration.

Computer-assisted instruction - Any instructional method which primarily uses the computer to augment or manage the learning process.

Interactive video instruction- An instructional strategy in which a computer controls one or more videoplayers (either disk or tape) in a manner that the responses of the trainee determine the sequence of the module.

Interface - A device to connect two mechanical devices that differ in terms of speed or type of transmission. Computers and printers would be an example of dissimiliar machines.

Hardware - Any electronic or mechanical part of the computer system.

Level Zero Interactivity (hardware) - Uninterrupted play of a videodisc player (Nugent, 1988).

Level One Interactivity (hardware) - A videodisc player with the basic functions of stop, start, pause, and search, but lacking programmable on-board memory. The keypad provides the control in addition to functions controlled by code inserted during the mastering process (Nugent, 1988).

Level Two Interactivity (hardware) - A videodisc player with on-board programmable memory. The functions are controlled by a code on the auxillary audio channel and are input by the keypad or other similar devices (Nugent, 1988).

Level Three Interactivity (hardware) - A videodisc player attached to and under the control of an external computer (Nugent, 1988).

Level Four Interactivity (hardware) - A videodisc player and computer system which store both digital and analog video and sound data. A digital to analog encoder must be present in addition to having a large storage device (Nugent, 1988).

Software - The part of the computer system that is only present in terms of electronic code.

Level I interactive (software) - The first level is response interactivity. Responsive interactivity requires the participant to perform by recall, selection, or some other response to material the participant has been exposed. Multiple choice testing is one of the forms of evaluation employed for response interactivity (Floyd and Floyd).

Level II interactive (software) - The second level is exploratory and does not restrict the user to specific segments of material. Reversing motion or surrogate travel are examples of Level II interactivity (Floyd and Floyd, 1982).

Level III interactive (software) - The third level utilizes creativity to allow responses the program designer had not yet thought of, in addition to evaluating and responding to the user if the sequence was unique and useable (Floyd and Floyd, 1982).

Interactive videodisc - A digitally encoded disc capable of random access.

Interactive videotape - An analogy encoded tape with capability only for linear access.

CAV videodisc player - Constant angular velocity videodisc players capable of random access to any portion of the disc.

CLV videodisc player - Constant linear velocity videodisc players restricted to traveling along the disc in a linear path and not having random access.

CHAPTER 2

REVIEW OF LITERATURE

The purpose of the review of literature is to present an overview of the past and current investigations in the area of computer assisted instruction in education, government, industry, medicine, and business and relevant attitudes toward computers in those fields. Computer searches as well as manual literature searches were conducted.

Although interactive video was developed in 1979, little appeared in the literature until recently. The majority of literature is still in the form of journals rather than books. A computer search at the Library of Congress revealed only three books that were available, while several were being ordered. Journal articles concerning interactive videotape are extremely rare and journal articles in general were sparse in the early 1980's. With the decreased cost of videodisc and advances in other related disc technology, the literature is becoming larger.

Historical Development

Historically all instruction and training was interactive and person to person or teacher to student. But as mass education became more prevalent individual attention became more difficult. Group training with all the drawbacks became the norm. Students had different learning styles and only the majority could be accommodated.

Sidney Pressey, a professor at Ohio State University, was among the first to develop a teaching machine in the 1920's. The machine was similar to a typewriter and would present questions which could be answered by pressing a key. The student could not progress until the answer was correct. The machine met with limited success and was not fully implemented (Lumsdaine & Glaser, 1960).

In the 1930's and 50's B.F. Skinner developed programmed instruction as a result of his experimentation in learning (Skinner, 1958). Learning was broken into small increments and appropriate rewards were given upon the acquisition of that knowledge. The teaching machines he developed presented precise selections of information followed by fill-in-the-blank questions. Popularity of these machines lasted a few years, followed by development of linear programmed workbooks (Lumsdaine and Glaser,1960).

Dr. Norman Crowder later combined both of his predecessor's innovations to produce branched programming tests. Each multiple choice response led the individual on a unique route. In essence this was type of learning would lead to computer assisted instruction (Crowder, 1959).

IBM researchers developed the first computer assisted instruction system in the 1950's to teach binary math to elementary students. Later the University of Illinois developed Programmed Logic for Automatic Teaching Operations (PLATO) which was a CAI program that could be accessed from a remote location to the central computer (Montanelli, 1979).

Mitre Corp. and Brigham Young University created Time-shared Interactive Controlled Informational Television (TICCIT). This system also was a time-share system which utilized a computer and video technology in additions to allowing simultaneous use by several users.

In 1977 McGraw-Hill funded an interactive biology video disc which was developed by WICAT, Inc. (World Institute for Computer Assisted Teaching). This represented the first use of interactive video disc. Recently MIT, the University of Nebraska, Utah State, and Brigham Young University have continued the development of interactive video technology (Floyd & Floyd, 1982).

The advantages of computer assisted instruction are many. The student can learn at his/her own pace rather than learning en masse and receiving instructions aimed at the majority. The instruction pace and pattern is dependent upon the responses of the student and is unique to that student. In reality lecture does not provide a large degree of interaction because often the student listens passively to the instructor and/or other students.

Experiments that are too dangerous or expensive can be replicated and closely approximate the real conditions of experimentation. Medical students can give patient care and administer drugs to patients and become aware of mistakes that could jeopardize a patient's life. Music, sound effects, graphics, and animation add lively components to the expression of concepts. Elaborate statistical procedures can be conducted during the lessons that are far beyond the ability of other modes of presentations.

Interactive video combines computer assisted instruction and linear video. The result is a technology that has no visual limit and has the additional advantage of microprocessor speed for computations and interactivity. The student views a segment of video and is presented a question. Depending upon the question and the level of interactive video the video may be presented again, branched to a remedial segment, or advanced to the next concept.

At the highest level other peripheral devices measure motor responses to assess the level of achievement in a activity such as cardiopulmonary resuscitation or other activities requiring precise, sequential actions. Although initially used also exclusively for training now interactive video is used in research, marketing, testing, consumer information, and data retrieval applications (Gayeski and Williams, 1985).

Industrial Use

Interactive video has been used in industry broadly and to a large extent in the automotive industry. In 1979 General Motor purchased 8,000 video disc players for point-of-purchase demonstrations which show customers models and features depending upon the needs provided by the customer. In addition discs were used to train sales personnel, new product information, and automobile repair and service (Kearsley, 1981).

The Ford Motor company is also using video discs in similar ventures (Zollman, 1982). In 1985 Ford utilized 4,000 video disc players for interactive video for sales and service, motivational programs, and customer presentations. In a survey of the dealers seventy percent stated the quality of customer presentations was improved and ninety percent stated that sales training was higher quality when interactive video discs were used (Broderick, 1982). Companies are using this technology for sales presentations, marketing, and consumer information.

Sears experimented with the Summer catalogue on video disc. The customers had no significant problem locating information about items and plans for the future are use of video disc rather than catalogues due to the bulk and cost of the paper counterpart . Mothercare, a maternity and children's clothing chain in Britain, is using this technology to demonstrate products and research completed has shown lower cost and time savings (E-ITV, 1982).

In-house training comprises the largest use of interactive video. Banking is among the businesses using this medium for training. The Bank of America is training new tellers with their video disc "Debits, Credits, Balancing, and Stamps" (Kearsley, 1981). The Columbia Savings and Loan of Colorado has developed a video disc with has training for personnel on one side and customer information on services. Marine Midland Bank produced an interactive video training program to aid personnel in determining how personal appearance and behavior could aid them in job advancement (Theis, 1981).

Philip Morris uses video disc to teach repair of cigarette packing equipment. Included on the disc are parts of repair manuals which can be isolated in still frames for repair aid. Reliance Electric is using interactive video to train sales engineers in order to decrease the traditional six month training period (Kearsley, 1981).

Government Uses

National museums, and government agencies are also this technology. They include the Smithsonian Institution, the U.S. Post Office, the Gerald Ford Museum, and the Mexican Government Tourist Bureau (Zollman, 1982).

The U.S. Army is using video disc extensively in training personnel. A system called SIDE (Soldier Information Delivery Equipment) is designed to train soldiers to repair tanks in the field. A small monitor attached to a remote videodisc system accesses the information needed to repair the equipment in the field.

The U.S. Signal Corp uses interactive video to simulate satellite station controls and reduces the need for expensive equipment. At Fort Benning leadership training is taught by video disc. The disc can either present the consequences of the choice or a response as to the effectiveness of that response. The JOINS project allows potential recruits information concerning occupations, training, and responsibilities of that occupation (Gayeski and Williams, 1985).

Group presentation and training is also possible. Mead Johnson's Pharmaceutical Division uses interactive video to introduce new drugs to the sales team. A multi-user system allows questioning of large numbers of representatives to be displayed on screens as well as tracking individual scores (E-ITV, 1982).

Educational Use

The Nebraska Videodesign/Production Group (of the Nebraska ETV Network at the University of Nebraska, Lincoln) was created in 1978 as a service agency for videodisc production. It sponsors videodisc symposia and workshops for disc mastering and production in addition to producing hundreds of videodiscs for industrial clients (Nugent and Christie, 1982). The Group produced an interactive videodisc called "The Puzzle of the Tacoma Narrows Bridge collapse", which teaches physics principles at the college level. The Nebraska College of Dentistry collaborated with the Group to create an interactive videodisc about dental case studies (Nebraska Videodisc Design/Production News, 1980) and a program for law students (Levine, 1983).

The National Science Foundation has sponsored several interactive videodisc projects around the nation. WICAT, Inc. produced an introductory college-level biology disc. Utah State University and the University of Utah developed a module on quantum mechanics, electronics, and gravitational experiments(Kearsley, 1981). Kansas State University Department of Physics prepared a lab with eight stations using videodisc to serve as a site for experimental simulations (Zollman, 1982). At Ithaca College a student produced an interactive videotape for teaching the creation of behavioral objectives. The project utilized low-end video equipment and a half-inch videocassette player (Gayeski and Williams, 1985). ABC and the National Education Association are jointly developing a series of discs (Schooldisc) to teach language skills, social studies, and the arts. The Nebraska Videodisc Group produced a disc for the hearing impaired, while the Utah

State University Exceptional Child Center used a touch screen and a videodisc program to teach the developmentally disabled (Kearsley, 1981).

The medical profession has also adopted interactive video for training purposes. The Robert Packer Hospital in Sayre, Pennsylvania has created a patient information interactive videotape for those with chronic lung disease. The program teaches self-treatment procedures and practices. A follow-up of the program demonstrated that the patients learned complex medical information about physiology and treatment at a 90% mastery level and favored this type of instruction (Gayeski and Williams, 1985).

Affective Domain

Rosenburg noted that, "Many nurses are disturbed about the effect automation will have on the nurse-patient relationship. Their comments reflect a general concern that a necessary result of automation is its dehumanizing effect, implying that its effect on patients is to make them cease being people and become numbers." (Rosenburg & Stroebel, 1967). Automation does not necessarily result in a negative nurse-patient relationship. For example, automated nursing notes may in fact increase the closeness of the nurse-patient relationship.

In the Rosenburg experiment, nursing notes consisted of 215 statements which were divided into 18 categories. These statements described most of the behaviors of the psychiatric patients described in the article. Senior nursing personnel and research personnel applauded the automated nursing notes while other staff (especially the student nurses) resisted the changes. In an attempt to remedy the situation nursing students were involved in an experiment. A questionnaire to assess attitudes toward computers was administered to the student nurses. The students were assigned to computer and noncomputer groups. The computer group used automated nursing notes in the nursing unit, while the noncomputer group used the traditional narrative nursing notes. The questionnaire statements were rated on a scale from one to six. The higher scores indicated a more positive attitude. The range was from 35 to 210. There were no significant differences in the groups initially.

Following the unit experience the attitude questionnaire was administered again. The difference in attitude between the two groups was significant at the .001 level. Exposure to the benefits of the automated nursing notes appears to have removed the negative attitudes. The pluses of the automated notes included: (1) a standardized and objective method of recording the psychiatric patients' behavior, (2) increased perusal of nurses' notes by doctors , and (3) a perception by nursing students that they were part of the psychiatric team.

Thies (1975) attempted to identify individuals with negative predispositions toward computer-based systems. Hopefully potential problem areas could be identified and special training could be provided. Five hospitals ranging from a 727-bed urban hospital to a 40-bed rural hospital were involved in the experiment. An attitudinal scaling instrument was developed and administered before the system was installed, six weeks after the system was installed, and six months later.

The following were found to be significant at the 5 percent level:

1. The small rural hospital personnel were significantly more negative than the large urban hospital.
2. Technicians exhibited the most positive attitudes followed by administrators, physicians, secretarial/clerical, and nurses.
3. Attitudes of the females were significantly more negative than males.
4. Personnel who had prior experience were

slightly more positive than those with no previous experience.

5. More positive attitudes were associated with greater years of education, employment at a given hospital, and employment in healthcare.

6. Training by hospital personnel was generally better received than by the systems vendor.

More recent studies again show the reluctance of nurses to embrace the use of computers on the job (Stronge, 1985). Brodt and Stronge (1986) categorized the hospital staff and found nurses with the most negative attitudes toward computerization.

In summary, the review of literature consistently shows that interactive video training has resulted in time-saving in training, flexibility for the trainee, and higher levels of skill acquisition (Manning, 1983). The advantages are many, but a disadvantage which may be evident for the nursing profession is the negative predisposition toward computer-based systems identified in previous research (Rosenburg, 1967), (Thies, 1975), (Stronge, 1985), (Brodt and Stronge, 1986).

CHAPTER 3

PROCEDURES

The procedures followed in this study include the development of methods for utilizing interactive videotape hardware and software, the hardware configuration, the installation of hardware, and the software installation. These descriptions provide the template for initial use in business or education in terms of training and/or education. Additionally, this chapter will describe the field testing of the aforementioned low budget interactive video module.

Developmental Phase

The following illustrates how the hardware and software were assembled and made operational. Step by step instructions are included in the genesis of the project. Illustrations provide a visual aid for cabling and component identification.

Module Development

The subject of the module is Alzheimer's disease.

This module was chosen because of recent technological developments in Alzheimer's research and the need for innovative curriculum methods to present this new information to students.

Videotaping involved a three-tube Panasonic NTSC Color WV-V3 series video camera which produces near broadcast quality signals. The recording unit was a U-matic Sony VO-2850 videocassette recorder capable of producing videosignals of NTSC color standards. The video cable connecting the videocassette recorder and camera was a standard shielded coaxial type with a BNC connector at the video output on the camera side and a PL259 connector at the video input on the videocassette recorder. A Sony condenser microphone was attached to audio input of the videocassette recorder. Professional grade UCA 60 Scotch videotape was used for the production.

A faculty physiologist from the College of Nursing reviewed the most current research and developed a lecture on Alzheimer's disease. With no students present, the lecture was videotaped in the same facilities to be used for the experiment. The length of the lecture was 55 minutes. The lecture involved a general description of the characteristics of Alzheimer's, the genetic implications of the disease, hormonal involvement, broad physiological involvement, and possible causes of Alzheimer's disease.

Validity of the instrument dealing with the achievement test (Appendix A) and the satisfaction survey (Appendix B) was established by the expertise of the faculty member. She has authored several physiology textbooks and is widely known in the field of physiology. Reliability of these instruments was established by the Cronbach Alpha Coefficient Split Halves test. The reliability of the satisfaction survey was .96 and the teacher-made achievement test was .43. Both were determined by the Cronbach Alpha Coefficient.

Both control and experimental groups completed the demographic survey (Appendix C) at the same time in the lecture area. The control group listened to the lecture which was approximately one hour in length. This group subsequently took the satisfaction and achievement posttest. Students assigned to the experimental group scheduled times to use the interactive video module on Alzeheimer's disease in the learning center. The experimental group took the satisfaction and achievement posttest upon completion of the module in the learning laboratory.

Students from the experimental group arrived at the scheduled time in the learning center and obtained the interactive videotape and software. The student placed the videotape in the videotape player and the diskette in the top drive of the IBM-XT computer. The program loaded automatically from a batch file in the autoexec program which controls the computer program and interface initialization. The first video segment began as the student watched. Following the first segment of video on the RGB monitor, question one was presented on the IBM monitor. Four multiple-choice answers were listed beneath the question and the student was prompted to select an answer, press the key for that choice, and press the return key. If the answer matched the correct answer in the program, "CORRECT" is printed across the screen and the videotape continues into the next segment. If the answer selected did not match the correct answer in the program, the videoplayer returned to the original point of that video segment and was played again. This process continued until the participant selected the correct answer. The time and the number of attempts was recorded on the printer for each question answered. The student then proceeded to the end of the tape in the same manner for each question. Upon completion of the module the student returned the videotape and diskette and completed the achievement test and satisfaction survey.

Pilot Study

To investigate the possible occurrence of logistical (hardware and software) problems, a pilot study of four students was conducted. A number of changes in planned research procedures were implemented as a result of this pilot study.

Headphones were not initially used for private listening to the audio portion of the video production and consequently the learning station became a center of curiousity and distraction. The use of headphones greatly reduced the distraction to the participant and fellow students.

Some students wished to stop or review part of the tape even though the program was not designed for such adjustments. This procedure was added to the model and instruction was included so the student could stop the tape manually.

Some students required more time to ponder their answer than was first planned before answering certain questions asked on the screen. This need was met by programming an increased time on those questions.

The lecture and control groups of the pilot study were required to complete satisfaction and demographic surveys during a short period of time. Since this limited time rushed some students to complete the instuments, more time during class for testing was made available.

The pilot study also revealed the time needed to complete the module is a product of the length of all pauses and the number of repeats. These factors vary from student to student. As a result more time than necessary for actual completion should be scheduled and students should not be scheduled "back-to-back". Students completing the pilot study were positive about the experience and commented that the new method of instruction had promise for aiding the learner.

Interactive Video Hardware

Levels of interactivity are measured in both the hardware and software domains. Software levels are generally from Level I to Level III depending upon the sophistication of branching. Hardware levels are generally from Level 0 to Level IV depending upon the independence from arbitary control by the participant. The level of interactivity is essential a moot question in terms of the videotape player. Although there is some difference in access time among the different players, the videotape player is not capable of access time beyond the level I. Half-inch players are significantly faster than the three-quarter inch (U-matic) players, albeit much slower than the CAV (constant angular velocity) videodisc players. Conversely CLV (constant linear velocity) players are much slower than the CAV videodisc players and may take as much as five to eight seconds to locate an individual frame.

Advantages and disadvantages are inherent in either the interactive videotape or video disc units. The advantages of videotape according to Floyd and Floyd (1982) are:

1. greater flexibility in terms of changes
2. more economical for small numbers of copies
3. more quickly produced
4. less initial investment costs

Disadvantages are:

1. slow access time
2. generally unpredictable still frames
3. videotape deteriorates with every play
4. branching is limited

Videodisc technology has advantages in the following areas:

1. CAV has fast access time
2. branching may be complex

3. essentially no deterioration with use

4. still frames are accurate and not jittery

Disadvantages are:

1. high cost for initial investment

2. high cost for mastering

3. no universal standards between players

4. better used for classic programs

To play the frame that is addressed by the subject or the microprocessor the video disc player must follow a procedure. The tracking and focus is maintained by the objective lens assembly, including a radial tracing and a tangential mirror, which are mounted on a "sled" that is driven radially by a small motor (Miller, 1986). This allows rapid access to the select track. To accomplish exact placement the beam must be centered on the track. This is accomplished by two tracking beams reflecting back to photodiodes and being equally off-center. If the photodiodes receive equal signals, the main beam is centered and reading of the disc can begin.

Reading of the videodisc is determined by the type of recording used. Constant Angular Velocity (CAV) and Constant Linear Velocity (CLV) constitute those two types. CAV disc players spin at 1800 rpm, 1/30th of second (NTSC), or one frame per revolution. The exception is the European television standard which spins at 1500 rpm or 1/25th of second (PAL). Although CAV recording only uses approximately one-half of the available space on the disc, it allows for the attributes necessary for interactive video movement. The CLV recording process uses frames of equal length and thus is more thrifty to the increased capacity of 1 hour on one side. The CLV discs rate of revolution varies upon the radial location of the frame. The outer frames are located in areas that spin at about half the rate of inner tracts. The CLV recordings do not favorably conform to the requirements for interactive video due to the slow access time for frame location. Currently the CAV players are the only players which fully support interactive features.

Videotape players are by design linear and necessitated the device traveling over varying lengths of tape to the appropriate frame. As a word of explanation, in interactive video applications the specific frame must be located by SMPTE Time Code (Society of Motion Picture and Television Engineers), a controller that counts control track pulses, or address code (Utz, 1980).

SMPTE Time code is typically imprinted on the tape in a professional video production facility but some interactive video interface companies offer the capability to read SMPTE time code as part of the interface.

There are only a few of interactive video interface manufacturers in the country. Some manufacturers produce only videdisc interfaces while others produce both videodisc and videotape. Varieties of computers may include Apple, IBM, compatibles, and dedicated interactive video units (Sony View System, JVC Video High Density player and MSX computer, and others)(Miller, 1986). BCD is almost exclusively the IBM videotape interface manufacturer.

Videotape recorders and players must obviously be capable of remote operation, thus eliminating most home models. BCD compatibles include:

SONY - Type V Series (VP-5000), BVU Series, SLO-323, SLP-303, SLO-383, SLP-305, SLO-325, VO-2011, VO-2611, VO-2811, VO-2850, VO-2860.

PANSONIC - NV-9240, NV-9600, NV-8200, NV-8170, NV-8500, AG-6100, AG-6200, AG-6300.

JVC - CR-6400U w/special modification

Caution must be exercised in using the above equipment for interactive video application because some of those listed will not operate properly in the fast forward mode. This is because the tape may in some cases leave the head and cause the count to revert to zero thus allowing the videorecorder to mistake this malfunction as the beginning of the videotape. Programmers must check with the company or previous users of the type videorecorder you plan to purchase.

BCD company manufactures an interface to control either the videodisc and/or videotape recorders/players. This allows for both the use of either videodisc or videotape independently or the simultaneous of videodisc and videotape devices. A use of both types of devices might occur when volatile knowledge is used in conjunction with knowledge not quite so volatile. The complexity of the application will of course dictate the use of single or multiple apparat.

Interactive Software

Software control of the system may be in the form of either device drivers or authoring systems. The former is a skeleton of software port commands to direct the device in the plethora of device operations possible. The latter covers a wide array of authoring packages that range from simple to complex and relatively inexpensive to expensive. An authoring language provides a template for application programs.

The user does not have to know a programming language, but must respond to a menu or prompt system to allow the user to select the commands needed for the program. The advantage lies in not having to employ a programmer or learn the language; hence, a saving in cost and/or time. The disadvantage is the cost which may be many times more expensive than the language package and the restriction in program flexibility. When the programming language is used much more latitude in format is possible. Basic, Pascal, and Pilot are traditionally the most used languages and all have elements of user friendliness.

Hardware Configuration

The hardware configuration is based on the use of the BCD interfaces, but others may be used as they are developed. The setup should provide a method for initiating basic videotape hardware.

BCD System Setup. The VIPc is a single-board, microprocessor based videotape and disc controller which is in turn regulated by the computer. The video/audio external switch box permits video from either tape/disc or computer. A special device provides TTL trigger signals for RGB/Composite monitors. The VIPc's PROM memory contains all the vtr and disc control functions including stop, play, fast forward, rewind, pause, and find. In addition, the interface writes and reads BCD's Absolute Addressing frame number code which provides an unique I.D. number for each frame. SMPTE time code reading and animation are available as options. The VIPc-tape consists of the motherboard, video tape board, breakout box, and vtr control cable (Figure 3).

The VIPc's motherboard contains a 6502 processor and 24K of programmable read only memory (PROM). The interpreter changes the program's commands into analog signals that the video tape device can translate. There are two expansion slots for videotape and videodisc players.

The video control boards are smaller boards that are inserted into the motherboard to control videotape or videodisc players. The first expansion slot is designated for videotape or a second disc player, while the second expansion slot is for the first disc player. Care should be taken when inserting the male pins into the connector.

The breakout box (Figure 4) is used to allow the large number of cables to be connected to the computer and provide a bridge to the monitor and videotape device.

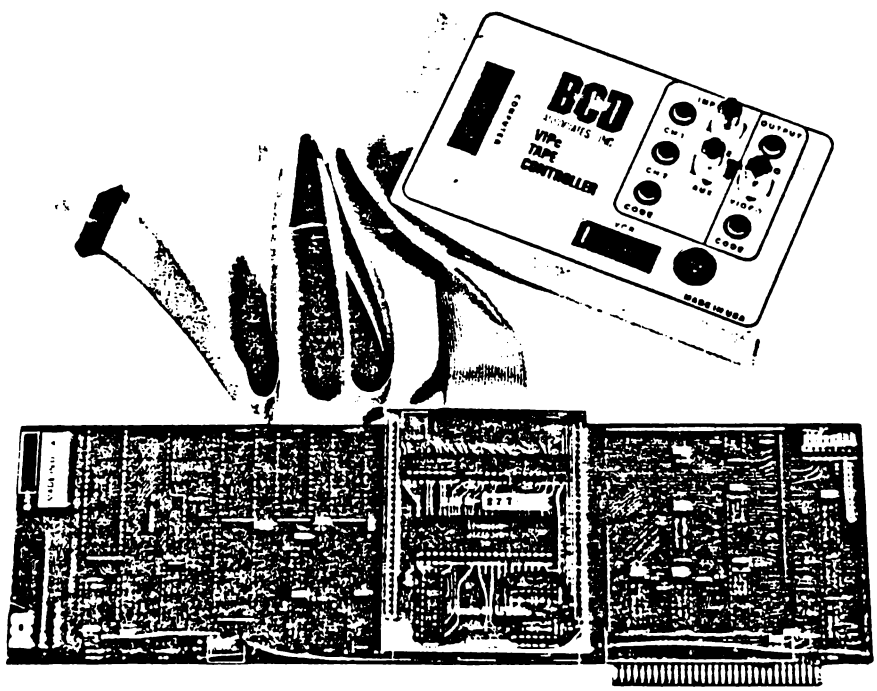

Figure 3

VIPc Tape Assembly

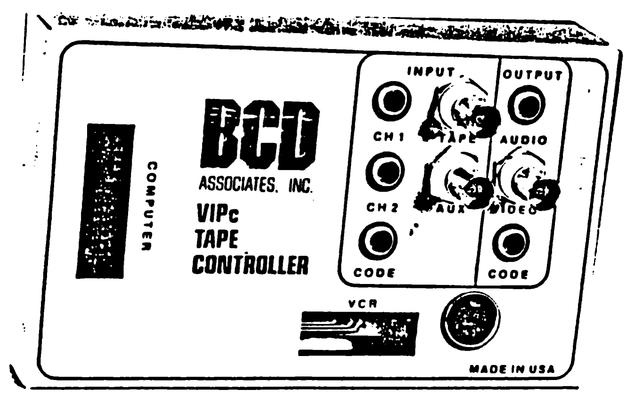

Figure 4

VIPc Tape Controller

Breakout Box

Installation of the hardware with specific reference to the motherboard assembly, cabling, and dip switch settings are found in Appendix D.

Software Installation

There are three programs in the software provided which may be used for several essential operations. Echo1.bas is the program for testing maneuvers in controling the videotape device. Bluelogger is the program used to determine in and out edit points for the interactive video. VIPC1.bas is the interactive video nucleus program which contains the BASIC, PC PILOT, C, or other language code plus the specific driver for that language. Specific instructions concerning software installation are found in Appendix E.

Data Analysis

Mean scores on achievement of the interactive and lecture groups were examined by a commercially produced t-test. Satisfaction of the two groups was also examined by using the t-test. The relationship between satisfaction and the demographic factor of prior computer use were assessed by the Pearson Rho Correlational analysis. The alpha level of .05 was selected.

CHAPTER 4

RESULTS

The purpose of this study was to develop a low cost procedure for trainers or educators to initiate interactive videotape instruction and to field test an Alzheimer's interactive videotape module by comparing achievement, satisfaction, and prior computer use. The research questions addressed by this study were:

a. Is there is a significant difference in the level of achievement in knowledge of concepts between nursing students taught by interactive video and those taught by lecture?

b. Is there a significant difference in the self-expressed level of satisfaction between students taught by interactive video and those taught by lecture?

c. Is there is a significantly positive relationship between prior use of computers and satisfaction?

Data were obtained in this study from the achievement test and satisfaction survey administered after the control method of lecture or after participation in the treatment group (16) of an interactive videotape module. It should be noted that two students in the lecture group (15) dropped the class prior to participation in the lecture. The lecture and the interactive module were both approximately 55 minutes. The lecture group (control) was given a traditional lecture that allowed questions and notetaking as a group at one time. Subjects selected for the interactive videotape group participated during a 27 day period of time because of their scheduling difficulties and the limitation of one interactive videotape device.

Hypotheses Results

Ho_1: There is no significant difference in the level of student achievement between the lecture control group and interactive video treatment groups. This hypothesis was accepted. Table 1 presents the raw scores of the achievement test (posttest) for each subject. The control (lecture) group and the treatment (interactive) group are indicated for each subject. The scores ranged from 10 to 16. The possible score range was 0 to 16.

The two groups were tested for significant difference between means by the t-test procedure. The results as reported in Table 2 indicate the mean score of the control group was 13.46, while the mean score of the experimental

Table 1

Posttest Scores and Group Membership *

Subject	Posttest Scores	Group
1	16	treatment
2	14	treatment
3	15	treatment
4	14	treatment
5	16	treatment
6	14	treatment
7	15	treatment
8	12	treatment
9	13	treatment
10	15	treatment
11	15	treatment
12	16	treatment
13	12	treatment
14	11	treatment
15	15	treatment
16	15	treatment
17	15	control
18	15	control
19	14	control

Table 1 (Continued)

Subject	Posttest Scores	Group
20	12	control
21	15	control
22	10	control
23	13	control
24	14	control
25	14	control
26	12	control
27	.	control
28	15	control
29	11	control
30	15	control
31	.	control

* range of scores is 10 to 16

Table 2

T-test Procedure for Posttest Mean Achievement Scores

Group	*n*	*Mean*	*SD*	*Min*	*Max*	*t*
Lecture	13	13.46	1.71	10	15	-1.31
Interactive	16	14.25	1.53	11	16	

(*N* = 29 with 27 degrees of freedom) (t.05=2.05) group was 14.25. The standard deviation of the control group was 1.71, and the standard deviation of the experimental group was 1.53. The t value was -1.31 with 27 degrees of freedom. The difference in means was not significant at the .05 level.

Personal scheduling problems because clinical assignments at hospitals across East Tennessee and the single interactive video unit necessitated the time of participation for the interactive group to vary widely. The length of time varied from 1 to 27 days for the experimental group. The Pearson correlation test was used to determine if there was a negative correlation between the number of days prior to the exam and the posttest achievement score.

Table 3 reveals the description for the number of subjects, standard deviations, and minimum and maximum scores comparing days before and posttest scores for interactive individuals. The mean number of days before the test was 15.81 with a minimum of 1 and a maximum of 27. The standard deviation was 10.13. The posttest mean was 14.25 with a standard deviation of 1.53. The minimum was 11 and the maximum was 16. Table 4 indicates the Pearson correlation calculated when comparing days before the exam and posttest scores for the interactive group. The correlation between the number of days before the posttest and the posttest score was moderately negative at

Table 3

N, Means, Standard Deviations, and Minimum and Maximum Scores Comparing Days Before and Posttest Scores for Interactive Group

VARIABLE	n	MEAN	SD	MIN.	MAX.
BEFORE	16	15.81	10.13	1.00	27.00
POSTTEST	16	14.25	1.53	11.00	16.00

Table 4

Pearson Correlation Comparing Days Before Exam and Posttest Scores for Interactive Group

	DAYS BEFORE	POSTTEST SCORE
DAYS BEFORE	1.00	-.37
POSTTEST SCORE	-.37	1.00

-.37. Stahl and Hennes (1980) state "coefficients in the r=$\pm$.30 to r=$\pm$.70 range could be called "moderate" correlations."

The number of days prior to the achievement test for the lecture group was 4, while the mean for the interactive group was 15.81 days. Thus there was approximately a 395% difference in the mean number of days before the test between the lecture and control group.

Ho_2: There is no significant difference in the self-expressed level of student satisfaction between the lecture and interactive video methods of instruction. This hypothesis was accepted.

Experimental subjects completed the satisfaction survey immediately after participating in the interactive videotape module. The control group took part in the lecture four days before the test and subsequently completed the satisfaction survey.

Table 5 exhibits the results of the t-test procedure for comparing total satisfaction scores between lecture and interactive groups. The mean and standard deviations are depicted. The mean score for the control group was 33.08, while the mean score for the interactive video group was 35.38. The standard deviation of the control group was 8.22, while the standard deviation of the interactive group was 4.40.

Table 5

T-test Procedure Comparing Total Satisfaction

Between Lecture and Interactive Groups

GROUP	n	MEAN	SD	MIN.	MAX.	t
Lecture	13	33.08	8.22	19.00	44.00	-.96
Interactive	16	35.38	4.40	29.00	45.00	

(N = 29 with 27 degrees of freedom) ($t_{.05}$=2.05)

The minimum and maximum respective values for the control were 19.00 and 44.00, while the minimum and maximum respective values for the interactive group were 29.00 and 45.00. T value was -.96 with 27 degrees of freedom. Tabled $t_{.05}$ was -2.052. Thus, there was no significant difference in the self-expressed level of satisfaction between the interactive videotape group and the traditional lecture group at the .05 level.

Appendix E shows the satisfaction survey and responses for each of the five choices using a Likert-type scale. Questions 1, 2, 3, 5, 6, 7, and 9 were listed with response 1 being the most negative and 5 being the most positive. Questions 4 and 8 were reversed with the 5 being the most negative and 1 being the most negative. (For analysis these scores were reversed using a mathematical equation.) A total score of 9 would indicate a completely negative attitude toward the method of instruction, while a score of 45 would indicate a completely positive attitude toward that mode of instruction.

Subsets of the satisfaction surveys were analyzed using the uncorrelated t-test for the variable of time satisfaction, comfort, effectiveness of the method, and satisfaction with the method. Scores on questions two and nine were combined to form time satisfaction, scores on questions four, seven, and eight were combined to form comfort, scores on questions three, five, and six were combined to form effect, and question one was satisfaction. Table 6 shows the results of the t-test procedure comparing time satisfaction between the lecture and interactive group. The mean was 7.00 for the lecture group while the interactive mean was 7.75. The t value was -.96 and was not significant. Table 7 depicts the results of the t-test procedure comparing comfort with the method of instruction between the lecture and interactive group. The mean was 11.08 for the lecture group while the interactive mean was 11.50. The t value was -.47 and was not significant. Table 8 exhibits the results of the t-test procedure comparing effect of the method of instruction between the lecture and interactive group. The mean was 10.92 for the lecture group while the interactive mean was 12.06. The t value was -1.16 and was not significant. Table 9 presents the results of the t-test procedure comparing satisfaction with the method of instruction between the lecture and interactive group. The mean was 3.69 for the lecture group while the interactive mean was 4.06. The t value was -.98 and was not significant.

Table 6

T-test Procedure Comparing Time Satisfaction

Between Lecture and Interactive Groups

GROUP	n	MEAN	SD	MIN.	MAX.	t
Lecture	13	7.00	2.31	4.00	10.00	-.96
Interactive	16	7.75	1.91	4.00	10.00	

(N = 29 with 27 degrees of freedom) (t.05=2.05)

Table 7

T-test Procedure Comparing Comfort

with Method of Instruction

GROUP	n	MEAN	SD	MIN.	MAX.	t
Lecture	13	11.08	2.60	7.00	15.00	-.47
Interactive	16	11.50	2.28	7.00	15.00	

(N = 29 with 27 degrees of freedom) (t.05=2.05)

Table 8

T-test Procedure Comparing Effect

Between Lecture and Interactive Groups

GROUP	n	MEAN	SD	MIN.	MAX.	t
Lecture	13	10.92	3.57	6.00	15.00	-1.16
Interactive	16	12.06	1.53	9.00	15.00	

(N = 29 with 27 degrees of freedom) (t.05=2.05)

Table 9

T-test Procedure Comparing Satisfaction

Between Lecture and Interactive Groups

GROUP	n	MEAN	SD	MIN.	MAX.	t
Lecture	13	3.69	1.38	1.00	5.00	-.98
Interactive	16	4.06	.57	3.00	5.00	

(N = 29 with 27 degrees of freedom) (t.05=2.05)

Ho_3: There is a significant positive relationship between prior computer use and satisfaction. This hypothesis was not accepted.

Table 10 shows the number, means, standard deviations, minimum and maximum scores for the demographic variable of prior computer experience and total satisfaction. The means are as follows: computer experience, 35.70; and no computer experience, 31.33.

Table 11 presents the Pearson correlation coefficients for the demographic variable of prior computer experience with total satisfaction. The correlation coefficient was .07. The correlation coefficient was not significant.

Table 10

N, Means, Standard Deviations, and Minimum and Maximum Scores for Total Satisfaction with Prior Computer Experience

VARIABLE	n	MEAN	SD	MIN.	MAX.
Computer Experience	20	35.70	6.17	19	45
No Computer Experience	9	31.33	3.96	21	39

Table 11

Pearson Correlation Coefficients for the Demographic Variable of Computer Experience with Total Satisfaction

	Total Satisfaction	
	r	p
Computer Experience	.07	.77 *

* not significant at the .05 level

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to develop a low cost procedure for the educational professional to integrate interactive videotape into the curriculum and to conduct a field test of the procedure. The objectives of the study were to provide professionals in education and business with specific procedures for incorporating an economically feasible interactive video module in classroom training and to field test the application of an interactive video module on a limited population to answer the following research questions:

a. Is there is a difference in the level of achievement in knowledge of concepts between graduate nursing students taught by interactive video and those taught by lecture?

b. Is there a difference in the self-expressed level of satisfaction between students taught by interactive video and those taught by lecture?

c. Is there a relationship between prior use of computers and satisfaction?

The problem focused on developing for instituting economical interactive videotape procedures and the ability of interactive videotape to provide equitable teaching when compared to traditional lecture. The control group was exposed to the Alzheimer's disease lecture in a traditional manner of lecture, while the interactive videotape group individually viewed and interacted with an Alzheimer's lecture on videotape.

The results suggest that the experimental method of teaching using interactive video may provide comparable achievement scores. There was no significant difference between the interactive videotape group achievement scores and the traditional lecture group.

The experimental group achieved slightly higher scores than the control group but the difference between groups was not statistically significant. Prior research has continuously shown significantly higher levels of achievement.

Additionally, although the mean level of self-expressed satisfaction was higher for the interactive videotape group, the difference between groups was not significant at the .05 level.

There was no relationship between satisfaction and prior computer experience. This finding is inconsistent with previous research. Usually higher levels of satisfaction are associated with an increase in computer training and participation.

Conclusions

The low cost and flexibility of interactive videotape can be the deciding factor in either using the interactive mode of instruction or other more traditional forms. Training with the interactive model can occur any time the equipment is available. This flexibility does not appear to compromise achievement and satisfaction which should make interactive video an important tool for training.

Recommendations

This field study used a homogenous group of graduate nursing students with limited sampling of subjects. Replication of this study should avoid this limitation and focus on larger groups. Successive studies should focus on the earlier levels of the educational process such as the Junior level. This would help in inferring the results to a larger population, where subjects may be selected using statistical randomization. The graduate nurses used in this study represent a narrow homogeneous group with similar academic scores and experiences.

A greater number of interactive videotape or videodisc devices should be used for the treatment group. This 'critical mass' would decrease the amount of time between the completion of the interactive videotape module and the achievement test.

A half-inch videotape player or videodisc player should be used to decrease the access time and allow more complex branching. This increase in branching would allow more elaborate training procedures and provide reinforcement to a wider array of responses.

The video segments should be shorter to allow smaller units of information to be tested and thus provide more specific direction in the concepts to be mastered.

A built-in choice to return to the beginning of the segment without giving the incorrect answer should be given to provide students the opportunity to repeat the segment.

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APPENDIXES

APPENDIX A

DEMOGRAPHIC INFO

DATE:__________

STUDENT NAME:_______________________

(a code will replace your name)

AGE_______

SEX_______

HIGHEST DEGREE_______ Major______ Minor _________

MARRIED_______ SINGLE_______

NUMBER OF CHILDREN_______

DO YOU HAVE EXPERIENCE USING A COMPUTER? YES___ NO____

If yes, how often?

___ on a daily basis

___ on a weekly basis

___ irregularly

___ never

___ will be using one in future

___ home

___ office

Computer used for: ___________________

HAVE YOU EVER TAKEN A COMPUTER CLASS? YES___ NO___

If yes, specify class(es)___________________________

HAVE YOU READ ABOUT ALZHEIMERS DISEASE IN PROFESSIONAL JOURNALS? _____ YES ______ NO

IF YES PLEASE LIST THE NUMBER AND JOURNALS.

APPENDIX B

SATISFACTION SCALE

Directions

When completing the Satisfaction Scale, think in terms of the method instruction you received (lecture or interactive video). You are to rate the statements on a five point scale; circle the number 5 for those statements with which you strongly agree and circle the number 1 for those statements you strongly disagree, or any number in between for the degree of agreement or disagreement.

Student Name: Date:

1. I am satisfied with this method of instruction.

   Strongly disagree 1___2___3___4___5___ Strongly agree

2. This method is time efficient.

   Strongly disagree 1___2___3___4___5___ Strongly agree

3. This method is an effective teaching method.

   Strongly disagree 1___2___3___4___5___ Strongly agree

4. I feel uncomfortable with method.

   Strongly disagree 1___2___3___4___5___ Strongly agree

5. I recommend this method of instruction.

   Strongly disagree 1___2___3___4___5___ Strongly agree

6. I feel this method would be effective for others.

   Strongly disagree 1___2___3___4___5___ Strongly agree

7. The pace of this method suited my learning style.

Strongly disagree 1___2___3___4___5___ Strongly agree

8. This method of instruction was cold and impersonal.

Strongly disagree 1___2___3___4___5___ Strongly agree

9. The use of this method of instruction was time effective.

Strongly disagree 1___2___3___4___5___ Strongly agree

APPENDIX C

ACHIEVEMENT QUESTIONS

1. Alzheimers disease is
   1. the 1st leading cause of death
   2. the 4th leading cause of death
   3. the 8th leading cause of death
   4. the 10th leading cause of death
2. Death of the diagnosed Alzheimers patient usually occurs within
   1. 6 months to 1 year
   2. 2-5 years
   3. 2-10 years
   4. 10-20 years
3. The first symptomatic stage of Alzheimers is characterized by
   1. silent neurological changes which cannot be detected
   2. anxiety, memory loss, hyperactivity, loss of ability to communicate, sleep disturbances
   3. apathy, incontinence, seizures
   4. loss of judgement, mood changes, memory loss
4. The probable mode of Mendelian inheritance for early onset of Alzheimers is
   1. heterozygote recessive

2. autosomal dominant
3. sex-linked
4. multiple allelic

5. The increased risk of Alzheimers in Down's syndrome is due to
   1. infections
   2. amyloidosis
   3. immunological incompetence
   4. extra dose of chromosome 21 genes

6. The region of chromosome 21 that appears to contain the Alzheimers gene is the same area which dictates the phenotypic expression of Down's syndrome.
   1. true
   2. false

7. The function of amyloid is
   1. to regulate neuritic function
   2. to participate in immunological recognition
   3. to control the blood-brain barrier
   4. unknown

8. Cell loss and shrinkage is predominant in the
   a. hippocampal cortex
   b. nucleus basalis
   c. basal ganglia

d. hypothalamus

1. a & d

2. b & c

3. a & b

4. c & d

9. Cell loss in Alzheimers is not particularly different than that seen in normal aging.

1. true

2. false

10. The part of the nerve cell most involved in early degeneration is

1. perikaryon

2. dendrites

3. cell body

4. nucleus

11. Normal aged brains contain which of the following:

1. lipofuscin pigments

2. neurofibrillary tangles

3. senile plaques

4. all of the above

12. Neurofibrillary tangles are found predominantly in

1. the glial cells

2. the extracellular spaces

3. the neuronal autoplasm

4. the synapses

13. Senile plaques contain

1. actin

2. acetylcholine

3. amyloid

4. blood vessels

14. The part of the brain showing the greater cholinergic deficit is the

1. hippocampus

2. locus coeruleus

3. septal nucleus

4. nucleus basalis

15. The possible type of virus speculated to be causative in Alzheimers is

1. an acutely infectious virus that results in a fulminating disease

2. an RNA retrovirus of the HTLV group

3. a latent virus such as Herpes which becomes reactivated by immunological suppression

4. a slow virus

16. There is evidence that aluminum is present in the brain in the brain tissue of Alzheimers disease

1. true

2. false

APPENDIX D

ACHIEVEMENT KEY

1.	2
2.	3
3.	4
4.	2
5.	4
6.	2
7.	4
8.	3
9.	2
10.	2
11.	4
12.	3
13.	3
14.	4
15.	4
16.	1

APPENDIX E

BASIC ALZHEIMER'S PROGRAM

```
4 REM ***************  INTERACTIVE VIDEO TRIAL FOR
ALZHEIMERS DISEASE- 10/5/87**
5 REM ****** LINES 5-120 PROPRIETARY CODE
6
7
9
10
20
30
40
50
60
70
80
90
100
110
120
121 PRINT " PLEASE MAKE SURE THE PRINTER IS
ON!":PRINT:PRINT:
122 LINE INPUT "PRINT FIRST NAME AND LAST NAME ";N$
123 LPRINT N$
```

```
130 ' Then check for IBM console input.

134 AA$="INIT;FIND 2600;WAIT;PLYB 4718;STAT"

135 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000

140 CLS:PRINT "1.  Alzheimers disease is"

150 PRINT "         1. the 1st leading cause of death"

160 PRINT "         2. the 4th leading cause of death"

165 PRINT "         3. the 8th leading cause of death"

168 PRINT "         4. the 10th leading cause of death"

170 PRINT TAB(10):INPUT "ANSWER 1-4";B

180 IF B<>2 THEN PRINT:CLS:PRINT TAB(15)
"INCORRECT":Q1=Q1+1:GOTO 134

190 IF B=2 THEN PRINT:PRINT:PRINT
"CORRECT!":Q1=Q1+1:LPRINT "QUESTION ONE TRIES =
";Q1:Q1=0:LPRINT TIME$

200 REM****************** QUESTION TWO
***********************

210 AA$="FIND 4718;PLYB 7338"

220 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000

230 CLS: PRINT "WHICH IS CORRECT?":PRINT

240 PRINT "2.  Death of the diagnosed Alzheimers
patient usually occurs within"

250 PRINT "         1. 6 months to 1 year"

260 PRINT "         2. 2-5 years"

270 PRINT "         3. 2-10 years"
```

```
280 PRINT "          4. 10-20 years"

290 PRINT TAB(10):INPUT "ANSWER 1-4";B

295 IF B<>3 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q2=Q2+1:GOTO 210

298 IF B=3 THEN PRINT:PRINT:PRINT
"CORRECT!":Q2=Q2+1:LPRINT "QUESTION TWO TRIES
=";Q2:Q2=0:LPRINT TIME$

300 REM****************** QUESTION THREE
*********************

310 AA$="FIND 7338;PLYB 17148"

320 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000

330 CLS: PRINT "WHICH IS CORRECT?":PRINT

340 PRINT "3.  The first symptomatic stage of
Alzheimers is characterized by"

350 PRINT "          1. silent neurological changes
which cannot be detected"

360 PRINT "          2. anxiety, memory loss,
hyperactivity, loss of ability"

365 PRINT "             to communicate, sleep
disturbances"

370 PRINT "          3. apathy, incontinence, seizures"

380 PRINT "          4. loss of judgement, mood changes,
memory loss"

390 PRINT TAB(10):INPUT "ANSWER 1-4";B
```

```
395 IF B<>4 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q3=Q3+1:GOTO 310
398 IF B=4 THEN PRINT:PRINT:PRINT
"CORRECT!":Q3=Q3+1:LPRINT "QUESTION THREE TRIES
=";Q3:Q3=0:LPRINT TIME$
400 REM****************** QUESTION FOUR
**********************
410 AA$="FIND 17148;PLYB 22421"
420 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
430 CLS: PRINT "WHICH IS CORRECT?":PRINT
440 PRINT "4. List some diseases which can meomic
Alzheimers disease in the"
450 PRINT "   early stages."
455 PRINT:PRINT:PRINT
460 LINE INPUT "LIMIT RESPONSE TO TWO COMPUTER
LINES";I$
463 PRINT " THE CORRECT ANSWERS ARE:"
464 PRINT:PRINT " CREUTSFELD JACOB, PICK'S DISEASE,
DEMYELINATING DISEASES, INFECTIONS, TUMORS, NORMAL
PRESSURE HYDROCEPHALUS, VASCULAR DISEASES, DEPRESSION"
465 LPRINT "QUESTION FOUR":LPRINT:LPRINT TIME$
470 LPRINT I$
500 REM****************** QUESTION FIVE
**********************
```

```
510 AA$="FIND 22421;PLYB 28132"
520 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
530 CLS: PRINT "WHICH IS CORRECT?":PRINT
540 PRINT "5.  The probable mode of Mendelian
inheritance for early onset"
545 PRINT "    of Alzheimers disease is"
550 PRINT "          1. heretozygote recessive"
560 PRINT "          2. autosomal dominant"
570 PRINT "          3. sex-linked"
580 PRINT "          4. multiple allelic"
590 PRINT TAB(10):INPUT "ANSWER 1-4";B
595 IF B<>2 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q5=Q5+1:GOTO 510
598 IF B=2 THEN PRINT:PRINT:PRINT
"CORRECT!":Q5=Q5+1:LPRINT "QUESTION FIVE TRIES
=";Q5:Q5=0:LPRINT TIME$
600 REM****************** QUESTION SIX
***********************
610 AA$="FIND 28132;PLYB 33408"
620 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
630 CLS: PRINT "WHICH IS CORRECT?":PRINT
640 PRINT "6.  The increased risk of Alzheimers in
Down's syndrome is due to"
```

```
650 PRINT "          1. infections"
660 PRINT "          2. amyloidosis"
670 PRINT "          3. immunological incompetence"
680 PRINT "          4. extra dose of chromosome 21
genes"
690 PRINT TAB(10):INPUT "ANSWER 1-4";B
695 IF B<>4 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q6=Q6+1:GOTO 610
698 IF B=4 THEN PRINT:PRINT:PRINT
"CORRECT!":Q6=Q6+1:LPRINT "QUESTION SIX TRIES
=";Q6:Q6=0:LPRINT TIME$
700 REM****************** QUESTION SEVEN
*********************
710 AA$="FIND 33408;PLYB 38202"
720 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
730 CLS: PRINT "WHICH IS CORRECT?":PRINT
740 PRINT "7.  The region of chromosome 21 that appears
to contain the"
745 PRINT "    Alzheimers gene is the same areas which
dictates the"
748 PRINT "    phenotypic expression of Down's
syndrome."
750 PRINT "          1. true"
760 PRINT "          2. false"
```

```
790 PRINT TAB(10):INPUT "ANSWER 1-2";B
795 IF B<>2 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q7=Q7+1:GOTO 710
798 IF B=2 THEN PRINT:PRINT:PRINT
"CORRECT!":Q7=Q7+1:LPRINT "QUESTION SEVEN TRIES
=";Q7:Q7=0:LPRINT TIME$
800 REM****************** QUESTION EIGHT
*********************
810 AA$="FIND 38202;PLYB 45147"
820 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
830 CLS: PRINT "WHICH IS CORRECT?":PRINT
840 PRINT "8.  The function of amyloid is"
850 PRINT "         1. to regulate neuritic function"
860 PRINT "         2. to participate in immunological
recognition"
870 PRINT "         3. to control the blood-brain
barrier"
880 PRINT "         4. unknown"
890 PRINT TAB(10):INPUT "ANSWER 1-4";B
895 IF B<>4 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q8=Q8+1:GOTO 810
898 IF B=4 THEN PRINT:PRINT:PRINT
"CORRECT!":Q8=Q8+1:LPRINT "QUESTION EIGHT TRIES
```

```
=";Q8:Q8=0:LPRINT TIME$

900 REM****************** QUESTION NINE

**********************

910 AA$="FIND 45147;PLYB 52570"

920 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000

930 CLS: PRINT "WHICH IS CORRECT?":PRINT

940 PRINT "9.  Cell loss and shrinkage is predominantly

in the"

941 PRINT "     a. hippocampal cortex"

942 PRINT "     b. nucleus basalis"

943 PRINT "     c. basal ganglia"

944 PRINT "     d. hypothalamus"

945 PRINT:PRINT:PRINT

950 PRINT "         1. a & d"

960 PRINT "         2. b & c"

970 PRINT "         3. a & b"

980 PRINT "         4. c & d"

990 PRINT TAB(10):INPUT "ANSWER 1-4";B

995 IF B<>3 THEN PRINT:CLS:PRINT TAB(35)

"INCORRECT":Q9=Q9+1:GOTO 910

998 IF B=3 THEN PRINT:PRINT:PRINT

"CORRECT!":Q9=Q9+1:LPRINT "QUESTION NINE TRIES

=";Q9:Q9=0:LPRINT TIME$

1000 REM****************** QUESTION TEN

**********************
```

```
1010 AA$="FIND 52570;PLYB 56168"
1020 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
1030 CLS: PRINT "WHICH IS CORRECT?":PRINT
1040 PRINT "10.  Cell loss in Alzheimers is not
particularly different"
1041 PRINT "     than that seen in normal aging."
1042 PRINT "     1. true"
1043 PRINT "     2. false"
1090 PRINT TAB(10):INPUT "ANSWER 1-2";B
1095 IF B<>2 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q10=Q10+1:GOTO 1010
1098 IF B=2 THEN PRINT:PRINT:PRINT
"CORRECT!":Q10=Q10+1:LPRINT "QUESTION TEN TRIES
=";Q10:Q10=0:LPRINT TIME$
1100 REM****************** QUESTION ELEVEN
******************
1110 AA$="FIND 56168;PLYB 56711"
1120 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
1130 CLS: PRINT "WHICH IS CORRECT?":PRINT
1140 PRINT "11.  The part of the cell most involved in
early degeneration is"
1142 PRINT "     1. perikaryon"
1143 PRINT "     2. dendrites"
1144 PRINT "     3. cell body"
```

```
1145 PRINT "     4. nucleus"
1190 PRINT TAB(10):INPUT "ANSWER 1-4";B
1195 IF B<>2 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q11=Q11+1:AA$="FIND 52570;PLYB 56711":PRINT
TAB(35) "IGNORE QUESTION 10 ON THE VIDEOTAPE":GOTO 1120
1198 IF B=2 THEN PRINT:PRINT:PRINT
"CORRECT!":Q11=Q11+1:LPRINT "QUESTION ELEVEN TRIES
=";Q11:Q11=0:LPRINT TIME$
1200 REM****************** QUESTION TWELVE
******************
1210 AA$="FIND 56711;PLYB 70938"
1220 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
1230 CLS: PRINT "WHICH IS CORRECT?":PRINT
1240 PRINT "12.  Normal aged brains contain which of
the following:"
1242 PRINT "     1. lipofuscin pigments"
1243 PRINT "     2. neurofibrillary tangles"
1244 PRINT "     3. senile plaques"
1245 PRINT "     4. all of the above"
1290 PRINT TAB(10):INPUT "ANSWER 1-4";B
1295 IF B<>4 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q12=Q12+1:GOTO 1210
1298 IF B=4 THEN PRINT:PRINT:PRINT
"CORRECT!":Q12=Q12+1:LPRINT "QUESTION TWELVE TRIES
```

```
=";Q12:Q12=0:LPRINT TIME$
1300 REM****************** QUESTION THIRTEEN
*****************
1310 AA$="FIND 70938;PLYB 71547"
1320 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
1330 CLS: PRINT "WHICH IS CORRECT?":PRINT
1340 PRINT "13.  Neurofibrillary tangles are found
predominantly in"
1342 PRINT "     1. the glial cells"
1343 PRINT "     2. the extracellular spaces"
1344 PRINT "     3. the neuronal cytoplasm"
1345 PRINT "     4. the synapses"
1390 PRINT TAB(10):INPUT "ANSWER 1-4";B
1395 IF B<>3 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":AA$="FIND 56711;PLYB 71954":PRINT TAB(35)
"IGNORE QUESTION 12 ON THE VIDEOTAPE":Q13=Q13+1:GOTO
1320
1398 IF B=3 THEN PRINT:PRINT:PRINT
"CORRECT!":Q13=Q13+1:LPRINT "QUESTION THIRTEEN TRIES
=";Q13:Q13=0:LPRINT TIME$
1400 REM****************** QUESTION FOURTEEN
******************
1410 AA$="FIND 71547;PLYB 71954"
1420 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
```

```
1430 CLS: PRINT "WHICH IS CORRECT?":PRINT
1440 PRINT "14.  Senile plaques contain"
1442 PRINT "     1. actin"
1443 PRINT "     2. acetylcholine"
1444 PRINT "     3. amyloid"
1445 PRINT "     4. blood vessels"
1490 PRINT TAB(10):INPUT "ANSWER 1-4";B
1495 IF B<>3 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":AA$="FIND 56711;PLYB 71954":PRINT TAB(35)
"IGNORE QUESTIONS 12 & 13 ON THE
VIDEOTAPE":Q14=Q14+1:GOTO 1420
1498 IF B=3 THEN PRINT:PRINT:PRINT
"CORRECT!":Q14=Q14+1:LPRINT "QUESTION FOURTEEN TRIES
=";Q14:Q14=0:LPRINT TIME$
1500 REM****************** QUESTION FIFTEEN
******************
1510 AA$="FIND 71954;PLYB 80856"
1520 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
1530 CLS: PRINT "WHICH IS CORRECT?":PRINT
1540 PRINT "15.  The part of the brain showing the
greater cholinergic"
1541 PRINT "     deficit is the"
1542 PRINT "     1. hippocampus"
1543 PRINT "     2. locus coeruleus"
```

```
1544 PRINT "     3. septal nucleus"
1545 PRINT "     4. nucleus basalis"
1590 PRINT TAB(10):INPUT "ANSWER 1-4";B
1595 IF B<>4 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q15=Q15+1:GOTO 1510
1598 IF B=4 THEN PRINT:PRINT:PRINT
"CORRECT!":Q15=Q15+1:LPRINT "QUESTION FIFTEEN TRIES
=";Q15:Q15=0:LPRINT TIME$
1600 REM****************** QUESTION SIXTEEN
******************
1610 AA$="FIND 80856;PLYB 101832"
1620 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
1630 CLS: PRINT "WHICH IS CORRECT?":PRINT
1640 PRINT "16.  The possible type of virus speculated
to be causative"
1641 PRINT "     in Alzheimers is"
1642 PRINT "     1. an acutely infectious virus that
results in a"
1643 PRINT "        fulminating disease"
1644 PRINT "     2. an RNA retrovirus of the HTLV
group"
1645 PRINT "     3. a latent virus such as Herpes which
becomes reactivated"
1646 PRINT "        by immunological suppression"
```

```
1647 PRINT "     4.  a slow virus"
1690 PRINT TAB(10):INPUT "ANSWER 1-4";B
1695 IF B<>4 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q16=Q16+1:GOTO 1610
1698 IF B=4 THEN PRINT:PRINT:PRINT
"CORRECT!":Q16=Q16+1:LPRINT "QUESTION SIXTEEN TRIES
=";Q16:Q16=0:LPRINT TIME$
1700 REM****************** QUESTION SEVENTEEN
******************
1710 AA$="FIND 101832;PLYB 102137"
1720 LOCATE 12,35:PRINT "PLEASE WAIT":GOSUB 2000
1730 CLS: PRINT "WHICH IS CORRECT?":PRINT
1740 PRINT "17.  There is evidence that aluminum is
present in the brain"
1741 PRINT "     tissue of Alzheimers disease."
1742 PRINT "     1. true"
1743 PRINT "     2. false"
1790 PRINT TAB(10):INPUT "ANSWER 1-2";B
1795 IF B<>1 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":AA$="FIND 80856;PLYB 102137":PRINT TAB(35)
"IGNORE QUESTION 16 ON THE VIDEOTAPE":Q17=Q17+1:GOTO
1720
1798 IF B=1 THEN PRINT:PRINT:PRINT
"CORRECT!":Q17=Q17+1:LPRINT "QUESTION SEVENTEEN TRIES
```

```
=";Q17:Q17=0:LPRINT TIME$
1799 PRINT:PRINT:PRINT:PRINT N$;"PLEASE PUT RECORD
SHEET IN DR. GROER'S FOLDER AT DESK.  THANKS FOR YOUR
COOPERATION!"
1800 END
2000 LINES 2000-2250 PROPRIETARY CODE
2010
2020
2030
2040
2050
2060
2070
2080
2090
2100
2110
2120
2130
2140
2150
2160
2170
2180
```

```
2190
2200
2210
2220
2230
2240
2250 RETURN
```

APPENDIX F

INTERACTIVE INSTRUCTIONS

1. Fill out the demographic survey before lab time.
2. If possible schedule lab time with Michael Lusk.
3. The time required should be approximately 1 hour depending upon the answers given.
4. Contact Michael Lusk for aid in equipment use (should be in lab if time is scheduled).
5. Get key, interactive diskette, and interactive Alzheimer's videotape from Room 207-A.
6. Press on the videotape player power switch and gently press the videotape into the player.
7. Place the diskette in the top drive (drive A) of the computer and turn on the power strip.
8. The program should boot automatically. Please wait approximately 30 seconds for the program to load. Follow the instructions shown on the computer screen.
9. If you have any problems please check with Michael Lusk.

PLEASE GIVE THE COMPUTER PRINTOUT TO THE PERSON IN ROOM 207-A!

APPENDIX G

INTERFACE VENDORS

Allen Communications

7490 Clubhouse Rd.

Boulder, CO 80301

(303) 530-7300

BCD Associates

1216 North Blackwelder Ave.

Oklahoma City, OK 73106

(405) 524-7403

APPENDIX H

INSTALLATION OF HARDWARE

The motherboard may be installed in any vacant slot in the computer, but the eight-position DIP switches must be set for the brand and type of computer. The configuration listed below is for the IBM-PC:

1	2	3	4	5	6	7	8
DN	DN	DN	DN	UP	UP	UP	UP

The block of the DIP switches should have either on, 1, or up on the top. The up above corresponds to either on, or up.

The breakout box may be set up as followed:

Breakout Box———— to ———— Videotape recorder
video in (BNC)--------------------video out
channel 1 (RCA)-------------------audio channel 1 out
channel 2 (RCA)-------------------audio channel 2 out
code in (RCA)---------------------code channel out
code out (RCA)--------------------code channel in
ribbon vtr control cable----------vtr remote connector

Breakout Box ——— to ————— Computer
auxillary video-------------------composite videoout

Breakout box ———— to ————— Videotape board
ribbon cable (connected)----------ribbon connector

Breakout box ———— to ————— Monitor

video out (BNC)---------------------composite video in

audio out (RCA)---------------------audio in

Breakout box ————— to ————— RGB/Composite

Monitor

DIN connector-------- to -----------DIN connector

An illustration of the cabling setup is found in Figure 5 and Figure 6.

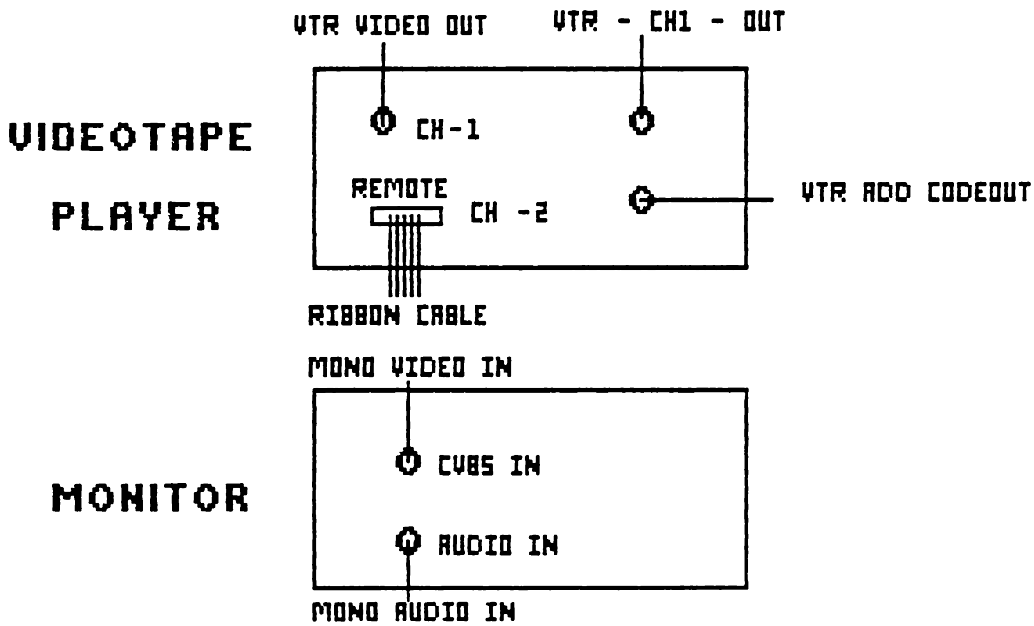

Figure 5

Videotape Player and Monitor Configuration

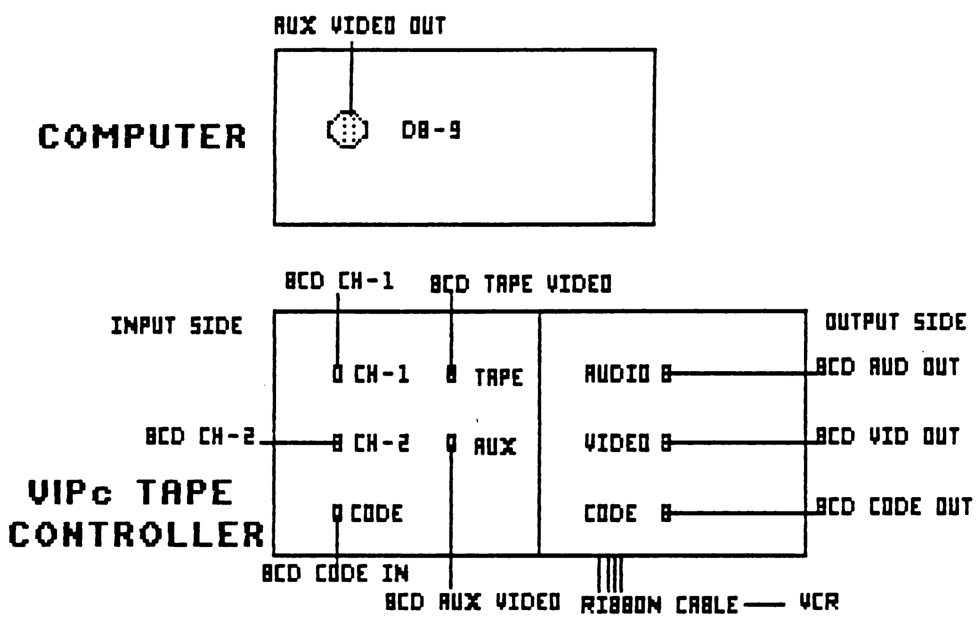

Figure 6

Computer and Tape Controller Configuration

Appendix I

SOFTWARE INSTALLATION

To test the system place the diskette in drive A and turn on the computer. After the A> is displayed type in basica and carriage return. Type load "echo1.bas" and carriage return. From this point on it will be assumed carriage return is used after each command. A small amount of text should be displayed and a > sign. If this does not appear check the cabling and computer. This sign declares that the videotape player and interface are capable of receiving commands.

Certain precautions must be taken to insure that the recording of time code can occur. They are:

1. Video (color bars, video, black) must on the tape.
2. Code out (breakout box) goes to audio in (usually ch. 2)
3. Record tab must be present on video tape for recording.
4. Audio limiter must be off to allow manual control.
5. Tape memory and auto repeat functions should be off.

Writing timing code on the videotape is as follows:

1. After the cables have been checked, type INIT. The VTR should play a short time and stop with the > prompt appearing.

2. Type STAT and the following should appear.

STOP,000255,STOP

000000,000000

This confirms that no code is on the tape.

3. Type TPID and a number of choice from 0 to 65535. This id number appears on every frame along with the time code.

4. Type WRIT. The tape rewinds to the beginning of the tape and a high pitched sound is emitted. Set the code channel record level to 0 dB.

5. Type WRGO without a return and press the audio dub button or follow the procedure for insert editing on the older models. Then press return. The VTR will play and code will be written. Type X if it is necessary to stop the process before the end of the tape.

6. Type REWD to rewind the tape.

7. Type INIT;STAT and the following should appear:

STOP,00000,STOP

tttttt,ffffff (tpid,frame#)

If the tpid number you typed is not listed or the error code is not less than 250, then the procedure should be double-checked and repeated.

At this point commands may be issued to control the VTR. These commands include:

STOP - Stops player and displays aux video.

REWD - Rewinds player with aux video.

FFWD - Fast forwards with aux video.

PAUS - Pauses player and displays a still frame.

PLAY zzz - Plays from current position until frame zzz.

PAUS zzz - Pauses the player at or near frame zzz.

FIND zzz - Searches and stops near preroll number before frame zzz.

PLYB zzz - Videotape device plays until exactly frame zzz.

FRAM - Returns the current frame number.

Commands may be chained together by using a ; between the commands. An example would be FIND 2500;PLYB 3000. This sequence of commands would result in the VTR locating frame 2500 and playing until frame 3000.

Note: All operations of the BCD interactive system involve using the command INIT. This command rewinds the tape and zeros the frame counter. It is essential for any program to use this as an initial part of the startup.

Blue Logger is a program with the control system that allows IN and OUT points to be logged rather than writing down each sequence. Start the program by typing

BASICA at the DOS prompt (A>). Type BLUELOG. Type init in lower case. Press the caps lock key and PLAY. Use the I to mark the beginning point of the scene and O to mark the end of the scene. Type save and the file name upon completion. The file may then be printed and provide accurate control of the postproduction strategy.

Basic may be used with the program to include text, graphics, and sound. The program used with basic is called VIPC1.BAS. Two lines must be changed:

140 Input "Command ";AA$ (to a remark statement such as)

140 Rem ************ Input "Command ";AA$

and

260 Goto 140 'back to input' (to return)

280 Return

The defined variables PD, PS, CR$, and other defined variables should remain at the beginning of the program. The program could be renumbered and save as an ASCII file to merge from your program or the program can be written within your program because of the small size.

A programming example is included below:

200 REM **************** QUESTION TWO

```
******************
205 AA$="FIND 9075;PLYB 9383"
210 LOCATE 12,35:PRINT "PLEASE WAIT':GOSUB 200
215 CLS: PRINT "WHICH IS CORRECT?":PRINT
220 PRINT "2. Which of the following examples
contain all of the necessary elements of a drug
order?"
225 PRINT "   1. Nov. 22, 1987 - 10:00AM, Jane
Doe, Morphine Sulfate, 10 mg IM q 4 hr prn, pain"
230 PRINT "                     Joe Smith MD"
235 PRINT "   2. Nov. 22, 1987 - 10:00AM, Jane
Doe, Motrin 600 mg, TID,         Joe Smith MD"
240 PRINT "   3. Nov. 22, 1987 - 10:00AM, Jane
Doe, Tylenol 650 mg, PO, prn elevated temp> 101 "
245 PRINT "                        Joe Smith MD"
250 PRINT "  4. Nov. 22, 1987 - 10:00AM, Jane Doe,
Regular Insulin, sub q every AM Joe Smith MD"
260 PRINT TAB(10):INPUT "ANSWER 1-4";B
265 PRINT IF B=2 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q2=Q2+1
270 PRINT "No route is indicated.":GOTO 210
275 PRINT IF B=3 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q2=Q2+1
280 PRINT "No time or frequency is
```

```
indicated.":GOTO 210
285 PRINT IF B=4 THEN PRINT:CLS:PRINT TAB(35)
"INCORRECT":Q2=Q2+1
290 PRINT "No dosage is indicated.":GOTO 210
291 PRINT IF B=1 THEN PRINT:PRINT:PRINT
"CORRECT!":Q2=Q2+1:LPRINT "QUESTION TWO TRIES
=";Q2Q2=0:LPRINT TIME$
292 PRINT "Contains pt name, date & time of
order, name of drug, dosage of the drug, route,
time of administration or frequency, physician's
signature."
292 PRINT:PRINT:PRINT "PRESS ANY KEY TO
CONTINUE."
293 A$=INKEY$
294 IF A$="" THEN 293
```

Line 210 indicates the beginning (frame 9075) and the conclusion of the video segment. The find statement may seem to be supererogatory yet if the respondent replies with an incorrect answer the segment cannot be replayed. Line 220 provides directions that allow a time delay necessary for the videotape player to access the proper beginning frame. Lines 230-274 present the clinical situation and allow a response. Lines 276-277, 279-280, and 283-284 give unique explanations concerning the incorrect responses. Lines 292-296 display the rationale behind the correct answer. Lines 296-298 allow the participant time to read and reflect upon the correct answer. Other question divisions may be similar with the exception of the first question which must include the INIT statement previous to the description of AA$. An example would be AA$="INIT;FIND 910;PLYB 5849".

VITA

Michael Lusk was born in Woodbury, Tennessee on March 16, 1949. He attended elementary school and high school in that city. He attended Middle Tennessee State University from 1967-69 and majored in Engineering. From 1969-72 he attended the University of Tennessee, Knoxville and graduated with a Bachelor of Science in Psychology. During that time he attended the University of the Americas in Cholula, Mexico in the Summer of 1971.

He taught students at the Learning Institute of North Carolina and took several graduate courses at the University of North Carolina at Greensboro and Chapel Hill. He also attended the University of Moscow to study Russian. From 1975-76 he attended the University of Tennessee, Knoxville. He received a Master of Science in Early Childhood Education.

He taught Science, Math, and Computer Literacy in a private school from 1979-84. He enrolled in the Doctoral of Education program in 1985.