A COMPARISON OF TWO METHODS OF
TRAINING NAIVE USERS IN THE USE OF
A MICROCOMPUTER SYSTEM

DISSERTATION

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

Doctor of Philosophy

By

Susan Ree Heil Wallace, M.A., M.S.
Denton, Texas
May, 1986
Wallace, Susan Ree Heil. *A Comparison of Two Methods of Training Naive Users in the Use of a Microcomputer System.*

Doctor of Philosophy (College Teaching), May, 1986. 67 pp., 4 tables, bibliography, 32 titles.

The problem addressed in this study is the need for efficient and economic methods to train naive college students to operate microcomputers as a necessary step in their acquisition of computer proficiency. Two methods of training were compared. These were training by live demonstration and training by videotape. These methods were considered economically viable because each could be presented in a classroom and neither required a one-to-one student-to-computer or student-to-tutor ratio.

Four sections of an introductory computer science class were used in the study. Two classes were presented each treatment. The effectiveness of the presentations was measured by means of a written quiz administered immediately after the presentation and by the number of microcomputer system operation tasks successfully completed during an individual laboratory session. The computer anxiety level of each participant was measured prior to the presentation to determine if anxiety was a factor in finding the best training method.

When scores of naive users who saw the videotape were compared with the scores of naive users who saw the live
demonstration, no significant differences were found. However, when novice users (those who had some previous experience with operating or programming a microcomputer) were included, the group that saw the videotape scored significantly higher on the written quiz than the group that saw the live demonstration. A two by two analysis of variance showed no significant interactions between anxiety and treatment. User satisfaction was found to be significantly higher for the videotape group than for the live demonstration group.

This study concluded with the recommendation that the Computer Science Department of North Texas State University utilize videotapes to train students in introductory classes to use a microcomputer system. This recommendation was based on the superior test results for naive and novice users who saw the videotape, the user satisfaction scores and inherent advantages of videotapes over live demonstrations.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF TABLES</th>
<th>vi</th>
</tr>
</thead>
</table>

## I. INTRODUCTION

- Statement of the Problem
- Major Purpose of the Study
- Specific Purposes of the Study
- Hypotheses
- Significance of the Study
- Definition of Terms
- Basic Assumptions
- Development of the Videotape
- Procedures for Data Collection
- Procedures for Data Analysis
- Chapter Bibliography

## II. SYNTHESIS OF RELATED LITERATURE

- Optimal Training Methods
- Alternate Training Methods
- Advantages of Videotapes
- Studies Showing Videotape Training Received Well
- Studies Showing Videotape Superior to Other Methods
- Studies Showing Videotape As Good As Other Methods
- Studies Showing Videotape Inferior to Other Methods
- Anxiety As a Confounding Factor
- Conclusion
- Chapter Bibliography

## III. PROCEDURES FOR DATA COLLECTION AND ANALYSIS

- Selection of the Subjects
- Description of Data Collection
- The Dependent Variables
- Statistical Procedures Used in Data Analysis
- Chapter Bibliography
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. RESULTS OF DATA ANALYSIS</td>
<td>35</td>
</tr>
<tr>
<td>Description of the Population</td>
<td></td>
</tr>
<tr>
<td>Results for the Hypotheses</td>
<td></td>
</tr>
<tr>
<td>Additional Results</td>
<td></td>
</tr>
<tr>
<td>V. DISCUSSION, SUMMARY, RECOMMENDATIONS</td>
<td>45</td>
</tr>
<tr>
<td>Discussion of the Hypotheses</td>
<td></td>
</tr>
<tr>
<td>Discussion of Additional Results</td>
<td></td>
</tr>
<tr>
<td>Suggestions for Further Research</td>
<td></td>
</tr>
<tr>
<td>Summary and Conclusions</td>
<td></td>
</tr>
<tr>
<td>Recommendations for North Texas State University</td>
<td></td>
</tr>
<tr>
<td>Chapter Bibliography</td>
<td></td>
</tr>
<tr>
<td>APPENDICES</td>
<td>57</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>63</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Summary Table for System Tasks Completed By Naive Subjects: Treatment by Anxiety</td>
<td>38</td>
</tr>
<tr>
<td>II. Summary Table for User Satisfaction of Naive Subjects: Treatment by Sex</td>
<td>40</td>
</tr>
<tr>
<td>III. Summary Table for User Satisfaction of Naive and Novice Subjects: Treatment by Sex</td>
<td>41</td>
</tr>
<tr>
<td>IV. Summary Table for Written Test Scores of Naive and Novice Subjects: Treatment by Sex</td>
<td>42</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

Another proficiency has been added to the list of basic skills considered necessary for an educated person to have--computer proficiency. The National Commission on Excellence in Education calls computing a new basic skill (4) and the Educational Equality Project's paper "Academic Preparation for College: What Students Need to Know" states that students should know how to operate a computer (1). According to John Naisbitt, we are an information intensive society and computer literacy is part of that society (3). In institutions like North Texas State University where degrees within certain colleges require evidence of computer literacy as a prerequisite for graduation, students without the appropriate high school backgrounds to pass computer literacy exams are enrolling in large numbers in introductory computer science courses. These naive users must be instructed in the use of the particular equipment and the procedures of the particular laboratory that they will be using in these classes. They need to have access to information such as the following: the location of the microcomputers to be used and the policies concerning their
use; responsibilities of the student; the function of support personnel, if any; sources of documentation and help; the function of and operating instructions for each component of the microcomputer system such as the console, the keyboard, the storage device and the printer; special or unusual features of the equipment.

It appears that optimal training of naive users would involve total access to a computer or one-to-one tutoring on the system or both (5, 6); however, the increased enrollment of students in introductory computer classes and their need for system training comes at a time when budget cuts are limiting the acquisition of new equipment and the hiring of new personnel. Therefore, in many situations, not only is unlimited computer access and unlimited one-to-one tutoring impossible, but microcomputer resources are inadequate to permit scheduling of classes in the computer laboratory. In such situations, the question becomes what is the best method for giving information on the use of a particular microcomputer to groups of naive users before they enter the lab. Although other possibilities exist (such as reading about how to operate a computer or hearing someone talk about how to operate a computer), it was decided that the methods of presentation chosen for comparison in this study would include a computer (live or filmed) in operation. One of the chosen methods is that of
live demonstration; that is, a computer is taken to the classroom and its use is demonstrated by a person who is familiar with the computer lab and the computer itself. The other method selected involves showing a videotape of the computer being operated in its normal laboratory setting.

Statement of the Problem

The problem addressed in this study is the need for efficient and economic methods to train naive college students to operate microcomputers as a necessary step in their acquiring computer proficiency. There are a number of different types of training techniques in use and these methods may vary in their overall effectiveness.

Major Purpose of the Study

The major purpose of this study is to evaluate two types of training in the use of microcomputers. These two methods are training by videotape and training by live demonstration.

Specific Purposes of the Study

The specific purposes of the proposed study are

1. To determine if naive computer users can correctly answer a significantly greater number of questions on a written test over microcomputer use if they are trained by a viewing of a videotape rather than by a live demonstration:
2. To determine if the users trained by videotape can complete a significantly greater number of system operation tasks in a fixed amount of time than the users trained by a live demonstration;

3. To determine if an individual's degree of 'computer anxiety' is a significant factor for optimum training;

4. To recommend training procedures to be used for North Texas State University students who have not passed the computer literacy examination and are fulfilling a computer proficiency degree requirement by taking CSCI 1100.

Hypotheses

To carry out the purposes of this study, the following hypotheses are tested.

1. Naive microcomputer users who have watched a training videotape answer correctly a significantly greater number of questions on a written test over microcomputer use than users trained by a live demonstration.

2. Videotape trained users correctly complete a significantly greater number of tasks involving the operation of a microcomputer than users who have been trained via a live demonstration.

3. Users who are 'computer anxious' as determined by the Computer Anxiety Index of the Standardized Test of Computer Literacy and who view the videotape correctly complete a significantly greater number of tasks involving
the operation of a microcomputer than computer anxious users
who view the live demonstration.

Significance of the Study

The proposed study compares two different methods of
teaching naive computer users to operate a microcomputer.
Because computer literacy is now considered important for
each college and high school graduate, the need for computer
literacy training has increased in the past several years.
Resources are not typically available within most
educational environments to provide what would probably be
the ideal situation - one microcomputer and one tutor per
learner. The significance of this study lies in the
exploration of alternate ways of successfully teaching
students to use a microcomputer system.

This study is significant in that it

1. Determines whether videotape training is more
   successful than training by live demonstration;

2. Determines if computer anxiety is a factor in
   selecting the more effective method of training.

Definition of Terms

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

1. Naïve user is defined as a person who has had no
   prior experience in programming or in operating a
   microcomputer.
2. **Microcomputer** is defined as a self-contained, single-user computer system including a monitor, keyboard and secondary storage device.

3. **Computer anxiety** is defined operationally by the Computer Anxiety Index (called the Computer Opinions Survey) which is part of the Standardized Test of Computer Literacy.

**Basic Assumptions**

It is assumed that subjects respond honestly to the Computer Anxiety Index and perform to the best of their ability the tasks that they are asked to do. This assumption is based on the fact that all information presented during the course of this study is presented to students currently enrolled in CSCI 1100 and this information is an integral part of the CSCI 1100 curriculum. It is further assumed that all uncontrolled variables are random across groups.

**Development of the Videotape**

The development of the videotape to be used in the training of one of the groups plays an important role in this study. The development process must take into account both the content of the material to be covered and the techniques necessary to produce a quality product in general (7, 8). To ensure the accuracy of the script and that it covers all pertinent points, the script was developed in
consultation with North Texas State University Department of Computer Sciences Microcomputer Laboratory employees who have experience in assisting naive students with the use of the Texas Instruments 99/4A microcomputer and who are, therefore, familiar with the common problems encountered by first-time users of the system. To ensure the professional quality of the finished product, the tape was filmed and edited by video specialists from the North Texas State University Center for Instructional Services. The tape was filmed, for the most part, in the Computer Sciences Department's Microcomputer Laboratory, although the direct taping of computer output was done in the studio of the Center for Instructional Services.

Procedures for Data Collection

Four daytime Computer Science 1100 classes at North Texas State University were selected for use in this study with two of them being chosen to receive training via the videotaped presentation. The other two classes received the live demonstration training. An attempt was made to minimize any effects due to the teacher or class scheduling. Therefore, the classes of two teachers of the same sex who had taught CSCI 1100 during at least two previous semesters were chosen for the study. These teachers each had two daytime classes. One class of each teacher, one morning and one afternoon class, and one 50 minute class and one 80
minute class received each treatment. Each student in the study took the Computer Anxiety Index component of the Standardized Test of Computer Literacy before the presentation. The survey is titled the Computer Opinions Survey to minimize the possibility of answer bias.

All training sessions were conducted in the normally scheduled rooms of the classes and lasted approximately 35 minutes. The videotape presentation consisted of the showing of a tape depicting the use of the Microcomputer Laboratory and the operation of a TI99/4A microcomputer. For the live demonstration presentation, a TI99/4A microcomputer was taken to the classroom on a cart. The demonstrator described the use of the Microcomputer Laboratory and demonstrated the operation of the TI99/4A microcomputer. In order to ensure comparability of the two types of presentations, an experienced lab employee who had previously given TI99/4A microcomputer demonstrations to CSCI 1100 classes was chosen as the demonstrator. In order to ensure that the same material was covered in each type of training session, the live demonstration was based on the transcript of the tape. In order to control for effects due to the sex of the trainer, the demonstrator and the tape narrator are the same sex.

After being trained in the use of the microcomputer, each group took a written test over the material covered in
the training session. The number of correct answers on this quiz was used as one of the dependent variables in this study. However, since knowing how to do something and being able to do it are not synonymous, the participants also were measured on their ability to operate the actual hardware.

Each participant reserved a laboratory time to work with the TI99/4A microcomputer. He was given a prepared floppy disk, instructions and a set of tasks to do. Each participant worked alone in a room that contained a single TI99/4A system. All output sent to the monitor screen during a laboratory session was also recorded on a video cassette recorder to aid in the determination of the number of completed tasks. The number of tasks completed during the laboratory session was used as a dependent variable in this study. A set amount of time was allocated for the tasks. A participant was considered to be finished when the tasks were all completed or when the time period expired, whichever came first. At the end of the laboratory session, each participant completed a eight item five-point Likert scale of user satisfaction (see Appendices C and D) with respect to the presentation mode of the training received.

Considerable thought was given to the tasks that the students were asked to perform. The tasks had to be clearly stated so that problems and resulting errors could be attributed to lack of knowledge of how to perform a given
task and not with confusion as to what the task was. With
the preceding in mind, a pilot study for the data collection
was done and a number of problems were noted by the
experimenter (2). The task instructions for this study
attempted to avoid the problems noted in the pilot study.
The written quiz and task set used in this study are in
Appendices A and B, respectively. The first three tasks in
Appendix B are listed separately to make the directions to
the participant as clear as possible. However, these three
tasks are considered as a single unit (getting the system
ready to go) for scoring purposes.

Procedures for Data Analysis

The scores of naive participants were included in the
final data analysis. In order to test the first hypothesis,
after determining that the two groups did not vary
significantly with respect to computer anxiety, a t-test was
used to compare the students who were trained by seeing the
videotape and those who were trained by seeing the live
demonstration. The number of correct answers on the written
test was used as the dependent variable.

A second t-test was used to test the second hypothesis.
The groups compared were those trained by videotape and
those trained by live demonstration with the number of
system operation tasks performed correctly used as the
dependent variable.
In order to test the third hypothesis, the original plan was to use only the subjects whose computer anxiety scores fall in the top standardized quartile or the bottom standardized quartile as determined by the Computer Anxiety Index of the Standardized Test of Computer Literacy with those in the top quartile being considered 'anxious' and those in the bottom quartile being considered 'not anxious.' However, additional information about this test came to light which called into question the accuracy of using the quartile cutoffs to discriminate between anxious and not anxious subjects. Therefore, to prevent the exclusion of subjects from membership in the appropriate group, a median split was used to divide the anxious group from the non anxious group employing the median established by the Computer Anxiety Index of the Standardized Test of Computer Literacy. A two by two analysis of variance was computed with the levels being those who were trained by videotape and those who were trained by live demonstration in one dimension and those who are anxious and those who are not anxious in the other dimension. The number of system operation tasks successfully completed was used as the dependent variable.

In addition to data analyses which are directly related to the stated hypotheses of this study, certain general statistical analyses were made. These statistical
procedures include calculation of means, standard deviations, correlations and group statistics. Two by two analyses of variance were computed using combined naive and novice subjects with treatment and sex as the independent variables. The dependent variables were written test score, anxiety level, system task completion score and user satisfaction.
CHAPTER BIBLIOGRAPHY


CHAPTER II
SYNTHESIS OF RELATED LITERATURE

Optimal Training Methods

Training naive computer users, particularly ones with computer anxiety, is not a particularly easy task. Many successful methods require large amounts of equipment or large amounts of time of highly trained tutors or both. One attempt to train a group of college teachers to use computers was not successful until the teachers were allowed to take microcomputers home with them for ten weeks (18). Availability of the computer and the opportunity to learn in the privacy of their own homes seemed to be the keys in this attempt to make a group of computer anxious adults computer literate. When training occurs in a public situation then the role of the human beings involved becomes important according to Tannebaum and Rahn (19, p.21) who emphasize the importance of computer laboratory personnel and state: "Laboratory tutors must be carefully chosen and trained. Often a student's success in learning to compute is a direct result of tutoring received during the first few hours of hands on experience." It appears that optimal training would involve total access to a computer or one-to-one tutoring on the system or both.
Alternate Training Methods

In a typical academic situation involving hundreds of students and significantly fewer numbers of microcomputers and personnel (approximately one microcomputer per 30 students and one student laboratory employee per 30 microcomputers), providing microcomputers to take home or individual training in a laboratory is not feasible. Some other form of training must be devised. One possibility is a live demonstration given by a computer laboratory employee who transports a microcomputer to a classroom and demonstrates the fundamentals of the computer's use to the entire class. Another possibility is to create a videotape depicting each step of operating a microcomputer and to show it to a group of students in their classroom. Either of these methods is considerably more cost effective in terms of hardware and personnel than either a one-to-one student-to-computer or student-to-tutor approach. However, an important question remains as to which of these two training methods might be more effective.

Advantages of Videotapes

Rosenkoetter (16) cites several advantages of videotapes over live demonstrations including the (1) assurance of quality and correctness of the material covered (2) assurance that equipment in the demonstration will not malfunction (3) positive influence on the attitudes of the
students who respect the time and effort involved in making the tape (4) ability to stop the tape at any time for discussion. He does not, however, offer any evidence to the effect that students who are presented material via videotapes learn as much as students exposed to the more traditional live demonstration.

Studies Showing Videotape Training Received Well

Videotape training has been judged successful in many situations. McNeece (9), reporting on results of a survey of 400 companies, concludes that videotapes and other high technology means of training were judged successful when the training problem was delineated and was integrated into a larger educational environment.

Moore (10) reports on the use of videotapes in an introductory French course at Sir George Williams University. The tapes were created in response to an increasing demand for the course at the same time that the budget for teaching was decreasing and a large number of part-time instructors were being used. The experience at Sir George Williams University showed the tapes to be a cost effective method of presentation but no attempt was made to compare student performance except the note that the average grade in classes receiving traditional instruction and the classes receiving videotaped instruction was 75 per cent in each case.
Students do not seem to find viewing videotapes objectionable. In fact, Schade and Bartholomew (17) found that teaching assistants participating in a training program to learn teaching techniques found the videotaped episodes "effective and enjoyable." No effort was made in this study, however, to compare the ratings of teaching assistants trained by the videotapes and teaching assistants trained by other methods.

Studies Showing Videotape Superior to Other Methods

A number of studies that compare the results of training via videotape with training via other methods indicate that the videotape training method is superior. One study evaluated five methods for training Kansas agricultural producers for certification as private pesticide applicators (4). The training procedures used included video cassettes, a team of specialists at a one day session, self study via programmed instruction, a Telenet instructional program duplicating the specialist team with phone hook up and one day educational meetings conducted by county agents. Four hundred and seventy-one participants were used in the comparison. The mean score differences reported showed the most effective presentation method was the videotape followed by the specialist team, the self study program, the Telenet broadcast and the meetings conducted by the county agents, in that order. However, it
was not reported whether the differences between the groups were significant.

Training via videotape was found to be superior to no training in teaching interpersonal communication skills to teachers (22). In that study, teachers receiving the videotape training responded more empathetically to students than the teachers with no training. It is not too surprising, however, that some training was found to be better than no training.

In a project designed to teach parents in the use of time out, O'Dell, Mahoney, Horton and Turner (12) compared the performance of groups of parents trained by various methods and a control group that received no training. The training methods included written material, a tape depicting parents modeling the time out technique, the same tape used in conjunction with a brief checkout by a trainer, a seven minute live modeling demonstration and a longer (20 minute) modeling session. That study found that the parents trained with the tape and checkout period performed significantly better than all others except those trained by the tape alone. In a related study four training methods used to instruct mothers how to use time out were compared (11). The training methods included written instructions, a lecture, symbolic modeling via videotape and symbolic modeling via videotape plus roleplaying. A control group
received no instruction. All training methods were found to be superior to no training but no difference was found among training methods when the mothers responded to a written questionnaire over their knowledge. However, when the mothers were asked to apply their knowledge, the mothers trained with the videotaped modeling techniques performed better.

In all of these studies where the goal was to teach someone to perform some task or activity, showing a videotape that presented the required information and depicted the appropriate activity was a superior training technique when trainees were judged on their performance of the activity.

Studies Showing Videotape As Good As Other Methods

In some studies, videotapes were found to be as good as, but not significantly better than, lecture methods. In a study designed to teach affective attending responses to undergraduates, Albert (1) found no significant differences between groups trained with written material and videotaped modeling and groups trained with written material alone.

Jovick (6) looked at problem solving performance of second, seventh and twelfth graders and found that any of the training methods used were superior to no training for the seventh and twelfth graders but that there was nothing to suggest differences between the effects of the three
experimental methods. The methods used in the study by Jovick were guided practice, concrete modeling via videotape and abstract modeling via videotape.

Robinson (15) found in a study concerned with eliciting particular categories of responses from counselors that training that included modeling of the particular behaviors was better than training without the modeling. However, the method of model presentation did not make a difference in this study, since no significant difference was found between groups that received a written model and those that received a videotaped model.

McMullen (8) reports finding no significant difference in the behavior of women trained by videotape and those trained by written instruction in a study dealing with sexual dysfunction. In another study, Vesper (20) compared two teaching approaches for human relations training in a business environment and found no significant difference between training utilizing videotape feedback and training using prerecorded videotapes. In a study comparing the effectiveness of videotapes vs. written transcripts of the tapes in training teachers to use higher cognitive questioning skills, Gall (5) found that the two methods were equally effective although on some indices, the method using the written material was superior.
In teaching medical students to give the Mental Status Exam using both videotapes and lecture methods, Pohl (14) found no difference in scores on a multiple choice exam between the group seeing the tapes and the group hearing the lectures. In this study, knowledge about how to give the exam was tested and no attempt was make to test the students' ability to apply that knowledge. In another study involving medical students, no difference was found in test scores between groups seeing a traditional lecture and groups seeing a videotaped lecture (although students expressed a preference for the 'live' lecture) (13).

Studies Showing Videotape Inferior to Other Methods

In one area, letting individuals observe a tape depicting people exhibiting the type of behavior that the individuals were learning was detrimental to their subsequent performance. In investigating brainstorming performance, Dillon (3) trained people in groups and individually using methods involving videotape modeling and no modeling, practice and no practice. Based on the number of ideas generated, individuals outperformed groups and the no model method was better than the method incorporating modeling at a significant level. Walter (21) reports similar results with teaching brainstorming techniques.
Anxiety as a Confounding Factor

The majority of evidence presented seems to indicate that if we want to train someone to do something, it will be helpful to show them a videotape illustrating the various tasks we want them to perform. If computer anxiety is considered as an additional factor, there is some evidence to suggest that such a videotape will be particularly helpful. Since the causes of computer anxiety, stemming from fear of the unknown, include fear of embarrassment or ridicule, a hesitancy to ask questions and uneasiness caused by seeing younger people seemingly so comfortable with computers (23), a videotape has the opportunity to address many of these fears by presenting information in a production that viewers will remember (24, 25).

There is evidence to suggest that videotapes depicting the situation or object feared can be used successfully in alleviating fears. Lineham (7) treated subjects with fears ranging from fear of spiders to fear of public speaking using such tapes. In another study, seeing a tape of a group therapy session reduced the anxiety of subjects entering group therapy (2). Therefore, there is some evidence that computer anxious people will learn more easily from a videotape than from a live demonstration and that a tape depicting the computer laboratory environment might be helpful in alleviating their anxiety.
Conclusion

Although no studies were found that compared various methods of training naive users to operate microcomputers, the evidence suggests that videotape training is typically more effective than other techniques, possibly because of the factors cited by Rosenkoetter (16). Certainly, one of the perennial problems of demonstrating a microcomputer is hardware or software failure. The failure of videotape modeling to be effective in the brainstorming studies could be due to the nature of the brainstorming activity which is necessarily very creative and imaginative. It could be that seeing a brainstorming group in action inhibited the responses of the subjects. Since this study will deal with a set of activities that must be performed precisely (the insertion of even one blank in a system command can lead to erroneous results), it seems likely that the results suggested by the brainstorming studies will not apply here. Therefore, the evidence suggests that training naive subjects to use a microcomputer, particularly if anxiety is a factor, will be more successful if done by videotape than if done by live demonstration.
CHAPTER BIBLIOGRAPHY


CHAPTER III
PROCEEDURES FOR DATA COLLECTION AND ANALYSIS

Selection of the Subjects

Four introductory computer science classes were selected for this study from the fourteen CSCI 1100 sections being offered at North Texas State University in the spring 1986 semester. An attempt was made to minimize any effects due to the classroom teachers; therefore, the classes of two teachers of the same sex who had taught CSCI 1100 during at least two previous semesters and who had two daytime classes each were selected for the study. One class of each teacher was chosen to receive the videotape presentation with the other class in each case receiving the live demonstration presentation. One morning and one afternoon class and one 50 minute class and one 80 minute class received each treatment.

Description of Data Collection

The videotape and live demonstration presentations were made to each class during a regular class session during the second week of the semester. After a brief introduction explaining the nature of the presentation and requesting
participate were asked to fill out a questionnaire containing demographic information and the Computer Opinions Survey which was used as the computer anxiety scale. Then each class saw either the videotape or the live demonstration on the use of the TI99/4A microcomputer. Immediately following the presentation, each student answered 15 multiple choice questions related to material in the presentation.

Those who wished to complete their participation were asked to make a reservation for the laboratory phase of the study. The laboratory sessions began the day after the class presentations and continued for two weeks. During a laboratory session, each participant worked alone in a room which contained a TI99/4A microcomputer system with a printer. Each participant was given a set of microcomputer system operations to perform (see Appendix B), a prepared floppy disk and a TI99/4A User's Guide (1). The floppy disk contained a program named SAMPLE that was to be copied into the computer's memory, executed, modified, executed, listed and copied back onto the floppy disk under the name TEST. Each participant was also asked to get a printed listing and a printed version of the execution of the modified program. All computer output was captured on a video cassette recorder. This technique allowed subsequent analysis of the subjects behavior at the level of single keystrokes without
introducing the uncontrolled variance associated with a human observer. The system operation portion of the laboratory session concluded when the participant indicated he was through or when 30 minutes had elapsed, whichever came first. At that time, the participant was asked to fill out an eight part five-point Likert scale questionnaire (see Appendices C and D) concerning his reactions to the presentation he had seen in the classroom, either the videotape or the live demonstration.

The Dependent Variables

One of the dependent variable used in this study is the total number of correct answers on the multiple choice questions that participants answered immediately after seeing the videotape or live demonstration. The highest possible score is fifteen and the lowest possible score is zero. If the subject circled two answers for one item or failed to respond to an item, that item was counted as incorrect.

Another dependent variable is the participant's score on the Computer Anxiety Index which is a 26 item six-point Likert scale questionnaire with 12 statements worded positively and 14 worded negatively. Each participant's score on this index was found by subtracting the answer given on the positive statements from seven and summing the replies over the 26 items. If a subject circled more than
one number for an item or omitted an item, then that subject's anxiety score was not used. The highest possible score on the anxiety index is 156 and the lowest possible score is 26. The higher the score, the more computer anxious the participant.

A third dependent variable used is based on the number of system operation tasks completed. Each participant's performance on the system operation tasks was graded on the basis of completed or not completed. The first three tasks (see Appendix B) were scored as a unit (getting the system ready). Tasks numbered four, five, six, eight, nine, ten and eleven were scored as one task each. Task numbered seven was scored as two tasks - one task was issuing the appropriate system command (LIST) and the other was writing down the highest line number contained in the program (1950). The task numbered twelve, which gave directions for those who completed everything before the time period was up, was not scored. There were, therefore, a total of ten system tasks so that the highest possible score for the laboratory session is ten and the lowest possible score is zero.

A user satisfaction score was computed from an eight item five-point Likert scale (see Appendices C and D). Each of the eight statements was worded positively so that the score for each participant on this scale was computed by
summing the individual responses. The lower the score, the more satisfied the observer had been with the presentation he had seen. The lowest possible score is 8 and the highest possible score is 40.

Statistical Procedures Used in Data Analysis

All those who were present the day of the class presentation, who signed the participation agreement, filled out the Computer Opinion Survey, observed the presentation and answered the fifteen multiple choice questions and who indicated that they did not have previous experience in programming or operating a computer were included in the test of the first hypothesis. Since it was determined (by using a t-test) that the group who viewed the videotape and the group who viewed the live demonstration did not differ significantly with respect to computer anxiety, anxiety was not used as a covariate in further analyses. A t-test was used to compare the two groups with respect to their scores on the written 15 question quiz over material covered in the presentation.

All those who had participated in the classroom portion of the study and who completed the laboratory segment of the study were included in the test of the second hypothesis. This group was smaller since not everyone who was eligible completed the laboratory session. As before, since those in this group who had seen the videotape presentation did not
this group who had seen the videotape presentation did not differ significantly with respect to computer anxiety from those who had seen the live demonstration, a t-test was used to compare the groups with respect to the number of successfully completed system operation tasks without using anxiety as a covariate.

Those who completed both the classroom and laboratory segments of the study were divided into two groups labeled anxious and not anxious using the standardized median of the Computer Anxiety Index as the division point. A two by two analysis of variance was computed with levels of anxiety in one dimension and the two presentations in the other dimension. The number of system operation tasks completed was the dependent variable.

Descriptive statistics and correlations were computed for three groups—the naive users (those with no previous computer experience), the novice users (those with some previous computer experience) and the participants as a whole (either naive or novice subjects).

In addition, eight two by two analyses of variance were computed, four using the entire group (both experienced and non experienced) and four using just the naive group, with treatment and sex as the independent variables. The four dependent variables used are written test score, anxiety level, system tasks score and satisfaction level. Post hoc
Two t-tests were computed for the entire group (naive and novice) with treatment the independent variable. The two dependent variables were the task total and test total.

All statistics, except for analyses of interactions, were computed using a National Advanced Systems 8043 computer at North Texas State University and the SPSSX statistical software package (2). The post hoc analyses of significant interactions were computed using techniques described in Winer (3) on the North Texas State University VAX 11/785.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

RESULTS OF DATA ANALYSIS

Description of the Population

At the time of the study, 221 students were enrolled in the four CSCI 1100 classes selected for participation. Of this total, 197 participated in the classroom part of the study. This group included 106 males and 89 females (2 subjects did not designate their sex) ranging in age from 18 to 39 with a median age of 20 and a mean age of 21.70 (10 subjects did not give their age). All classifications (freshman through graduate student) were represented with the median classification being sophomore. Forty-nine subjects were taking CSCI 1100 as an elective and 134 to fulfill a requirement. Sixty-one viewed the live demonstration and 136 saw the videotape.

Of the 197 original participants, 187 answered the question concerning prior computer experience. A total of 101 had no previous experience in programming or operating a computer. These subjects were considered naive users. Eighty-six had some previous experience with computers and were considered novice users. Seventy-four of these original 197 participants completed the laboratory segment.
of the study. Fifty of these were naive users and 24 were novice.

The population used in the testing of the first hypothesis consisted of the 101 naive users who completed the classroom segment of the study. This group contained 47 males and 54 females. Their ages ranged from 18 to 39 with the mean age being 22.22 and the median age being 21. All classifications were represented (freshman through graduate student) with the median classification being sophomore. Of those who responded to the question concerning their reason for taking CSCI 1100, 31 were taking it as an elective and for 67 it was a requirement. Thirty-seven viewed the live demonstration and 64 saw the videotape presentation.

The population used in the testing of the second and third hypotheses are the 50 naive users who completed both the classroom and the laboratory segments of the study. Of these 50, there were 22 males and 28 females. The ages of group members ranged from 18 to 39 with the mean age being 23.10 and the median age being 22. The median classification of the group is sophomore with all classifications being represented. Eleven had selected the course as an elective and 37 were taking it to fulfill a requirement. Twenty-six had viewed the live demonstration and 24 the videotape.
Since approximately half of the students who participated in the classroom portion of the study did not complete the laboratory session, tests were made to see if differences could be found with respect to the dependent variables test score and anxiety index score between the classroom participants who did not complete the laboratory session and those who completed both segments of the study. There were no significant differences between the groups with respect to written test scores \((t = 0.716, \text{ df } = 99, \ p = 0.476)\) or computer anxiety scores \((t = 0.985, \text{ df } = 91, \ p = 0.327)\).

**Results for the Hypotheses**

According to the first hypothesis, the participants who had seen the videotape would average a significantly higher score on the written quiz over material covered in the presentation than would the participants who had seen the live demonstration. Results of the t-test indicate that the mean score for the videotape subjects is 11.44 with a standard deviation of 2.25 while the mean score for the live demonstration subjects is 10.78 with a standard deviation of 2.21. However, this difference did not prove to be statistically significant \((t = 1.417, \text{ df } = 99, \ p = 0.160)\).

The second hypothesis states that participants who had seen the videotape would complete a significantly larger number of system operation tasks than would the participants
who had seen the live demonstration. Results of the t-test show that the mean number of tasks completed by those who saw the videotape is 5.29 with a standard deviation of 3.01 while the subjects who viewed the live demonstration completed an average of 5.65 tasks with a standard deviation of 2.62. This difference is not statistically significant ($t = 0.4539$, $df = 48$, $p = 0.652$).

The third hypothesis was tested using a two by two analysis of variance with anxiety and treatment as the independent variables and the number of tasks completed as the dependent variable. Table I provides a summary table for the analysis testing the third hypothesis.

### TABLE I

**SUMMARY TABLE FOR SYSTEM TASKS COMPLETED BY NAIVE SUBJECTS: TREATMENT BY ANXIETY**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>3.62</td>
<td>1</td>
<td>3.62</td>
<td>0.47</td>
<td>0.496</td>
</tr>
<tr>
<td>Anxiety</td>
<td>7.99</td>
<td>1</td>
<td>7.99</td>
<td>1.04</td>
<td>0.313</td>
</tr>
<tr>
<td>Interaction</td>
<td>1.65</td>
<td>1</td>
<td>1.65</td>
<td>0.22</td>
<td>0.645</td>
</tr>
<tr>
<td>Error</td>
<td>329.93</td>
<td>43</td>
<td>7.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>341.83</td>
<td>46</td>
<td>7.43</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The mean for anxious subjects is 5.25 with a standard deviation of 2.86 for those who saw the videotape and 5.50 with a standard deviation of 2.66 for those who saw the live demonstration. For non-anxious students, the means are 5.73 with a standard deviation of 3.13 for those who saw the videotape and 6.75 with a standard deviation of 2.25 for those who saw the live demonstration. No statistically significant differences were found for differential main effects or interactions.

Additional Results

For the naive group, the two by two analysis of variance with treatment and sex as the independent variables and user satisfaction as the dependent variables revealed differential main effects for both independent variables. The videotape viewers were significantly more satisfied with the presentation than were the viewers of the live demonstration. The mean satisfaction score for those who saw the videotape presentation is 19.38 with a standard deviation of 3.28 and the mean satisfaction score for those who saw the live demonstration is 24.19 with a standard deviation of 6.01 (a lower score indicated greater satisfaction with the presentation). A second differential main effect indicated that the males were significantly more satisfied with the presentation they saw, whichever one it was, than were the females. The mean satisfaction scores
are 20.64 with a standard deviation of 4.24 for males and 22.86 with a standard deviation of 6.10 for females. A summary of this analysis is presented in Table II.

**TABLE II**

**SUMMARY TABLE FOR USER SATISFACTION OF NAIVE SUBJECTS: TREATMENT BY SEX**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>329.17</td>
<td>1</td>
<td>329.17</td>
<td>14.68</td>
<td>0.000</td>
</tr>
<tr>
<td>Sex</td>
<td>100.31</td>
<td>1</td>
<td>100.31</td>
<td>4.48</td>
<td>0.040</td>
</tr>
<tr>
<td>Interaction</td>
<td>20.20</td>
<td>1</td>
<td>20.20</td>
<td>0.90</td>
<td>0.347</td>
</tr>
<tr>
<td>Error</td>
<td>1031.16</td>
<td>46</td>
<td>22.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1441.28</td>
<td>46</td>
<td>29.41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analogous results occurred for the combined naive and novice groups. The mean satisfaction scores in this case are 18.34 with a standard deviation of 3.57 for the videotape viewers and 23.32 with a standard deviation of 6.04 for those who viewed the live demonstration. Naive and novice males have a mean satisfaction score of 19.61 with a standard deviation of 4.56 while the mean satisfaction score for naive and novice females is 22.03 with a standard deviation of 6.17. A summary table of this analysis is presented in Table III.
A two by two analysis of variance with independent variables treatment and sex, using the written test scores of both naive and novice participants as the dependent variable, shows a significant interaction. A posteriori analysis indicated that females who viewed the live demonstration with a mean test score of 10.48 and standard deviation of 2.14 scored significantly lower on the written test than did each of the other three groups - females who viewed the videotape (mean = 12.23, standard deviation = 1.83), males who viewed the videotape (mean = 12.11, standard deviation = 2.73) and males who viewed the live demonstration (mean = 11.81, standard deviation = 2.49). In
addition, a significant differential main effect occurred with respect to treatment. The participants who saw the videotape scored higher on the written test than did those who saw the live demonstration. The mean test scores are 12.17 with a standard deviation of 2.33 for the first group and 11.26 with a standard deviation of 2.43 for the second. A summary table of this analysis is presented in Table IV.

**TABLE IV**

**SUMMARY TABLE FOR WRITTEN TEST SCORES OF NAIVE AND NOVICE SUBJECTS: TREATMENT BY SEX**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>36.20</td>
<td>1</td>
<td>36.20</td>
<td>6.57</td>
<td>0.011</td>
</tr>
<tr>
<td>Sex</td>
<td>5.01</td>
<td>1</td>
<td>5.01</td>
<td>0.91</td>
<td>0.341</td>
</tr>
<tr>
<td>Interaction</td>
<td>21.39</td>
<td>1</td>
<td>21.39</td>
<td>3.88</td>
<td>0.050</td>
</tr>
<tr>
<td>Error</td>
<td>1052.45</td>
<td>191</td>
<td>5.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1113.52</td>
<td>194</td>
<td>5.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Anxiety was found to be significantly correlated with written test total, system task completion total and user satisfaction. For the naive subjects, a Pearson product moment correlation revealed that lower computer anxiety (lower anxiety score) was associated with a higher score on
the written test \(r = -0.2986, \text{df} = 91, p = 0.002\) and a higher number of system operation tasks completed \(r = -0.3784, \text{df} = 45, p = 0.004\). The same correlations are significant when the naive and novice users are grouped together \(r = -0.2688, \text{df} = 174, p < 0.001\) for anxiety and test scores and \(r = -0.4767, \text{df} = 67, p < 0.001\) for anxiety and task scores).

For the combined naive and novice group, a significant positive correlation was found \(r = 0.2775, \text{df} = 67, p = 0.010\) between computer anxiety and user satisfaction. Higher anxiety is related to lower satisfaction (higher user satisfaction score) with the presentation.

Within the combined naive and novice group, females tended to be more computer anxious than males. A significant positive correlation exists between sex and computer anxiety \(r = 0.1281, \text{df} = 174, p = .045\).

Having some prior experience with computers was found to be significantly related to sex, anxiety, test total, task total and user satisfaction. Males tended to have had prior computer experience more than females \(r = 0.1743, \text{df} = 185, p = 0.009\). Those with some prior experience tended to have less computer anxiety \(r = -0.3376, \text{df} = 172, p < 0.001\). Prior experience was positively associated with test total \(r = 0.3376, \text{df} = 172, p < 0.001\) and task total \(r = 0.4314, \text{df} = 72, p < 0.001\). Those with prior
experience tended to be more satisfied with the presentation they saw ($r = -0.3118$, $df = 72$, $p = 0.003$).
Discussion of the Hypotheses

The findings do not support the first hypothesis that the naive users who saw the videotape would score significantly higher on the written test than the naive users who saw the live demonstration. The mean test score was higher for the videotape group but the difference was not statistically significant.

These results are in accordance with the findings of Pohl (6) who found no difference in multiple choice exam scores between a group of medical students who learned to give the Mental Status Exam by seeing a videotape and a group who heard a lecture. Similarly, Nay (5) reports no differences among training techniques (written instructions, lecture, symbolic modeling via videotape and symbolic modeling via videotape plus roleplaying) when mothers who were being trained in the time out technique responded to a written questionnaire over their acquired knowledge.

The second hypothesis, that naive users who saw the videotape would complete a significantly greater number of system operation tasks than would the naive users who saw
the live demonstration, was not supported by this study. Based on this study, it appears that the ability to apply information is not dependent upon the presentation of that information. This result is not in accordance with the findings of Nay (5) who reports that the mothers learning the time out technique who were trained by the videotape outperformed mothers trained by other methods when they were asked to apply their knowledge. However, this study is in accordance with the results of other studies where the ability to apply information was tested and the method of material presentation was found to be immaterial (2, 3, 4, 7).

The third hypothesis addressed the role of computer anxiety in system task performance and stated that the naive computer anxious subjects who saw the videotape would perform a significantly higher number of system operation tasks than would the naive computer anxious subjects who saw the live demonstration. This hypothesis is not supported by the findings of the study. Since there is no significant difference in mean number of system operation tasks performed between the anxious and the not anxious groups, it appears that anxiety plays no role in the performance of naive computer users regardless of the method of information presentation.
Discussion of Additional Results

Since introductory computer science classes are not typically composed exclusively of naive computer users, differences between groups composed of combined naive and novice computer users were analyzed to see what effect, if any, method of information presentation had on written test and system task completion scores. When all participants are considered, those who had seen the videotape scored significantly higher on the written test than did those who had seen the live demonstration. These results are in accordance with an Environmental Protection Agency study (1) that showed videotape presentation was superior to four other methods of information presentation, including presentation by a team of specialists, when information acquisition was tested by written exam. The EPA study did not, however, attempt to assess the participants on how well they could apply the knowledge they had acquired.

When the combined naive and novice users in this study are compared with respect to system task completion scores, no significant effect was found due to treatment. It appears, then, that having information in mind (as demonstrated by written test score) is a necessary but not sufficient condition for being able to apply that information. The ability to recall information is influenced by mode of presentation, but the ability to apply that information is not.
When participants' preferences are considered, videotape is the presentation of choice. Subjects who saw the videotape were significantly more satisfied with that presentation than were the subjects who saw the live demonstration. This preference was found for naive participants and for combined naive and novice groups. These results are in accordance with the reports of Rosenkoetter (9) and Schade and Bartholomew (8) as to the positive response of students to videotapes.

The interaction between sex and treatment with respect to written test scores is one area that merits further attention. Females who saw the live demonstration scored significantly lower on the written test than females who saw the videotape or males in either treatment group. Females tend to be more computer anxious than males as shown by a significant correlation between sex and anxiety. A significant correlation was also found between higher anxiety and lower written test scores. The low written test scores of females who viewed the live demonstration might be partially explained by these correlations. However, the correlation suggesting females tend to be more computer anxious than males should be viewed guardedly. With a correlation of 0.1281, less than 1.5 per cent of the variation can be accounted for. In addition, since there was no differential main effect due to sex with respect to
written test scores, it appears more than anxiety is involved. It is possible that the females' scores were influenced by the sex of the tape narrator and demonstrator.

Suggestions for Further Research

One possible extension of this study would be to explore the interaction found in this study between treatment and sex with respect to written test scores. A similar study using a female for the live demonstration and a female narrator in the videotape would help clarify the issues involved.

Since this study did not find method of information presentation affected application of acquired knowledge, the question remains open as to how information can be presented so that application of knowledge so acquired can be enhanced. This could be approached by employing different information presentation techniques. A comparison could be made between a group who viewed the videotape in a classroom setting and a group whose members each viewed the tape individually. A group whose members could view the videotape or any part of it on demand while completing the system operation tasks might be compared to a group who saw the tape once and then had access to a consultant during the task completion phase.

To further explore the effects of computer anxiety on performance, anxiety reduction techniques could be employed.
For one group the anxiety reduction treatment could occur before information presentation; for another, between the presentation and the written test; and for a third, between the written test and the system operation tasks. A control group would receive no anxiety reduction treatment.

Summary and Conclusions

The purpose of this study was to compare two methods of training people to use a microcomputer system. While it was acknowledged that optimal training methods require a large outlay of equipment and one-to-one tutoring, practical considerations often dictate that alternative methods be employed. This study looked at two alternatives, each of which allowed presentation of information to groups of students in a classroom setting. These alternative training methods were videotape presentation and live demonstration. In addition to comparing the two presentation methods, this study also attempted to discover the interaction, if any, between the computer anxiety of the subjects and the presentation they were given.

A survey of the pertinent literature revealed mixed conclusions. In some situations videotape presentations were found to be better than other methods but in other studies, videotape presentation was found to be no better than or, in some cases, worse than other methods. Some studies showed anxiety was alleviated if anxious subjects saw videotapes depicting the feared object or situation.
The results of this study indicate that videotape is superior to live demonstration with respect to comprehensive knowledge acquired (as indicated by a written test) but that there is no difference between the methods of presentation when application of the acquired knowledge is tested (as indicated by the number of system operation tasks completed). User satisfaction was found to be higher for the videotape group than for the live demonstration group.

Due to the significant findings of this study and the inherent advantages of a videotape presentation over a live demonstration, it was concluded that the videotape presentation is superior to a live demonstration for purposes of training people to use a microcomputer system. These conclusions were incorporated into recommendations for North Texas State University's Computer Science Department.

Recommendations for North Texas State University

Demonstration of computer proficiency is a requirement for all undergraduates in the North Texas State University College of Arts and Sciences. Taking CSCI 1100 is one way of meeting that computer proficiency requirement. All elementary and secondary education majors in the North Texas State University College of Education must take a computer science course. Computer Science 1100 is the course that fulfills that requirement. Therefore, enrollment in CSCI 1100 with the concomitant need for training naive and novice
users how to use a microcomputer is predicted to remain high. It is recommended that the North Texas State University use a videotape presentation instead of a live demonstration for the purpose of training CSCI 1100 students how to use the Microcomputer Laboratory and the Texas Instruments 99/4A microcomputer. This recommendation is based on the results of this study and on the characteristics of videotape presentations.

The following are points in support of using a videotape presentation to teach students in an introductory computer science course to use a microcomputer system.

1. A videotape presentation is superior to a live demonstration in presenting information to combined naive and novice computer users when information acquisition is tested with a written quiz. In addition, user satisfaction is significantly greater for the videotape presentation than for the live demonstration. Since, method of information presentation does not seem to depend on application of the acquired information, this study found no evidence to support the use of a live demonstration.

2. A videotape provides innate advantages over live demonstration. Completeness and accuracy of the material covered is assured. There is less likelihood of equipment malfunction. Presenting a videotape requires a video cassette player hooked to a monitor screen while a live
demonstration of a TI 99/4A microcomputer requires a console, disk drive, disk drive controller and a monitor. If any of the four pieces of the microcomputer do not function correctly, a live demonstration can be negatively affected.

3. A videotape is preferable to a live demonstration in terms of damage to the equipment. Moving a microcomputer from room to room for presentations is potentially damaging to the computer. A videotape is much more portable and it is easy to make arrangements to show a videotape in any building on campus. Live demonstrations can only be scheduled inside the General Academic Building.

4. A videotape has an advantage over a live demonstration in a large classroom. While the output from the computer used in a live demonstration can be shown on a big screen, the parts of the computer itself such as the keyboard, etc., cannot be enlarged for easy viewing by all. The videotape incorporates closeups of each part of the computer, making them more visible for large audiences.

5. A videotape allows for much flexibility in presentation. As well as showing the tape to a classroom, individuals could view or review the tape in the Media Library. Arrangements could be made to use the Tager network so that the tape could be viewed on a monitor in the Microcomputer Laboratory.
6. A videotape is more cost effective than a live demonstration. A videotape requires a one time expenditure while live demonstrations require annual training of new Microlab employees.

In the event that the computer equipment used in CSCI 1100 changes, it is recommended, based on the above points, that another videotape be made and that that tape be used to present information about the operation of the microcomputer to students in the CSCI 1100 classes in lieu of a live demonstration.
CHAPTER BIBLIOGRAPHY


Appendix A

Written Test on Material Covered by Presentations

Based on the information you have just received about the NTSU Microcomputer Laboratory and the TI99/4A microcomputer, please circle the best answer to each of the following questions.

1. The TI99/4A microcomputers are in the Microcomputer Lab which is located
   A. on the first floor of the Business Administration building
   B. in the Science Library in the Information Sciences building
   C. on the third floor of the General Academic building
   D. on the fifth floor of the General Academic building

2. The primary memory of the microcomputer is located in
   A. the monitor
   B. the console with keyboard
   C. the disk drive
   D. the peripheral expansion box

3. The only switch that one needs to turn on in the Microlab in order to operate the TI99/4A microcomputer is located
   A. on the front of the console
   B. on the monitor
   C. on the disk drive controller
   D. on the disk drive

4. When you turn the TI99/4A on, it is important to check that
   A. the disk drive DOES spin momentarily.
   B. the disk drive DOES NOT spin momentarily.
5. When you place a disk in a drive with a horizontal door
A. the disk label should be on top and the disk notch on the right.
B. the disk label should be on the bottom and the notch on the right.
C. the disk label should be on top and the disk notch on the left.
D. the disk label should be on the bottom and the notch on the left.

6. After a disk is inserted in a disk drive, the drive door should be
A. left open
B. shut

7. The program named CAT is
A. used as part of each BASIC program you write
B. used for printing copies of your programs on paper
C. used in getting a list of the names of all the programs on a disk
D. a tutorial on the BASIC language

8. The program named SHELL is
A. used as part of each BASIC program you write
B. used for listing the lines of a BASIC program
C. used in getting a list of the names of all the programs on a disk
D. a tutorial on the BASIC language

9. The information stored on a floppy disk
A. may be lost if there is a power failure while the disk is in a drive
B. may not be changed
C. may be lost if the disk is placed on something containing a motor

10. Which of the following commands would be used for copying a program named CAT from a disk to the memory of the computer?
A. OLD DSK1 . CAT
B. LOAD DSK1 . CAT
C. COPY DSK1 . CAT
D. OLD DSK1.CAT

11. If you make a mistake while typing on the TI99/4A, how can you move the cursor to the left to correct the error?
A. use the backspace key
B. use the delete key
C. use the Function key and the 5 key
D. use the Function key and the 4 key
12. How can one stop a program such as one of the BASIC Tutorial programs before it is finished executing?
   A. use the Stop key
   B. use the delete key
   C. use the Function key and the S key
   D. use the Function key and the 4 key

13. What is the purpose of the LIST command?
   A. To tell the computer to execute the BASIC program currently in memory
   B. To tell the computer to show you the statements of the BASIC program currently in memory
   C. To tell the computer to show you the names of the programs on the disk currently in the disk drive

14. What is the purpose of the RUN command?
   A. To tell the computer to execute the BASIC program currently in memory
   B. To tell the computer to show you the statements of the BASIC program currently in memory
   C. To tell the computer to show you the names of the programs on the disk currently in the disk drive

15. If you were using a TI99/4A microcomputer system with a printer, which of the following commands would you use to get a printed copy of the statements of the BASIC program currently in the computer's memory?
   A. LIST
   B. PRINT
   C. LIST.PRINTER
   D. LIST "RS232/1.BA=2400"
Appendix B

Microlaboratory Assignment

1. Turn on the TI99/4A microcomputer system.

2. Insert the disk you were given into the disk drive.

3. The TI Instruments Title Screen should be on the screen. Get into TI BASIC.

4. There is a program named SAMPLE on the disk that is now in the disk drive. Copy it from the disk to the memory of the computer.

5. Execute the program you just copied into the computer's memory by issuing the appropriate system command.

6. Add the following lines to the program in memory by typing the following lines exactly (except type your own name instead of "your name"). Correct any typing errors that you make.

   110 REM your name
   120 FOR X = 2 TO 20
   130 PRINT #P: "NTSU"
   140 NEXT X

7. Look at the BASIC statements of the program currently in computer memory by issuing the appropriate system command. Write down the highest line number contained in that program in the space provided: __________.

8. Execute the modified program that is now in memory. (Even if you get an error message when you execute this program, go on to the next instruction.)

9. Copy the modified program currently in computer memory onto the disk in the disk drive giving it the name TEST.

10. Get a printed listing of the program currently in memory.
11. Get a printed version of the execution of the program in memory.

12. If you complete these tasks before the allotted time is up, turn off the TI99/4A microcomputer system, return the disk to GAB 331 along with your printed output and this instruction sheet.
Appendix C

User Satisfaction Scale - Live Demonstration

For each of the following statements, please indicate your degree of agreement or disagreement by circling the appropriate number based on the following scale:

1 - strongly agree
2 - agree
3 - neutral
4 - disagree
5 - strongly disagree

1 2 3 4 5 The lecture/demonstration covered all the information that I needed to adequately complete the assigned tasks in the laboratory.

1 2 3 4 5 I knew what the equipment would look like before I got to the lab.

1 2 3 4 5 The lecture/demonstration was more helpful than a videotape presentation covering the same material would have been.

1 2 3 4 5 All of the lecture/demonstration was easy to understand.

1 2 3 4 5 The information presented in the lecture/demonstration was well-organized.

1 2 3 4 5 It was easy for me to keep up with the information presented in the lecture/demonstration.

1 2 3 4 5 The lecture/demonstration kept my attention.

1 2 3 4 5 The overall quality of the lecture/demonstration was good.
Appendix D

User Satisfaction Scale - Videotape

For each of the following statements, please indicate your degree of agreement or disagreement by circling the appropriate number based on the following scale:

1 - strongly agree
2 - agree
3 - neutral
4 - disagree
5 - strongly disagree

1 2 3 4 5 The videotape covered all the information that I needed to adequately complete the assigned tasks in the laboratory.

1 2 3 4 5 I knew what the equipment would look like before I got to the lab.

1 2 3 4 5 The videotape was more helpful than a lecture/demonstration presentation covering the same material would have been.

1 2 3 4 5 All of the videotape was easy to understand.

1 2 3 4 5 The information presented in the videotape was well-organized.

1 2 3 4 5 It was easy for me to keep up with the information presented in the videotape.

1 2 3 4 5 The videotape kept my attention.

1 2 3 4 5 The overall quality of the videotape was good.
BIBLIOGRAPHY

Books


Technical Manuals


Articles


Tannebaum, Robert S. and Rahn, E. J., "Teaching Computer Literacy to Humanities and Social Science Students," Academe, 70 (October, 1984), 19-23.


Witt, Gary, "How to Design a Production That Viewers Will Remember," Instructional Innovator, 26 (October, 1981), 3-43.

Reports


Environmental Protection Agency, "Acquisition of Information to be Used in Programming for Pesticides Applicator Certification Training, Final Report," Kansas State University, Manhattan, January, 1976.

Public Documents

Unpublished Materials

Decker, Deanna, unpublished notes, Department of Computer Sciences, North Texas State University, Denton, Texas, 1985.

