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ABSTRACT

The Videodisc Interpersonal Skills Training and Assessment (VISTA) project was conceived as a means to use computer-assisted leadership training to reduce high personnel costs associated with assessment center training and simulation. Originated by the Army Research Institute's Ft. Benning Field Unit, the research effort included topic analysis, hardware selection, software development, scenario writing, studio production, editing, and videodisc mastering. Final evaluation of the videodiscs included the administration of two tests, one designed to measure the acquisition of leadership skills, and the other a subjective preference test designed to measure user acceptance. Nine highly interactive videodisc training scenarios covering 20 leadership problems were produced. The evaluation of the scenarios indicated that the videodisc method resulted in significantly greater learning of leadership principles, with the majority of students indicating that a combination of videodisc and role playing would be optimal for leadership training. (Author/DJR)

Technical Report 703

Videodisc Interpersonal Skills Training and Assessment (VISTA): Overview and Findings, Volume 1

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The Videodisc Interpersonal Skills Training and Assessment (VISTA) project was initiated as a means to use computer-assisted training/videodisc technology to reduce the high training costs associated with junior officer leadership skills training. Historically the major problem was simulating subordinates as they would probably respond in a given leadership situation; assessment center simulations and role playing could train leadership skills but not without high personnel costs due to the numbers of counselors and role players required.

(continued)

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Previous research indicated that a videodisc system could successfully train soldier skills even when only a fraction of the capabilities of the medium were used. Such a system could be used to supplement the current role playing and, hence, reduce the number of support personnel required.

The research effort included topic analysis, hardware selection, software development, scenario writing, studio production, editing, and videodisc mastering. Final evaluation of the videodiscs produced included the administration of two tests, a test designed to measure the acquisition of leadership skills and a subjective preference test designed to measure user acceptance.

Nine highly interactive videodisc training scenarios covering 20 leadership problems were produced. Overall evaluation results indicated a VISTA superiority followed by role playing and programmed text, with the majority of students indicating that a combination of videodisc and role playing would be optimal for leadership training. Results also indicate that although VISTA products were designed for the Infantry Officer's Basic Course, the problems addressed are probably common to other Army branches and should therefore be investigated for possible application in other training centers.

Technical Report 703

Videodisc Interpersonal Skills Training and Assessment (VISTA): Overview and Findings, Volume 1

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FOREWORD

The quality training of leadership and interpersonal skills is of major importance to any organization. The U.S. Army has always emphasized the importance of training and maintaining strong leadership skills at all levels, especially among junior officers. Over the years, various approaches have been utilized, most commonly textbooks and simulations (e.g., role playing and assessment center simulations). These methods have typically been shown to be effective means for the assessment and training of interpersonal leadership skills. However, both procedures require a large instructor core, including role players, evaluators, and administrators.

The Videodisc Interpersonal Skills Training and Assessment (VISTA) project was conceived as a means to use computer-assisted leadership training to reduce the high personnel costs associated with assessment center training and simulations. Computer-assisted videodisc technology would allow the rapid and accurate random access to a large number of motion sequences depicting various outcomes to given leadership situations encountered by both junior officers and subordinates.

The project was originated by the Army Research Institute's Fort Benning Field Unit as a part of a continuing research program dedicated to developing better training methods and techniques for teaching soldier skills. ARI oversaw the entire VISTA research and development effort. Research support and funding during development and evaluation came from the Training Developments Institute (TDI) of the U.S. Army Training and Doctrine Command, Fort Monroe. The U.S. Army Communicative Technology Office (ACTO), Fort Eustis, provided the equipment and funds for the videodisc production. The U.S. Army Infantry School at Fort Benning provided subject matter experts and students for the evaluation. The Training and Audiovisual Support Centers at Fort Benning and Fort Gordon provided support during the studio production and editing stages of the project.

The VISTA project produced nine highly interactive videodisc training scenarios covering 20 leadership problems that were judged to be high in difficulty, importance, and/or frequency. Each scenario can be presented in one of two instructional modes designed to maximize the potential of the new training technology. In addition, other products were created which were designed to expedite future development efforts.

The evaluation of the scenarios indicated that the videodisc method resulted in significantly greater learning of leadership principles. Both role playing and the videodisc products were rated high on a subjective preference scale used to measure user acceptance. Role playing was slightly but significantly higher than videodisc and both role playing and videodisc were much higher than a programmed text containing the same instructional content as the videodisc. The majority of the students indicated that a combination of videodisc and role playing would be optimal for leadership training.

Edgar M. Johnson

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Technical Director

VIDEODISC INTERPERSONAL SKILLS TRAINING AND ASSESSMENT (VISTA)

EXECUTIVE SUMMARY

Introduction:

The U.S. Army's VISTA (Videodisc Interpersonal Skills Training and Assessment) project was initiated to determine whether leadership and counseling skills could be trained using current computer-assisted instruction/videodisc technology. The target audience was Army junior officers (Second Lieutenants in the Infantry Officer's Basic Course at Fort Benning, Georgia). Five government agencies and two contractors were involved in this effort that included a front-end topic analysis, hardware selection, software development, scenario writing, studio production, editing, videodisc mastering, and final evaluation. The final evaluation compared the VISTA products with a programmed text containing the same information and role playing using the same topic themes. All seven VISTA videodiscs (nine scenarios) were tested.

Procedure:

The first stage of the project involved a front-end topic analysis, hardware and software selection, and design of the instruction. In the topic analysis, 57 candidate interpersonal problem situation topics were generated and rated by 58 subject matter experts for difficulty, importance, and frequency. Situations involving the highest composite scores for the three dimensions were subsequently addressed in the training scenarios. Twenty problem situations were covered in the 9 scenarios produced to date. The hardware system selected comprised an Apple 2+ computer, a DiscoVision videodisc player, a Sony monitor and other assorted peripherals. The software language chosen was Pascal. Two instructional modes of presentation were designed. The Experiential mode simulates a roleplaying situation. There is no textual feedback and the students can go several steps off the "best path". In the Pedagogical mode, extensive textual feedback is presented and the student is never allowed to go more than one step off the best path.

The second major stage of the project involved the scenario writing and the software development. A scenario authoring aid was developed. Guidance for the determination of appropriate alternatives was derived from the two U.S. Army field manuals dealing with leadership and counseling, subject matter experts, and various theoretical approaches for counseling and leadership. The software was developed to complement the instructional design. In addition, software was developed to allow relatively simple entry of textual information and videodisc frame numbers to expedite future videodisc development efforts.

The final stage involved the evaluation of the seven videodiscs (9 scenarios). An experimental evaluation conducted on all training products measured both learning of leadership principles and the student's acceptance of the new instructional technology.

Findings:

The overall results of the evaluation indicated a VISTA superiority followed by role playing and programmed text, respectively, on a test designed to measure the acquisition of leadership principles. Also, both role playing and videodisc were rated high on a subjective preference scale used to measure user acceptance. Role playing was slightly but significantly higher than videodisc and both videodisc and role playing were much higher than the programmed text. The great majority of the students indicated that a combination of videodisc and role playing would be optimal for leadership training.

Products completed:

- Nine scenarios which address 20 problem areas have been produced and evaluated. Overall results indicated a significant superiority of VISTA products over both role playing and programmed text.

- Two instructional approaches designed to optimize the training impact of the new technology.

- Scenario authoring workbook to aid future scenario writing.

- Generic software that will control any of the videodiscs developed played by either of two popular videodisc players, with or without maintenance of detailed student records, and with choice of two instructional modes.

Utilization:

- The VISTA products were implemented in the Counseling Laboratory of the IOBC in June, 1983.

The following is recommended:

- Due to the success of the VISTA project and other videodisc training projects, the U.S. Army should continue to investigate other possible areas for application of computer-assisted instruction/videodisc training.

- Develop standards in both hardware and courseware structure.

- The VISTA products should serve as a supplement to current leadership training approaches rather than a replacement of those approaches.

- The IOBC Counseling Laboratory is currently taught in two periods, one at the beginning of IOBC and one toward the end. Because of the standardized format, role playing should be conducted in the second laboratory as a performance test and the VISTA products should be utilized in the early laboratory (while students are at an early stage in their learning of leadership).

- Although the VISTA products were developed for the Infantry Officer's Basic Course, the problems addressed are probably common to the other branches. Therefore, the VISTA products should be investigated for possible application in other training centers.

ACKNOWLEDGMENTS

This study was originated by Dr. Frederick N. Dyer at the U.S. Army Research Institute, Fort Benning Field Unit. A total of five government agencies and two contractors were eventually involved. All seven organizations contributed to the success of the project.

Litton Mellonics was the primary contractor responsible for the great majority of the work effort. The original team was headed by Dr. James E. Schroeder who coordinated the overall effort and designed the instruction and evaluation. Dr. Paul Czerny was responsible for the hardware and software selection and the software development. Mr. Daniel P. Gillotti was the Leadership/Counseling subject matter expert responsible for the development of the scenario content. Dr. Edward W. Youngling was the Program Manager of the Litton Mellonics effort for the entire duration of the contract. Over the months, a number of other Litton employees were involved and made significant contributions: (alphabetically) Dr. Gary C. Bayer; Mr. W. Alfred Cook, Jr; Mr. Harry A. Lucker; Dr. Mary N. Perkins; Dr. Mike S. Perkins; Dr. Robert Pleban; Mr. David W. Reiss; and Dr. Gary P. Williams.

The U.S. Army Research Institute, Fort Benning Field Unit supervised the research effort. Special acknowledgement is exended to COL Franklin A. Hart, COL L. Neale Cosby, Dr. Frederick N. Dyer, Dr. Seward Smith, and Mr. Hal Strasel who all provided excellent management, guidance, and suggestions. In addition, Dr. John C. Morey and Sid Hall (an Auburn University doctoral candidate working with ARI through and the Cooperative Education Program at Auburn University), both provided valuable assistance in the data analysis. Also, thanks to MAJ Charles J. Slimowicz, the Research Coordinator at ARI, Fort Benning for his valuable input and for his assistance in securing troop support.

A special acknowledgement is given to the many individuals who volunteered to serve as actors for the six programs. For the most part, these were active duty soldiers who voluntarily arranged their own work schedules to accommodate the VISTA production schedule. Also, some of the actors were volunteers from Litton Mellonics and ARI at Fort Benning.

Fort Benning's Training Audiovisual Support Center (TASC) provided the facilities and expertise for the production of five of the six programs and editing of all six programs. Special credit is extended to Mr. Rubin Webster, Mr. Randy Amos, and Mr. Bennett Yeilding and their staff. The TASC at Fort Gordon provided the actors, facilities, and expertise for the production of the "Performance Counseling" program. Special credit is given to MAJ Doug Dooley, Mr. Gaylord Cavallaro and their staff.

The Training Development Institute (TDI) at Fort Monroe, VA provided funds for the topic analysis, instructional design, software development, scenario development, and evaluation. Acknowledgement is given to COL F. A. Nerone, COL Edmund J. Glabus, Ms. Janet Lamb, Ms. Jean Rose, Mr. Donald A. Kimberlin, and Mr. Frank E. Giunti for their valuable guidance and comments.

The Army Communicative Technology Field Office (ACTO) provided the hardware for the development as well as the funds for the videodisc mastering which was completed by Discovision (later Pioneer Video). Special thanks are extended to COL John A. Goetz, Mr. Bob Reynolds, Mr. Pete Benden, and CPT John Thompson from ACTO for their valuable coordination and assistance.

The U.S. Army Infantry School has made great contributions to the success of the project. Appreciation is extended to all the departments involved. Special thanks go to COL William L. Shackelford and Mr. Walter G. Gardner from the Directorate of Training and to the entire Leadership Department staff who, over the two year period, provided excellent suggestions and guidance (especially: LTC Richard G. Stillwell; MAJ Burton G. Lockwood, II; MAJ Donald E. Allison; MAJ Carl E. Linke; MAJ Edward L. Williams; MAJ Carl B. Fedde; MAJ Larry L. Owens; CPT Theodore Wiggins, Jr.; CPT Craig F. Bennedict; CPT Willard I. Ghere; and CPT Charles L. Smith).

VIDEODISC INTERPERSONAL SKILLS TRAINING AND ASSESSMENT (VISTA):
OVERVIEW AND FINDINGS
VOLUME 1

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NOTE: Appendixes were published separately as follows: ARI Research Note 86-08--Appendixes A, B, C, and D--contains details of the topic analysis, counseling and leadership theories, and scenario development. Research Note 86-09--Appendixes E, F, G, H, I, and J--has presentations of the six scenarios. Research Note 86-10--Appendixes K, L, and M--contains the details of the software, the evaluation instruments, and details of the evaluation results.

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Overview

This final report of the Videodisc Interpersonal Skills Training and Assessment (VISTA) project has been structured to allow the reader to go to various levels of detail. The report presents general information about how the project was developed and evaluated. The various development sections address the wide range of topics involved in the VISTA project, from counseling theories to hardware selection. The evaluation section reports only the most important general findings. The Appendices (published separately) provide more detailed discussions of selected areas. The entire report has been divided into four volumes. Volume 1 contains the main report. Volume 2 contains Appendices A - D, which present details of the topic analysis, discussions of counseling and leadership theories, and details of scenario development. Volume 3 contains Appendices E - J which present the six sceanrios. Volume 4 contains Appendices K - M which present details of the software, the evaluation instruments, and details of the evaluation results. It should be noted that masculine pronouns are used in this report because VISTA was designed for a Combined Arms-Infantry population.

Introduction

The quality training of leadership and interpersonal skills is of major importance to any organization. The U.S. Army has always emphasized the importance of training and maintaining strong leadership skills at all levels, especially among junior officers. Over the years, various approaches have been utilized from textbooks to simulations (e.g., role playing and assessment center simulations). Assessment centers and role playing have typically been shown to be effective means for the assessment and training of interpersonal leadership skills. However, both procedures have the disadvantage of requiring a large instructor core, including role players, evaluators, and administrators.

The Videodisc Interpersonal Skills Training and Assessment project (VISTA) was initially conceived as a means to use computer-assisted leadership training to reduce the high personnel costs associated with assessment centers and role playing (i.e., videodisc programs could be used to supplement the current role playing and, hence, reduce the number of support personnel required). Historically, the major problem was simulating subordinates as they would probably respond in a given leadership situation. An audiovisual medium was needed that would allow rapid and accurate random access to a large number of video motion sequences depicting various outcomes. Videotape was one possibility, but access times were too long for realistic simulations. Videodisc technology opened the door for such simulation.

Previous research has shown that a videodisc system could successfully train soldier skills even when only a fraction of the branching and other capabilities of the medium were used (Holmgren, Dyer, Hilligoss and Heller, 1979-80). Other recent projects have demonstrated the cost and training effectiveness of computer assisted videodisc in the Army hardware maintenance domain (e.g., Young & Tosti, 1981). Researchers have attempted to teach interpersonal skills using computer assisted instruction (e.g., Spencer, Hausser, Blaiwes, & Weller, 1975). In addition, various projects have

attempted to train specialized interpersonal interaction skills to various audiences. For example, vonFeldt (1978) used the DAVID (Digital and Video Interactive Device) system with video segments from a videotape source to help deaf students prepare for job interviews. Possible applications for training medical students have been investigated (e.g., Leveridge, 1980 and 1981). WICAT (World Institute for Computer Assisted Training) has produced a videodisc designed to teach appropriate interview techniques to medical students. Similarly, a videodisc has been produced to help teach California State Highway Patrolmen how to handle difficult situations, including interpersonal interactions. The VISTA project represented a test case for the possible extension of videodisc training technology into the soft skills areas of leadership and interpersonal skills. Consequently, there were two main goals for the VISTA project: to develop meaningful training material to satisfy a training need, and to determine the efficacy of using the new technology in soft skill areas.

Development of the VISTA leadership program included the selection of hardware; the identification of the most significant interpersonal problem areas for the target population (entry level infantry officers); designing the instruction in a way that would exploit the capabilities of the new technology; writing the scenarios; developing the computer software; and finally, the evaluation of all the products. The evaluation involved a series of experiments in which each videodisc training scenario was experimentally compared to role playing and to a low-fidelity simulation of the leadership training scenario (programmed text). The target audience that was selected to test and demonstrate the capability of videodisc for training and assessment of leadership skills was new infantry second lieutenants in the Infantry Officer Basic Course (IOBC). This course represents their first leadership course following commissioning. The current method for training interpersonal leadership skills is role playing. This requires more than a dozen evaluators and the same number of soldiers playing roles to provide training for about 90 Lieutenants in a three-hour period. In addition to high personnel costs, the effectiveness of role playing is greatly dependent on the acting skill of the role player and the ability of the observer to provide a meaningful critique. One of the possible advantages of the VISTA approach is the introduction of standardized training in an area where standardization has traditionally been difficult or impossible.

Three Army agencies, two civilian contractors, and two Army television studios worked with the Army Research Institute in the development and evaluation of this new technology for interpersonal skills training. The Army agencies were: the Training Developments Institute of the U.S. Army Training and Doctrine Command at Fort Monroe, Virginia which funded scenario development and evaluation; The Army Communicative Technology Office at Fort Eustis, Virginia which provided equipment and videodisc mastering; and the U. S. Army Infantry School at Fort Benning, Georgia which provided leadership subject matter experts and students for the evaluation. The Litton-Mellonics Systems Development Group at Fort Benning, Georgia conducted the topic analysis, developed the leadership training scenarios, integrated the computer and videodisc hardware and developed the computer software. They also carried out the experimental evaluation of the materials. Video production was done

primarily by the Fort Benning Educational Television Branch with some assistance from the Training and Audiovisual Support Center at Fort Gordon, Georgia. Videodisc mastering was done by DiscoVision Associates (now Pioneer).

Topic Analysis

It was critical for the success of the project that the topics selected for the VISTA scenarios be highly relevant and match the needs of the young officer. For that reason, a great deal of effort went into the front-end topic analysis. A conceptual overview of the entire analysis is presented in Figure 1 (page 4). The general strategy was to generate an extensive list of potential interpersonal problem areas and subsequently narrow the list down to the eight problem areas which were judged by subject matter experts to have the highest aggregate of difficulty, importance, and frequency. To reach this goal, a structured interview containing open-ended questions was constructed and administered individually to several officers and NCO's (a copy of the interview can be found in Appendix A, Part 1). The interviews were conducted with 18 Army personnel from randomly selected units assigned to the 197th Infantry Brigade, Fort Benning, Georgia. Interviewees fell into the following rank and duty assignment categories: six Captains serving as Company Commanders, six Lieutenants serving as Platoon Leaders, two First Sergeants serving as First Sergeants, and four Sergeants First Class serving as Platoon Sergeants. The interviews took place during November and December, 1980. Before each session, the interviewees were told the purpose of the interview. After this orientation, participants were asked to answer a series of questions based on their own experiences. Basically, the interviewees were asked to identify critical interpersonal/leadership situations which a new Infantry Second Lieutenant would be likely to encounter on the job. More specifically, interviewees were asked to comment on four general areas: problems arising from leader-to-subordinate relations, problems arising from leader-to-group relations, problems arising from subordinate-to-leader relations, and the general area of how to provide the young officer with better leadership skills to help him in his early career.

From the taped interviews, a list of problem areas was generated. In addition, 60 hours of taped interviews from the Rumsey and Creskoff (1982) study were screened, and relevant situations were added. The working list of critical interpersonal/leadership situations was carefully scrutinized to avoid redundancy and over-generalization, and was eventually reduced to a draft list containing 87 items (see Appendix A, Part 2). Because a questionnaire composed of 87 items was judged to be much too long and cumbersome to administer, the list was critically reviewed by members of the Leadership Department of the United States Infantry School, Army Research Institute personnel, and Litton Mellonics personnel. Any problems which appeared redundant were dropped or incorporated in common problem areas. The result was a list of 57 critical situations.

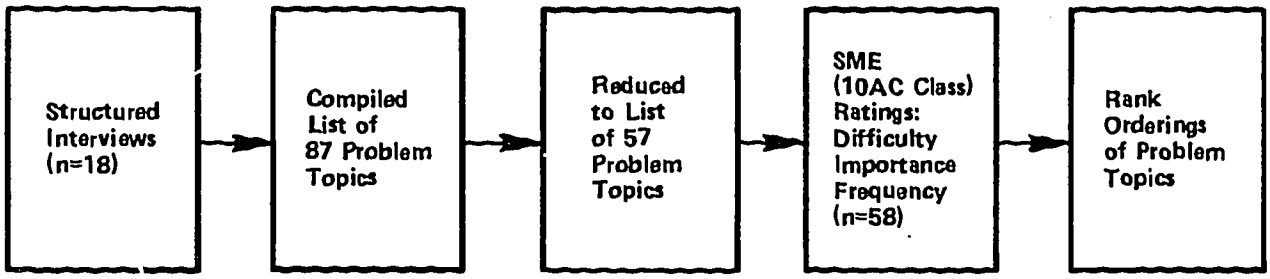

Figure 1. Topic analysis.

Note: Following the initial structured interviews, a list of 87 problem areas was generated and subsequently reduced to 57 topics in order to remove redundancy. Subject matter experts were then asked to rate all problems for Difficulty, Importance, and Frequency. Finally, the problems were rank ordered for: (a) Difficulty, (b) Importance, (c) Frequency, (d) Difficulty + Importance, and (e) Difficulty + Importance + Frequency.

Using the 57 items, a questionnaire was developed in which subjects were asked to rate each of the situations on a scale of one to seven for difficulty (how difficult it is to handle a given problem), importance (how important it is that a given problem be handled well), and frequency (how frequently a given problem occurs). The questionnaire was then administered to a group of 58 Captains and senior First Lieutenants in the Infantry Officer's Advanced Course. The complete questionnaire is contained in Appendix A, Part 3. Demographic information was also obtained and a summary appears in Appendix A, Part 4.

The resulting top 10 problem areas (derived by a simple summation of the three scales for each problem topic) are shown in Table 1 (page 6). Complete listings for each of the three scales separately, combinations of Difficulty + Importance, and Difficulty + Importance + Frequency along with detailed analyses can be found in Appendix A, Part 5.

Originally the intent at this point was to use the top eight problem areas as the themes for the scenarios. However, upon closer inspection, it became apparent that more than eight topics could be addressed. More specifically, clusters of topics were identified which--with some creative writing--could be addressed within a single scenario. A complete list of the scenarios along with their respective problem topics can be found in Table 2 (pages 7-10). As an example, consider the third scenario (Meeting the NCO's and the Platoon). Within that scenario, four specific problem areas were addressed (each of which was in the top 10 in Difficulty + Importance + Frequency). It should be noted that in addition to the four topics identified, a number of other instructional points were made in this scenario (e.g., company policies on promotions, how to introduce oneself to the platoon, etc.)

For each of the general scenario topics, as many specific topics as could be meaningfully and realistically covered were included. Thus, many more than the originally anticipated eight topics were addressed. For the composite scores of Difficulty + Importance + Frequency, nine out of the top ten problems and 15 out of the top 20 were addressed. A total of 26 topics were covered.* In the following section, the theoretical approach taken for the leadership/counseling content of the VISTA scenarios will be discussed.

Theoretical Approach for Instructional Content

In order to determine optimal leadership responses and justification for these choices, a number of sources were utilized. First, the training material must be consistent with existing Army leadership doctrine. The two relevant field manuals (FM 22-100 on Military Leadership and FM 22-101 on Leadership Counseling) were carefully studied and heavily referenced. Second, retired military personnel, active officers, and NCOs within the U.S. Army Infantry School Leadership Department were utilized as subject matter experts. These individuals were helpful in determining the best way to handle a given problem.

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*A total of 26 problem areas will be dealt with when all 8 scenario topics are completed. This report includes only topics 1-6 and, hence, only 20 problem areas have been addressed to date. Ongoing contractual work should complete the last two scenario topics by mid-1984.

Table 1

Most Difficult + Important + Frequent Interpersonal Situations

Rank Order		Item Number
1	The NCO will insure that the individual arms and equipment of subordinates, and all other government property issued to the Platoon is properly maintained and accounted for at all times.	55
2	The NCO is responsible for preparing subordinates to accomplish assigned missions by training subordinates in basic skills and attributes of a soldier.	53
3	The NCO will be held accountable for the location and actions of subordinates while in a duty status.	54
4	A Platton Leader giving his new Platoon Sergeant an initial briefing on how he expects the platoon to function.	9
5	The NCO is responsible for insuring that subordinates maintain established standards of personal appearance and hygiene, proper wearing of the uniform, and of military courtesy.	56
6	The NCO will supervise the care and maintenance of enlisted personnel billets and unit work areas.	57
7	A Lieutenant counseling a Sergeant who has failed a series of unannounced inspections.	1
8	The wife who cannot accept, or does not understand Army life.	38
9	A soldier who receives letters of indebtedness because bills are not paid on time or neglected completely.	29
10	The wife who is lonely or homesick because the husband is gone on training exercises frequently, works late, or pulls a lot of roster type duties.	37

Table 2

Scenario Topics

Topic 1: Verbal Abuse

DIFF + IMP + FREQ

#8	The wife who cannot accept, or does not understand Army life.
#38	A Platoon Leader counseling a Sergeant who verbally abuses and belittles soldiers in front of other platoon or squad members.

Topic 2: Taking Charge

DIFF + IMP + FREQ

#4	A Platoon Leader giving his new Platoon Sergeant an initial briefing on how he expects the platoon to function.

Topic 3: Meeting the NCO's and the Platoon

DIFF + IMP + FREQ

#1	The NCO will insure that the individual arms and equipment of subordinates, and all other government property issued to the Platoon is properly maintained and accounted for at all times.
#2	The NCO is responsible for preparing subordinates to accomplish assigned missions by training subordinates in basic skills and attributes of a soldier.
#3	The NCO will be accountable for the location and actions of subordinates while in a duty status.
#6	The NCO will supervise the care and maintenance of enlisted personnel billets and unit work areas.

Table 2

Scenario Topics
(continued)

Topic 4: Performance Counseling an NCO

DIFF + IMP + FREQ

#7	A Lieutenant counseling a Sergeant who has failed a series of unannounced inspections.
#15	A Platoon Leader counseling a Sergeant whose platoon has failed to pass a training exercise.
#17	A Platoon Leader counseling a Squad Leader who will not accept responsibility for his men and/or his equipment.
#19	A Lieutenant counseling a Sergeant who has failed to have his men and equipment report on time for a support requirement.

Topic 5: Insubordination

DIFF + IMP + FREQ

#5	The NCO is responsible for insuring that subordinates maintain established standards of personal appearance and hygiene, proper wearing of the uniform, and of military courtesy.
#21	A Platoon Leader counseling an Enlisted Soldier who has repeatedly failed to show up for work on time.
#26	A Lieutenant counseling an Enlisted Soldier who is insubordinate.
#27	A Platoon Leader counseling an Enlisted Soldier who disappears during duty hours.

Table 2

Scenario Topics
(continued)

Topic 5: Insubordination (Continued)

DIFF + IMP + FREQ

#44	The Soldier who openly begins to disobey any order given him.
#45	A Platoon Leader counseling an Enlisted Soldier whose personal appearance is falling below standards.

Topic 6: Personal Crises

DIFF + IMP + FREQ

#18	A Soldier who needs to go on emergency leave.
#24	The Soldier who normally is very social with his peers and supervisors, and suddenly becomes very withdrawn, extremely quiet, and depressed.
#31	A Soldier mumbling about suicide.

Topic 7: Financial

DIFF + IMP + FREQ

#9	A Soldier who receives letters of indebtedness because bills are not paid on time or neglected completely.
#13	A Soldier unable to balance a checkbook, or who writes bad checks.

Table 2

Scenario Topics
(continued)

Topic 8: EER Counseling

DIFF + IMP + FREQ

#16	A Platoon Leader counseling an Enlisted Soldier about his EER.
#39	A Lieutenant counseling a Sergeant whose personal appearance is starting to slip below standards.
#42	A Platoon Leader counseling an Enlisted Soldier who has done an outstanding job on a training exercise.
#48	A Platoon Leader counseling an Enlisted Soldier whose poor performance on a recent training exercise was easily recognizable.

Because of their experience with junior officers, they were also extremely valuable in identifying incorrect choices and consequences which frequently occur in the field. Another valuable human resource was the subject matter experts available within many different Army agencies. For example, the staff at the Judge Advocate General Office was very helpful in advising about legal implications for the insubordination scenario. Similarly, the Red Cross, the Army Community Services, and the Community Mental Health Center all willingly provided useful suggestions and information.

A third source of input for generating behavioral alternatives and their positive or negative feedback was the rather extensive theoretical counseling literature. Obviously, the goal of the VISTA project was not to make polished therapists out of Second Lieutenants in three hours of instruction. However, the various counseling approaches do offer valuable guidelines and tested principles which could be useful to a beginning counselor. Also, the new leader should be able to recognize problems at an early stage of development, be aware of the various sources of expert counseling that are available in the Army structure, and refer complex problems that require more expertise to the appropriate agency or person.

A fourth source of theoretical information considered was the various leadership theories. As in counseling theories, the intent was not to make a theorist out of the Second Lieutenant, but rather to take empirically supported principles and applications from existing leadership theories and present them as solutions or as a justification for a solution in a way that was easily understood.

Finally, facts from many other well-established disciplines were incorporated into the alternatives or feedback where appropriate (e.g., communications, learning and motivation, decision theory, cognitive theory, management theory, and social psychology). Two of the five sources of information (counseling theories and leadership theories), deserve further explication and, hence, are expanded in the following two sections. Also, much more detailed discussions of counseling and leadership theories are provided in Appendices B and C, respectively.

Counseling Theories

The purpose of this section is not to provide detailed theoretical accounts of the major counseling theories. Such accounts are available at various levels of discourse varying from the original source to excellent texts giving overviews of the various approaches. Also, a brief review of selected theories can be found in Appendix B.

On the basis of the two Army Field Manuals, a Counseling Decision Tree was constructed (see Figure 2, page 13). This decision tree doesn't appear in either Field Manual or in any of the VISTA scenarios. Rather, it was constructed to be consistent with doctrine and provide guidance to the scenario writers. When referring to "problems" in Figure 2 or in the following discussion, reference is being made to only the problems that a Second Lieutenant might encounter which are of a leadership/counseling nature and that involve interpersonal skills as part of the solution.

The original detection of a problem may come as a result of personal observation, reports from the individuals experiencing the problem, reports from a subordinate about another subordinate experiencing a problem, or reports from a superior. In any case, for the purpose of Army counseling, the problem is likely to fall primarily into one of three categories: performance problems, personal problems, or career problems. The three problem areas are not mutually exclusive, and in most cases, more than one of the problem areas are likely to be present. In such complex problems, the performance component is probably the most quickly and efficiently handled. That is, where there is a performance problem, immediate "on the spot" correction should be given as soon as possible. Depending on the magnitude, frequency, and circumstances, the leader should probably go one step farther and try to assess the reason for the performance problem. If there is an ability problem (either physical or mental), then additional training or reclassification are probably the best alternatives. If there is a motivation problem, then the leader should make use of any existing incentives and/or clearly inform the subordinate of the consequences of continued poor performance. If there is some personal problem at the root of the poor performance, then that personal problem should be attacked as soon as possible. Similarly, if there is a career crisis causing the performance problem, then career counseling should be made available as soon as possible.

If a personal problem is encountered, one of the main decisions the Second Lieutenant has to make is whether to refer the individual to one of the many Army agencies available, or whether he/she should attempt to counsel the individual. If the problem is personality-based, too difficult, too time-consuming, or more easily handled by another agency, then the individual should be referred to the appropriate agency. If the problem is more environmentally based, the Second Lieutenant should probably counsel the individual and attempt to resolve the situation by providing the necessary information and/or obtaining authority to effect a solution (e.g., get the individual a pass). In any case, if the situation becomes too difficult or time-consuming, the Second Lieutenant should probably refer the individual to an appropriate agency. If the individual has career-related problems, the Second Lieutenant should provide the necessary information as it is available or else refer the individual to an Army career counselor.

The essential ingredient for success along any of the above paths is the ability to interact effectively with other people. As stated above, the purpose of the VISTA project was not to make counselors or therapists out of Second Lieutenants in a three or four hour period of instruction. Rather, the purpose of VISTA was to teach the student some commonly accepted principles about how to interact with others in a way that will improve the problem situation and expedite its resolution. For this reason, the various counseling theories were studied, not with the goal of picking the "best" theory, but rather to collect general principles from the various approaches which were commonly agreed upon, easily explained, and would be useful to a new counselor.

Most counseling approaches are descendants of various therapeutic approaches. Therapy is usually conducted by psychiatrists, or psychologists, over an extended period of time, and usually involves more complex

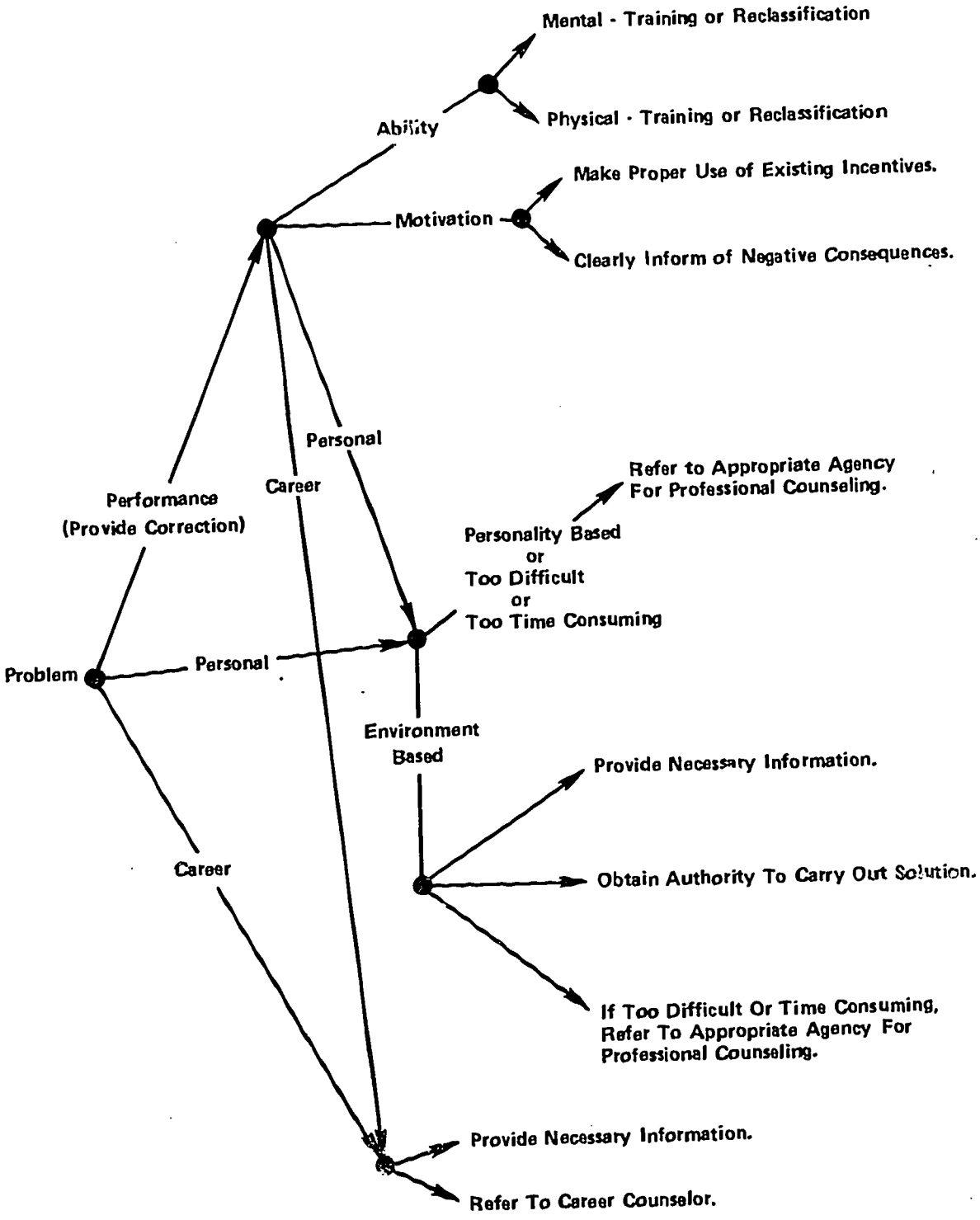


Figure 2. Counseling decision tree--proposed paths for various counseling situations.

personality-based difficulties. There are many ways of categorizing the various theoretical approaches. Selection of a single approach would have been untenable because even the most expert counselors and therapists disagree among themselves about the best approach. For example, one major distinction that can be made between different approaches is whether they are directive or nondirective. Directive therapies and counseling approaches (e.g.; Rational Emotive Therapy, (Ellis, 1962); Reality Therapy, (Glasser, 1965); Gestalt Therapy, (Perls, 1958); and the various Behavior Modification approaches of Wolpe, 1973; Krumboltz, 1969; Ullman and Krasner, 1969; Bandura, 1965; and others), typically emphasize the role of the therapist/counselor as a more authoritarian professional who strongly guides and determines the direction of the therapy/counseling session (i.e., the therapist is directive). On the other hand, nondirective approaches (e.g., Client-Centered Therapy, (Rogers, 1942, 1951); Logotherapy, (Frankl, 1963); Helping Counseling, (Carkhuff, 1969); and many of the various Existential Approaches of Keirkegaard, 1944; May, 1953; Tillich, 1952; and others), stress the importance of the client/counselee in the relationship. The counselor's main goal is to set an accepting, understanding atmosphere in which the client/counselee can gain acceptance, understanding, empathy, and can therefore grow. The Army Officer, by the very nature of his or her position, should obviously not be locked into either of these general counseling modes. Depending on the situation, the Army Officer must at times be very directive (e.g., in performance counseling situations), and at other times should be nondirective (e.g., during some personal counseling situations or during some career counseling situations). For that reason, the VISTA strategy was to teach flexibility. Depending upon the situation, various approaches were introduced as appropriate. In general, Behavioral approaches were stressed in situations involving performance counseling because of the behavioral component. However, students were urged to look deeper for more subtle motives and conduct personal counseling if appropriate. In personal counseling, many approaches were tapped, but the one most utilized was Carkhuff's Helping Counseling Approach because it is relatively intuitive, it was designed for counseling (as opposed to therapy), and there is empirical evidence indicating that it could be relatively easily understood and applied by a layman population (see Carkhuff, 1969).

Leadership Theories

Like the counseling theories, the various leadership theories have different origins and orientations (see Appendix C for a more complete overview of the various theories). Also, as in the Counseling Theories, it would be untenable to select a single theoretical approach for Army leadership as the best approach. A similar conclusion was recently made by Henriksen, Jones, Hannaman, Wylie, Shiver, Hamil, and Sulzen (1980). Therefore, as in Counseling, the approach was to selectively draw principles from the various theories as they appeared relevant and applicable in the various VISTA situations. Since the primary purpose of the VISTA project was the training of leadership, a few of the historical theoretical approaches were not particularly relevant because they deal principally with descriptive information concerning the prediction of leaders (e.g., the Trait Theory of Galton (1879), and Carlyle (1910); the Environmental Theory of Stogdill, 1948 and Hemphill, 1949; and the Empirical Approach of the Ohio State work group,

e.g., Stogdill and Coons, 1957). Many contemporary theories can somewhat arbitrarily be divided into two clusters. In general, humanistic theories (e.g., McGregor, 1960; Blake, Mouton, & Bidwell, 1962; and Bowers & Seashore, 1966) emphasize the importance of creating an environment in which the individual can fulfill his/her own potential while contributing to the organization's objectives. The role of the leader is to modify the typically structured organization to one that allows naturally motivated individuals to grow and reach their potential (Stogdill, 1974).

A second cluster of theories might be called Leader-Situation theories because they tend to emphasize the interactions between leader and situational characteristics (e.g.; Contingency Model, (Fiedler, 1967); Path Goal Theory, (House & Dressler, 1974); Decision-Making Model, (Vroom & Yetton, 1973); Jacob's Social Exchange Theory, (Jacobs, 1974); Life cycle Theory, (Hersey & Blanchard, 1977); Behavioral Theory, (Yukl, 1971); Power Theory, (McClelland, 1975); Vertical Dyad Linkage Approach, (Graen, Dansereau, & Minami, 1972); and Developmental Model of Leadership, (Sgro, Pence, & Orban, 1979). In general, these various approaches identify an important leadership characteristic (or characteristics) and systematically address how these characteristics impact on leader effectiveness over various situations. It should be noted that most of the theories listed above are not necessarily in conflict with each other. Rather, each has selected a given dimension for emphasis. In using the various leadership approaches as references for the VISTA project, various principles were applied as they fit the situation. In no case, was an elaborate theoretical explanation given. The purpose of VISTA was not to teach theoretical approaches. Rather, the intention was to teach easily comprehended and easily remembered principles which have their roots in more elaborate theoretical structures.

Instructional Design

The original intent of the VISTA project was to simulate an interpersonal interaction that represented an actual leadership situation that a young officer would probably encounter. The fast random access to video segments that the computer assisted videodisc provides, allows such simulation. For example, given a trainee's response in a particular situation, the videodisc system can quickly show the subordinate's probable reaction which will provide the trainee with immediate and realistic feedback about whether that choice was the best, or less than optimal. Because of the simulation nature of this mode of instruction, it was labeled "Experiential". Because of the difficulty in writing scripts that fully portray and explain some of the more subtle principles and teaching points that should occur in an interaction, it was decided to develop a second instructional mode that would similarly exploit the capabilities of the technology but would provide more detailed feedback about the principles being taught. Because of its high structure and heavy use of tutorial feedback, this mode of instruction was labeled "Pedagogical".

Experiential Mode

In the typical Experiential training situation, a new junior officer leadership trainee sits before a television monitor and holds a light pen or game paddle that will allow a direct interaction with the TV monitor and thus, the computer. Typically, the computer initiates the session by presenting background information on the monitor that sets the stage for the actual problem situation. Next, the videodisc player presents a video segment that introduces the problem situation. This might involve a member of the platoon who has financial problems or a NCO who has been verbally abusing members of his squad. For example, the person with the problem might be seen on the screen entering the Lieutenant's office or approaching the Lieutenant in a field setting. The televised subordinate typically begins the interaction speaking directly to the viewer. Following the initial comment by the simulated subordinate, the leadership trainee is shown a menu of possible responses that a Lieutenant might make in that situation. Each alternative was carefully chosen by scenario developers to appeal to a segment of the trainee population (see the section on Scenario Development and Production). However, some of the responses are more appropriate than others. The trainee reviews these alternative responses and chooses the one that he believes to be the best. Using the light pen, he informs the computer of his choice by touching that alternative. Immediately, the simulated subordinate reacts as he probably would if treated in the manner that was selected. When the video segment depicting the simulated subordinate is complete, a new menu of possible responses to the current situation appears on the screen and the trainee selects a response for the updated situation.

In the Experiential mode of instruction, interactions continue between the leadership trainee and the simulated subordinate for as many as 10 exchanges until the situation is resolved for better or worse. In the latter case, the subordinate might be last seen bolting away from the Lieutenant muttering about incompetent Second Lieutenants. Presumably, these interactive scenarios with their rapid branching will cause trainees to react and respond to the simulated subordinate in much the same way that they would respond to a real subordinate. Realistic consequences of these leader responses are the feedback. Hopefully, this approach to interpersonal skills training will provide a potent tool for training leader skills which, unfortunately, are now learned by trial and error on the job (see Rumsey and Creskoff, 1982). In the Experiential mode, the videodisc scenarios also provide trial-and-error learning, but the errors do not have "real life" negative consequences for either the counselor or the counselee.

Pedagogical Mode*

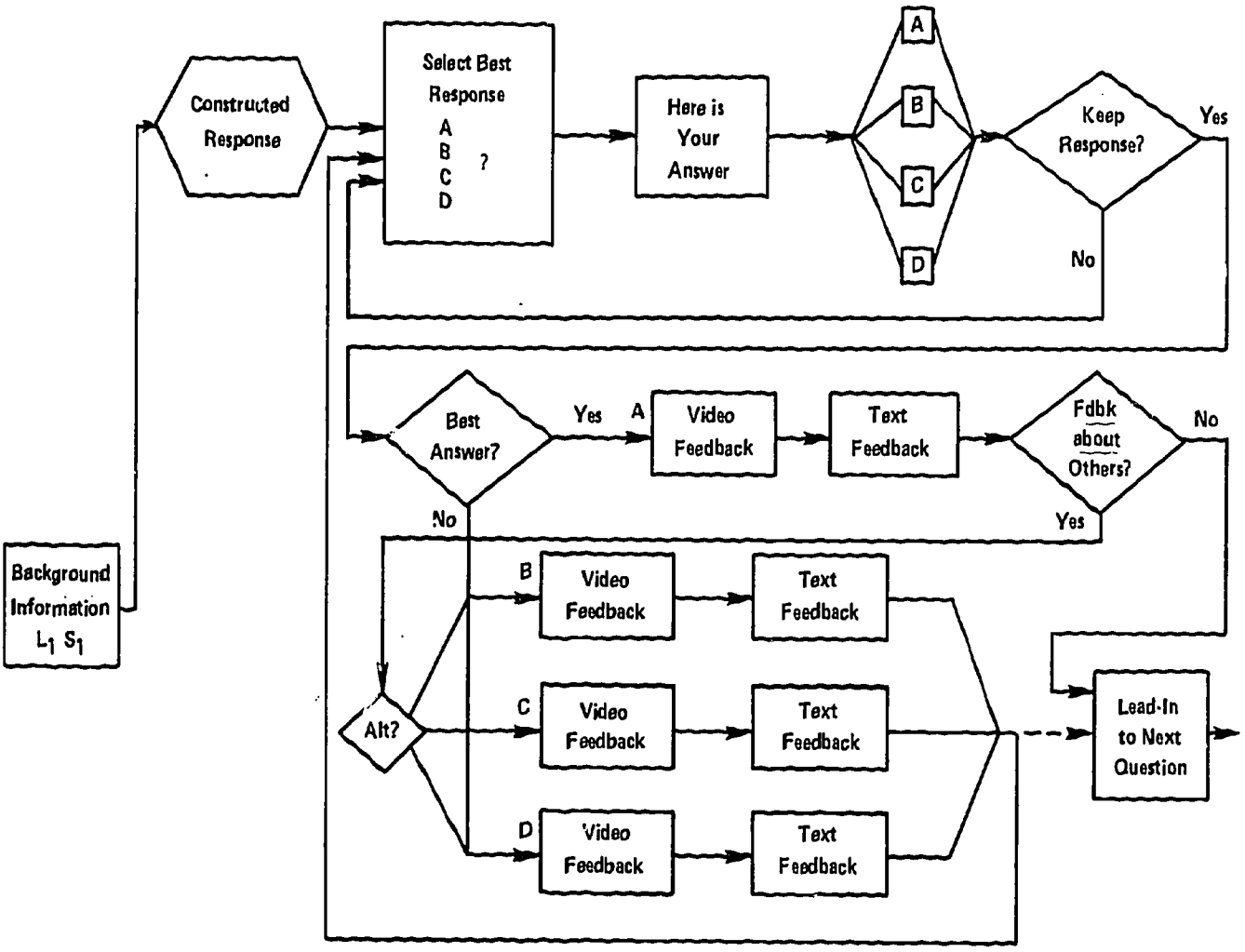
The instructional design for the Pedagogical mode is presented in Figure 3 (page 18). The student is originally given some background information. The background information contains only as much information as is necessary for the completion of the scenario. In the VISTA project, all text (e.g. background information, questions, answers, feedback, etc.) is presented on the monitor from a computer source. The reason for using the computer as a text source rather than having text stored as single frames on the videodisc, is that flexibility was desired. Wording changes for questions, answers, and

*Parts of this section were taken from Schroeder, 1982.

feedback can be easily made in the computer software, but can never be made once placed on a videodisc.

After receiving the background information, a short video segment is presented from the videodisc source. The video segment sets the stage for the first choice (e.g., a Sergeant reports a discipline problem and asks the Lieutenant what should be done). Following the video segment, the Trainee is asked to write down what he would say in that situation. This step was included so that the Trainee would be allowed to practice constructing a response. Following the completion of the constructed response, the Trainee is presented a response menu and asked to select the alternative that is the most similar to his constructed response or that is the best option of those presented. Once a response is selected, the Trainee is shown a video segment from the videodisc that depicts that choice. In this video segment the camera is on the Lieutenant so that the Trainee can see the effect of a particular response from the subordinate's perspective. The video segment portrays the chosen response only and stops before any feedback from the subordinate can clue the Trainee about the adequacy of the choice. The reason that the Trainee is given a preview of what the choice looks like when enacted is to prevent any discrepancies which might occur between the words of a choice when read and those same words acted out. For example, think of the various meanings that could be acted out with the words "I think you did just fine." After seeing the words acted out, the Trainee should have a much better idea of the intended meaning. The Trainee is next asked whether or not he wants to keep the response. If not, he is returned to the response menu. In this manner, it is possible for the student to preview every choice before keeping one. There are two additional reasons for showing the Lieutenant's actions in this video segment. First, if the camera were on the subordinate at this point, the subordinate's facial expressions or body language might serve as feedback regarding the effectiveness of a particular response. Second, by pairing a model's actions with feedback about their correctness, the Trainee will hopefully learn which styles of behavior to emulate.

After the student has selected and kept a response, he is immediately shown a video segment that again depicts that answer, but this time it is from the Lieutenant's perspective. Also, the Trainee is shown the subordinate's probable reaction to that response. Besides providing feedback to the Trainee about his last choice, the subordinate's reaction is carried to the point that a new decision point is created. Thus, the subordinate's video segment serves as a "conclusion" to the prior choice point and a "lead in" for the next decision. If the scenario is well written, the subordinate's reaction will convey some information about whether that response was good or poor. However, to insure that the subtle teaching points are communicated, the student is next given some very specific feedback (e.g., This answer was probably not the best for the following six reasons:, or, This answer was judged to be the best for the following five reasons). The feedback statements are typically based on principles of Counseling, Leadership, Management, Communications, Learning, Social Psychology, etc. The main principles to be taught were decided before and during the scenario writing. It was, therefore, the instruction that drove the scenarios and the technology rather than the other way around. If the response chosen was not the best, the student is given appropriate feedback and then returned to the response menu. If the response chosen was the best, the student is given appropriate feedback and then given the opportunity to learn why the other choices were less than optimal, or otherwise



ıre 3. Instructional flow chart for pedagogical mode.

proceed with the interaction. Should he choose the former, he is again presented with the response menu and can select the video and textual feedback for any or all of the remaining choices. The student must make the correct choice before he can continue with the interaction. Also, the student is never allowed to go more than one step off the best path.

The procedure described above repeats in cyclic fashion until the interaction reaches some closure. It should be noted that the subordinate's reaction to the best choice plays a double role: (a) it provides feedback about the appropriateness of the last choice, (b) it serves as a transitional lead-in to the next choice point.

Mo of the instructional features found in the Pedagogical Mode are found i' most computer assisted instruction applications (e.g., immediate feedback, branching, etc.). These principles come from well established principles of learning. There are five novel features which contribute greatly to the learning environment in the present application. First, the inclusion of the constructed response in addition to the fixed alternative choices allows the student to practice originating a response within the otherwise structured format of CAI. This attribute keeps the student active in the learning situation and is claimed to be extremely important in programmed learning (e.g., Skinner, 1958). In addition, the constructed response adds variability to the response mode which is apparently important in maintaining the student's interest (Gardner, 1979). The potential danger in using this procedure is that a student might construct a response that is substantially different from the subsequent fixed alternatives. In such a situation, the student could conceivably never receive feedback on the constructed response. To prevent this, it would be desirable to have a laboratory proctor available for further explanation.

A second novel feature is the provision of a "preview" of the answer selected. The reason for the novelty, of course, is that in most CAI applications, providing the student with a preview of what the response looks like would be unnecessary, impossible, or would provide the student with the answer. However, there are two very good reasons for including the preview in the present interpersonal skills training appli-tion. First, it is important that the textual-behavioral discrepancies be removed in order that students don't believe they have been misled. Second, the preview allows the student the unique opportunity of seeing what a surrogate-self looks like while acting out the various alternatives. By pairing behavioral portrayals with subsequent explicit feedback, the student has an opportunity to model and learn appropriate behavior. Also, the student can witness less than optimal performance and discern why it was not the best. In this way, the Trainee can objectively scrutinize the incorrect response without the defensiveness that might occur if, for example, he saw a videotape of himself making the same error.

The third significant inclusion is the option of studying the other (incorrect) alternatives after successfully completing a choice point. The student may have been torn between the correct choice and one or more distractors and may have arbitrarily selected the best choice. In such a situation, the Trainee would probably get feedback about why that alternative was the

best, but under many conventional instructional modes, he would leave the situation never really understanding (or being exposed to) the reasons that the other choices were not the best. Of course, arguments about whether students should be allowed to make, study, or dwell on incorrect options may be appropriate here (e.g., Skinner, 1968). However, while such arguments are appropriate in some learning tasks in which there is nothing to be learned from making the wrong response except the wrong response, they may be less appropriate in this situation where layers of explanation and feedback are added to facilitate understanding why the response was not the best.

A fourth significant feature of the present design is the fact that precise feedback is delivered immediately following a response. In most conventional interpersonal skills training approaches (e.g., role playing), feedback is delivered only at the conclusion of the entire interaction. The interaction would be interrupted if the instructor wished to give immediate feedback. After the interruption, it would be difficult to recreate the situation prior to the interruption. This interruption problem is also present with the Pedagogical design, except that the student can choose the option of looking at the prior sequence again in order to refresh the situation.

A fifth important feature of the current design is the mere presence of the textual feedback. In applied areas such as interpersonal skills training, reasons for behaving or not behaving in certain manners range from being clearly stated to being vaguely stated (depending on the skills of the instructor). The simple requirement of feedback in the scenario keeps the scenario writers honest in the sense that they must be able to state clearly why action A is better than action B. Hence, action A and B as well as their feedback are open to the scrutiny of both the student and other professionals for their agreement or disagreement. This feature leads to two important consequences. First, scenario writers must put a great deal of thought into the script and feedback because of the specificity required. Second, the requirement of specific feedback brings standardization into a content area where standardization has traditionally been difficult. The pedagogical mode can be thought of as a standardized role playing situation. Also, the visible feedback forces scenario writers, instructors, and theorists to clarify and operationally define their views. This process may help distinguish areas of theoretical agreement and/or disagreement.

Scenario Development and Production

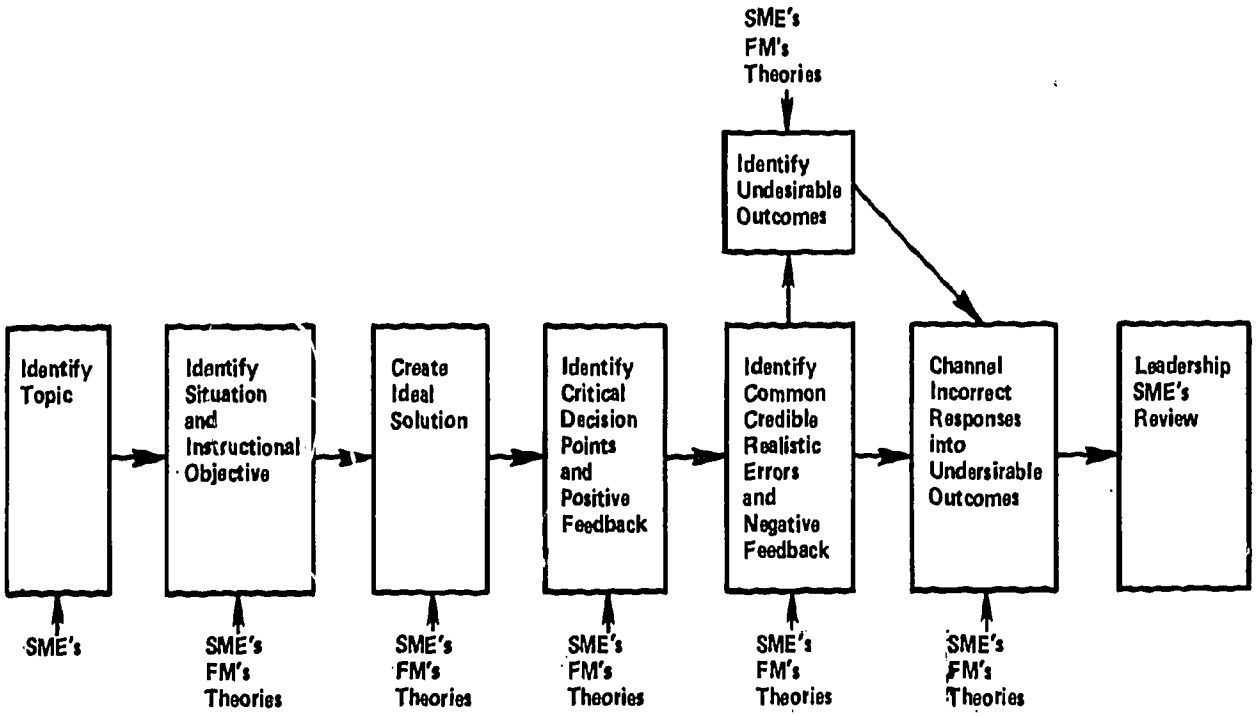
The major objective of the VISTA project was to determine whether the new computer assisted videodisc training technology could train leadership skills. Regardless of the sophistication of the hardware and software involved, the success or failure of any training system is still probably determined by the quality of the content material. For this reason, a great deal of effort was put into scenario development. In addition, regardless of how tutorial, creative, and insightful the written scenario may be, the translation from script to actual production must be of high quality in order to deliver a final product that is realistic, interesting, doctrinally accurate, and instructional.

An overview of the scenario development is shown in Figure 4 (page 22). After the topics for a given scenario had been determined (see section on Topic Analysis), the next step was to establish a realistic situation (time, place, characters, etc.), in which a given problem would be likely to occur. Also, it is important at this early point to establish the primary instructional objectives. These objectives were determined by consulting with subject matter experts (SME's), checking Army doctrine, and checking any other relevant sources of information (e.g., theories, referral agencies, etc.). A complete list of the major instructional objectives can be found in Appendix D, Part 1. It is important for the scenario writer to remember two things as he/she proceeds through the subsequent stages. First, the items listed should be included in the scenario if at all possible. The second point is not as obvious. The scenario writer should not feel compelled to limit the instruction to those a priori objectives. It is impossible to know what additional instructional points will evolve as the scenario progresses. For that reason, the original list should be considered as an initial list to which additional instructional points can be added as the writing evolves.

The next step is to create the ideal linear correct path. That is, the writer must write a dialogue between the counselor and counselee that is: (a) realistic; (b) contains all of the original objectives plus any that evolve; (c) resolves the problem situation to the extent that a Second Lieutenant can resolve it; and (d) is consistent with doctrine, theory and the SME's. This dialogue will represent the correct path for the scenario.

After the correct path has been determined, the next step is to carefully examine each of the Counselor's (Second Lieutenant's) responses and, with the help of the SME, doctrine, etc., determine if each is a point in the interaction that is critical, necessary for the correct resolution of the problem, involves one of the teaching objectives, and/or is a point where mistakes are commonly made. If a response satisfies one or more of the above conditions, then that part of the dialogue becomes a prime candidate for a choice point and the Lieutenant's statement becomes the correct alternative for that choice point. Next, the specific feedback for the Pedagogical Mode should be created. As stated above, writing the feedback has the desirable effect of keeping the writer honest (i.e., insuring that there is substantial justification for a correct choice). Writing feedback also provides another useful function in the scenario development. If there is insufficient feedback for a given choice, the choice point should be questioned.

After choice points and correct feedback for the correct alternatives have been determined, the next step is to create incorrect alternatives for each of the choice points. These alternatives should be realistic and commonly made mistakes. Along with the alternative, the counselee's most probable response should be written. This reaction should, if possible, depict an undesirable outcome so that immediate video feedback can indicate a less-than-optimal choice has been made. Also, feedback for each of the incorrect choices should be written that clearly states what was wrong with that alternative. At this point, the scenarist should also be identifying negative resulting consequences or end points which could develop as a result of a given incorrect response. When the above steps have been completed, the Pedagogical scenario is complete.



ure 4. Scenario authoring flow chart--developed to facilitate interactive videodisc scenario development.

To complete the Experiential scenario, the writer must address each incorrect alternative on the correct path as a new situation. The writer must identify a possible negative outcome or end point that could occur if the student were to persist in the wrong direction, and dialogue that takes the trainee to that end point. The writer should then identify potential choice points along that incorrect path and alternatives for those choice points. If possible, one of the alternatives at each choice point should allow the student to get back to the correct path and salvage the situation. For purposes of economy, a given incorrect path should probably never go more than three choice points off the correct path and various incorrect paths should be channeled into common undesirable end points If these suggestions are not followed, it could mean that the video segments might not fit on one videodisc. Of course, the final step is to submit the finished written scenario to the appropriate approving agency before production.

In order to facilitate future scenario writing, a Scenario Authoring Guide was created. This guide provides an outline and checklist for new scenario writers so that they can quickly proceed with scenario writing rather than recreating a scenario writing strategy that has already been developed, tried, and successfully tested. The Scenario Authoring Guide can be found in Appendix D, Part 2 and Scenarios 1-6 can be found in Appendices E-J.

After scenario approval and appropriate actors have been selected, the Production and Editing stages begin. It is very important to work closely with the production people from the onset. The Director should be given copies of the scenario well in advance of the actual shooting. Also, the scenario writer should go through the entire scenario with the Director to explain any desired mood, affect, etc. which may not be obvious in the text. The scenario should then be transformed into a production script by removing irrelevant material (choice point alternatives, feedback, etc.), inserting appropriate prompts for the Director and actors, and dividing the scenario into relatively short scenes. The scenes should be selected so that they run continuously from a given alternative at a choice point up to the next choice point or end point, whichever is next. The reason for flowing from one alternative to the next is that although videodisc edits can be conducted during the actual training, such edits are choppy and disrupt the flow of the instruction.

During the shooting, two cameras should be used simultaneously. One camera should be positioned so that it is facing the counselee (i.e., so that later, in the training setting, the trainee sees what he would if he were actually there talking to the counselee). The counselee should look into that camera when talking rather than looking at the actor who is playing the Second Lieutenant. Similarly, the second camera should be positioned in a similar fashion except facing toward the Second Lieutenant Counselor. Shots taken from the second camera will be used to show the student what a given response looks like. On opening and closing scenes, it proved beneficial to have a third camera taking a wide angle shot of the set. This was effective in establishing the situation and providing closure. Concerning sequence of shooting scenes, it is helpful to shoot scenes on the correct path first. Subsequently, it is helpful to shoot scenes along a given wrong path in correct sequence. This strategy helps everyone keep track of the appropriate mood, etc.

The scenario writer should be present during all shooting for three reasons. First, he/she must review each scene to insure that the right message was conveyed. Second, he/she must check to see that each scene has been included. Third, he/she must make sure that scene transitions flow smoothly. Given the heavy use of branching and the resulting impossibility of shooting scenes in true sequential order, this task is often a difficult one. To accomplish this, the scenario writer and director must often recreate earlier scenes or replay the appropriate tape if possible. In addition to the Director and Scenarist, it is desirable to have a military SME present to make sure that the acting carries the appropriate military bearing and to insure that uniforms, etc. are in accordance with military doctrine.

Technology Application

Hardware

The selection of the hardware started with the design of an ideal system to be used in the project. That is, the ideal system was designed and hardware was selected to implement, as closely as possible, the ideal system. This system was to consist of an industrial version, laser reflective optical videodisk player; a NTSC color monitor; a microprocessor (and floppy disk drives) that had a NTSC compatible text generator; a real-time clock; a videodisc interface card; and finally, a touch-panel for the monitor. Such a system would permit text from the computer or scenes from the videodisc player to be displayed on the monitor and would also permit a student to interact with the system by touching the monitor's screen. The latter capability would guarantee that the system would be easy to use.

A laser reflective optical videodisc player was chosen because it would permit rapid (under five seconds) access of any motion sequence stored on the videodisc. Because a laser beam is used to read the information from the videodisc, the laser reflective optical system also has the advantage of no degradation of the information stored on the disc with extensive use. An industrial version was chosen because it would permit the videodisc player to be connected to an external computer for its control. The external computer, therefore, would contain the program which would control the videodisc player.

A real-time clock was included in the design to afford the capability to collect time-based measures of the student's performance. Examples of such measures are response latency (the amount of time that the student takes to respond to a set of choices) and lesson duration (the amount of time that the student takes to complete an entire lesson).

The use of a touch-panel eliminates the necessity of the student using a keyboard to interact with the system. It precludes errors from being made during the response process, and it simplifies the man/machine interaction.

Table 3 (page 25) lists the microcomputers reviewed prior to the selection of the computer for the system. As the table indicates, the Apple II was the only microcomputer that met the necessary critera. This particular microcomputer has the advantage that it can be expanded to a full 64K of memory. Most of the other microcomputers reviewed could only be expanded to 48K.

The decision of which videodisc player to use had already been made by the Army Communicative Technology Office (ACTO). The player that they chose was a DiscoVision Associates PR-7820.

An interface board, manufactured by Colony Products, was chosen that would interface the PR-7820 to an Apple II. The board has the capability to be used with either of the programming languages, BASIC or Pascal, to command the player, and also has the capability to switch the source of the video appearing on the monitor to the videodisc player or to the text generator of the Apple II.

The clock card that was selected was the Mountain Hardware Clock Card. This card permits the time of day and date to be accessed either in Pascal or BASIC. This card is supplied with a rechargeable Ni-Cad battery for back-up when power is not supplied to the Apple II.

Unfortunately, a touch-panel for the Apple II could not be located. Consequently, the decision was made to use a light pen in its place. A Symtec light pen was selected for this purpose. The pen also permits use with BASIC or Pascal. Table 4 (page 26) is a review of the devices selected that constitute the ideal system, along with a rationale for their selection.

Table 3

Hardware Selection

Necessary Capabilities of Microcomputer	Apple II	TRS-80	ATARI 800	EXIDY
Interface to videodisc player?	yes	yes	yes	yes
Switch video between videodisc player and computer?	yes	yes	yes	yes
NTSC signal out of microcomputer character generator?	yes	yes	yes	yes
Real-time clock card available?	yes	yes	no	no
Light pen available?	yes	yes	no	no
Different languages available (Pascal, BASIC, FORTRAN)?	yes	no	no	no

Table 4

Final Hardware

Device	Function to be Served
Apple II Computer	Will contain the program which will control the videodisc player.
DiscoVision Associates PR-7820 Optical-Format Videodisc Player	Will display motion sequences on command from the Apple II.
Symtec Light Pen	Will permit the student to interact with the system by touching the light pen to specific positions on the face of the TV monitor.
Mountain Hardware Real-Time Clock Card	Will allow the capability to collect time-based measures of the student's performance.
Colony Products VAI-1 Videodisc Interface Board	Will permit the PR-7820 to be interfaced to the Apple II. Also permits the video signal to the monitor to be alternated between the signal from the videodisc player, and the text generator of the Apple II.

Programming Language

After the hardware was selected, a review was made of the advantages and disadvantages of the various programming languages available for the Apple II. This comparison is listed in Table 5 (page 27). Because it is a structured language, Pascal has an immediate advantage over the other two languages, BASIC and FORTRAN. A structured language, by its design, forces top-down programming. Simply put, top-down programming requires the programmer to define the problem to be programmed before writing the program. A structured language also makes the logic of the program easier to follow, because procedures must be defined before they are used. Pascal also tends to be self documenting. The same cannot be said for either FORTRAN or BASIC. Naturally, any language that approaches self-documentation is to be preferred over one that does not. In addition, the Apple implementation of Pascal allows for user developed procedures to be added to the LIBRARY of the language. Consequently, the vocabulary of the language can be expanded for a particular set of programs. This feature speeds the development of subsequent software in the same application area. Finally, the Apple implementation of Pascal permits a program to be broken down into several small segments. Each

Table 5

Comparison of Pascal, BASIC, and FORTRAN

	Pascal	BASIC	FORTRAN
Language allows for the expansion of its vocabulary?	yes	no	no
Language uses computer memory efficiently?	yes	no	yes
A program written in the language is easily read?	yes	no	no
Language forces "top-down" programming?	yes	no	yes(?)
A standard exists for the language?	yes	no	yes(?)

of the segments can be executed one at a time without the necessity for the entire program to be resident in memory at the same time. As a consequence, a program much larger than the available memory of the Apple can be executed.

Software Description

It is noteworthy that in this project the software design was developed to be complementary to the instructional design. That is, the instructional design drove the software and not vice versa. The following discussion describes how the software looks to the user. For a more detailed discussion, refer to the Functional Software Overview and the instructions for LAMP, Structure, and Transfer (in Appendix K). The main computer program, called Videodisc, produced for this contract is a general purpose computer-assisted-instruction (CAI)/videodisc program. The same program is capable of controlling each of the seven videodiscs developed for this project, even though each videodisc deals with a different topic area. The program accomplishes this by having flexibility designed into its structure. That is, the program was not designed to control one videodisc, but rather, was designed to control a generalized videodisc. The program assumes that each lesson consists of a series of junction points. A junction point is defined as the collection of potential events (text and/or motion sequences) that may occur prior to and following the selection of an answer by a student. Because a junction point consists of the potential for text and/or motion sequences, the appearance of each junction point can be defined independently of the preceding and/or following junction points. Table 6 (page 29) contains the list of events that may or may not happen during the execution of a junction point. From an instructional design view, these events can be thought of as options to be included or excluded. Thus, two quite different appearing instructional modes (or more) were made possible from one general program. If all of the potential events listed are included in a lesson, a somewhat traditional CAI lesson would be the result. This mode of operation was named the Pedagogical mode and has been discussed in depth in a previous section. If event #5 (displaying the second motion sequence), event #6 (allowing the student to decide about keeping the choice), and event #8 (providing feedback in the form of text) are consistently eliminated, another mode of instruction results. This mode is referred to as the Experiential mode and was also discussed in a previous section. In other words, the software was designed to instantiate the two instructional modes that had been established in the design of the instructional material. This may seem a trivial point, since this is the recommended procedure for software development, but it needs to be emphasized because many CAI projects seem to develop in the opposite manner. In the following paragraphs, the Pedagogical and Experiential modes will be reviewed. First, however, a brief description will be given of how the program looks to the user before one of the two modes is selected for use.

When the program is executed, text is displayed that informs the student that the videodisc is being positioned. Next the student has the option of viewing the instructions on the use of the light pen or bypassing the instructions.* If the student doesn't respond within 10 sec, then the

*The remainder of this discussion will assume that a light pen is in use. If a touch-panel is in use, the student would substitute touching the monitor screen with his finger for the light pen. Each of the videodiscs has instructions for both light pen and touch-panel use.

Table 6

Description of Events that Constitute a Junction Point

Event	Type	Description
1	TEXT (From Computer)	Used to provide background information or to provide additional information to student.
2	MOTION SEQUENCE #1 (From Videodisc)	Used to present the problem to the student or to continue the flow of an interview.
3	TEXT (From Computer)	Used to provide additional background information to the student or to provide additional information.
4	TEXT (From Computer)	The student is provided a set of choices (up to five) and must select from them.
5	MOTION SEQUENCE #2 (From Videodisc)	This motion sequence corresponds to the text of the selected choice. However, it does not show the consequence of the choice and it is from the counselor's perspective.
6	TEXT (From Computer)	After viewing motion sequence #2, the student is permitted to alter his selection or keep the selection.
7	MOTION SEQUENCE #3 (From Videodisc)	The motion sequence is a repeat of motion sequence #3 with the additional information of the consequences of the choice. Also, this sequence is from the lieutenant's perspective. That is, looking at NCO.
8	TEXT (From Computer)	Feedback, in the form of text, is presented to the student indicating whether this choice is the best of those listed. Additional information is given explaining the rating of this choice.

light pen instructions are automatically presented. To bypass the instructions, the student is required to touch the light pen to one of the lines of text on the monitor before the 10 sec have elapsed. The student then has the option to read an overview of how the lesson will progress. To look at the overview, the YES line is touched with the light pen. To bypass the overview, the NO line is touched. When appropriate, this YES/NO convention is used in the program. Next, the student must enter his or her identification number. This is done by touching the pen to the appropriate sections of the screen to enter the digits of the service number and then to another line to enter the number. Next, the student has the option of choosing the Pedagogical or Experiential mode. This option, however, can be eliminated by setting one variable in the main information file; see the subsection labeled "Information stored in record #0 of file Point.One" in the Functional Software Overview section of Appendix K. If this variable is set, the student will automatically go into the Pedagogical mode.

Once in the Pedagogical mode, the first event is either a display of page(s) of text or the initial motion sequence. If text is present, it is used to convey background information of the role to be assumed during the lesson. Next, a motion sequence may be displayed. This motion sequence is used either to present the problem that the student is to deal with, or to continue the flow of an interview as the student progresses through the lesson. Additional text may then be presented to give the student more background information pertaining to the scenario. Next, the student is asked to construct a response regarding what he would do in this situation. Next, the student is presented with up to five choices of what he could do in this particular situation. He is asked to choose the alternative that is closest to his constructed response or is the best of those given. After he makes this choice, he is shown that selection acted out but not its consequences. This was done to avoid any discrepancies in meaning between the text and the behavioral portrayal of that answer. When the choice is acted out, it is from the perspective of the person being counseled. That is, the student is looking at the junior officer. This was done for both role-modeling purposes and because it was thought that looking at the lieutenant conveyed less information than would be true if the student were shown the counselee's reactions. That is, the alternative is shown without indicating to the student whether it is the best of those listed.

The student is then given the option of keeping his selection or returning to the set of choices to make another choice. If he decides to keep his choice, he is again shown the response acted out along with its consequences. In this motion sequence, however, the perspective is that of the young officer. That is, the student is looking at the counselee while he hears the lieutenant speaking and while the counselee responds; as if the student were there. Next, the student is given feedback in the form of text as to whether or not this choice was the best of those listed. If it was the best, the student is shown a display which permits him to request "help" from the computer, look at the consequences of the other choices, repeat the last correct response, or continue to the next junction point. The "help" option allows the student to move back to earlier junction points or to exit the program. The option to look at other choices and their consequences was built in to permit the student to experiment with the other choices after he had

made the appropriate choice. The option to repeat the last correct choice was included in the event that the student lost the flow of the interview being mimicked. If the selection was not the best of those listed, the student is returned to the set of choices which is now minus the incorrect selection. That is, if the student picked choice number 1, and it was incorrect, when he is returned to the set of choices, choice number 1 will be eliminated.

The sequence of events listed above continues until the student has correctly progressed through the lesson. It should be noted that the student is forced to make the appropriate choice before he is advanced to the next junction point. Consequently, the student not only sees the correct choice acted out, but is also given additional feedback in the form of text as to why that choice is considered to be the best of those given.

As discussed earlier, the Experiential mode of instruction differs from the Pedagogical in that the second motion sequence, the opportunity to alter the selection made, and the textual feedback are eliminated during the lesson. This mode then simulates an interview more closely than does the Pedagogical. Up to and including the set of answers being presented, the Pedagogical and Experiential modes are identical. However, in the Experiential mode, after a choice is made, the student is shown his choice acted out along with the consequences of that choice. The perspective during this motion sequence is that of the lieutenant. That is, the student is looking at the counselee while he hears the lieutenant's response as well as seeing and hearing the counselee's reaction. Also, there is no provision for altering the selection. The only feedback is given in the counselee's reaction. The Experiential mode offers the advantage of a more realistic, flowing interaction with the possible disadvantage of relying heavily on the acting ability of the subordinate to convey adequate feedback about the quality of the choice made. The student progresses until an end point is reached; when the interaction between the lieutenant and the NCO reaches a logical conclusion. When this occurs, the student is allowed to return to the beginning of the scenario, move back one junction point, repeat the last junction point, or exit the program. Table 7 (page 32) is a review of the design differences between the two modes of instruction. For a more detailed discussion of the software and program listings, see Appendix K.

Evaluation Design and Results

Design

In order to assess the training effectiveness of the VISTA products, the videodiscs were evaluated relative to alternative instructional approaches. The first decision made concerned the selection of appropriate instructional alternatives from which relative measures of effectiveness could be obtained. Since the VISTA videodiscs were designed to supplement role playing techniques currently being used in the Counseling Laboratory of the Infantry Officer's Basic Course (IOBC), it seemed reasonable to include a control group that received role playing. In order to provide uniformity between conditions, the Role Play control group received the VISTA scenario topics, role played by

Table 7

Comparison of Pedagogical and Experiential Modes

	Presence of Option	
	Pedagogical	Experiential
1. Text	Yes	Yes
2. Motion Sequence #1	Yes	Yes
3. Text	Yes	Yes
4. Display Choices and Pick up Response	Yes	Yes
5. Motion Sequence #2	Yes	No
6. Allow Student to Alter Choice	Yes	No
7. Motion Sequence #3	Yes	Yes
8. Display Feedback	Yes	No

the Counseling Laboratory instructors. Thus, the inclusion of the Role Play condition allowed a comparison of the VISTA products with the current instructional approach.

Because the initial costs of the videodisc hardware and development are relatively high, it was decided to include a third condition that received exactly the same instructional information except at a much reduced fidelity and cost. This was accomplished by translating the VISTA scenarios into a programmed textbook format. By including a Text condition, comparison of the effectiveness of a much lower fidelity (along with lower development costs) could be made with both the Videodisc and Role Play conditions.

The major empirical question to be answered in this evaluation involved the relative training effectiveness of the three training conditions (i.e., VISTA, Role Play, and Text). In order to evaluate the three modes of instruction, an experimental design was chosen that allowed measurement of both the cognitive acquisition of leadership principles and the students' subjective evaluations of the three approaches. In addition, six different leadership content areas were addressed. Because of the limited amount of VISTA equipment, different IOBC Counseling Laboratory sections were used to test the six content areas. The IOBC Counseling Laboratory is divided into two sections with approximately 100 students per three-hour section. Assignment to each section is random. It was decided to use each section as a "unit" for the first and second content areas. Because of time and subject constraints,

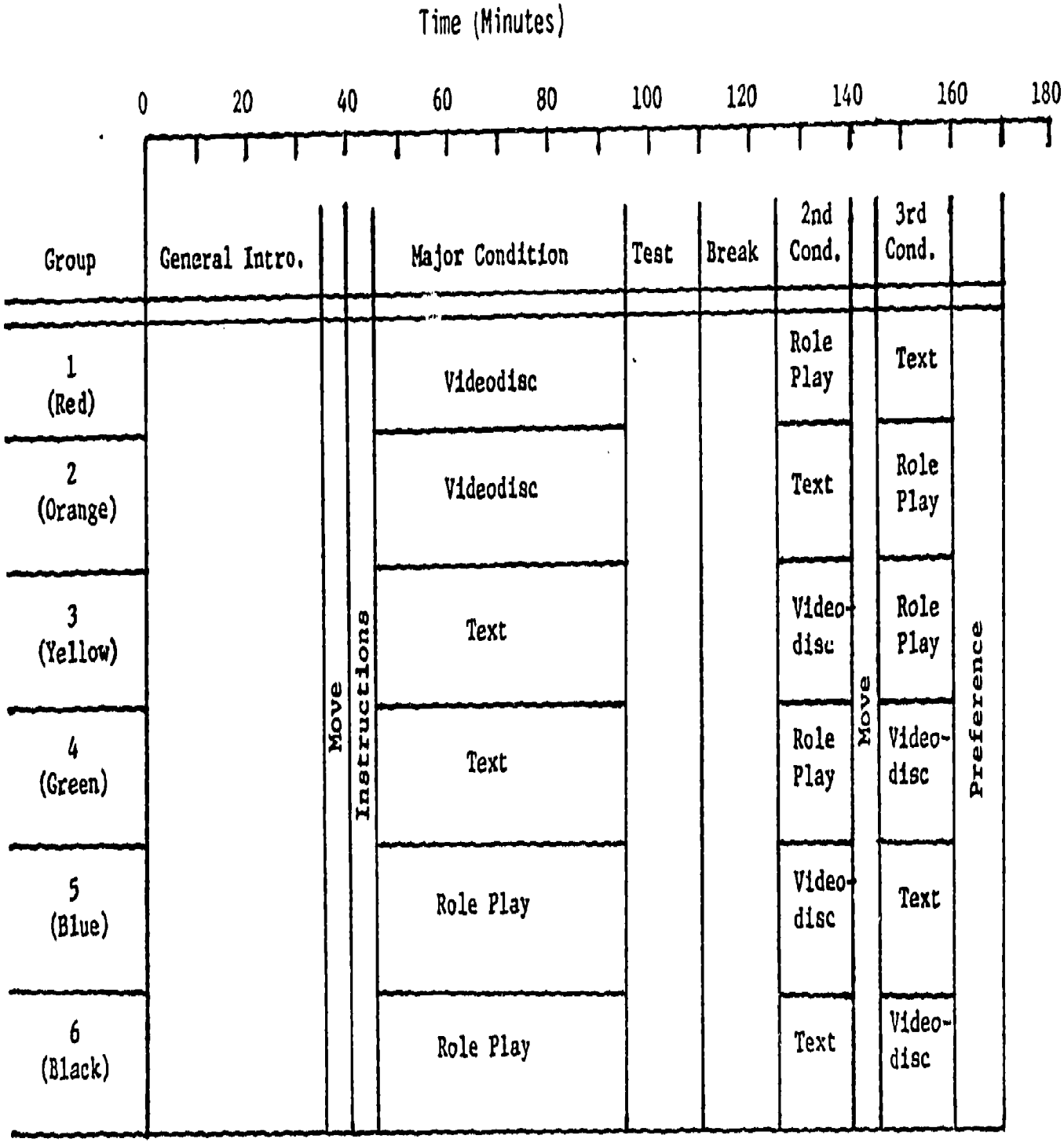
one-half of a section served as a unit for the third through sixth content areas. Table 8 shows the experimental design used for each content area. The design shown in Table 8 was repeated six times (once for each content area). In the entire effort, three different IOBC classes were used over a period of about 10 months. Hence, resulting statistical differences due to "content area" could be the result of different classes, different content areas, and/or different time of the year. However, this is not a major problem in the present effort because such differences are of minimal interest and can be statistically controlled. The main question was whether the different modes of instruction differentially affected the amount learned and/or if there was a significant interaction between mode of instruction and content area. Such an interaction would indicate that the effectiveness of the instructional mode was determined in part by the content area being addressed.

Subjects (N=312) were randomly assigned to each of the three major conditions. At the beginning of each evaluation session the students were given a brief explanation of the purpose of the experiment, i.e., three different methods of teaching leadership were being evaluated in order to determine the best approach. They were also given an outline of what would transpire over the next two hours. The Videodisc and Role Play stations were small rooms large enough for groups of seven students and one instructor. The size of the groups was set at seven because that is the size of the groups in the current training and also, the probable size of the groups if the VISTA program is implemented. The Text groups were exposed to the programmed texts in a large classroom. Once in the instructional environment, all subjects were given 5 min. of instructions and subsequently exposed to their experimental condition. For the Videodisc group, instructions and background information were presented on the television monitor. For the Text and Role Play groups, the instructions and background information were read from paper. In the Videodisc and Text conditions, the students were exposed to the Pedagogical mode of instruction for 35 min. followed by a 15 min. exposure to the Experiential mode. In the Role Play condition, the students either role played or watched others role play for the entire 50 min.

Following 50 min. of exposure to their major condition, the students were tested on what they had learned. The scores on this test were the major dependent variable in the experiment. It was decided that a highly structured format (e.g., multiple choice, fill in the blank, or short answer), would be inappropriate because it would probably be biased in favor of the Videodisc and Text conditions, i.e., there was no way of knowing what would be taught in the Role Playing situation and, hence, no way of knowing what questions to ask. Instead, it was decided to give students an open-ended, unstructured test (see Appendix L). Subjects were simply asked three questions. The first asked them to list any "principles" they had learned or been reminded of in the last 50 min. about how to deal with people. An example of a principle was "If you see a soldier doing an outstanding job, give him recognition". The second question asked subjects to list any principles they had learned or been reminded of in the last 50 min. about how to better perform their duties. An example was "Always make a written record of important meetings.". The third question asked the subjects to list any important Army information or facts they had learned or been reminded of in the last 50 min. The example given was "The Platoon Leader is responsible for all issued property that is sub-hand receipted from the Company Commander to him."

Table 8

VISTA Evaluation Design



Although it is debatable whether this test is the best possible test of "leadership," funds were not available for a longitudinal analysis. It is argued that regardless of whether students can or do apply the principles of leadership, any good instruction should make the student aware of such principles to the extent that he can state them clearly. Also, it is argued that this test is not biased in favor of any of the experimental treatments because such principles are supposedly being taught in all three approaches.

The above criterion measure was scored by three independent raters. Two of the raters were personnel who had been working on the VISTA project. In addition, a third Army Leadership SME who was not familiar with VISTA or group identity (the groups were color coded), served as the third judge. One point was given for each valid principle or fact. Levels of agreement were computed for all combinations of three judges taken two at a time.

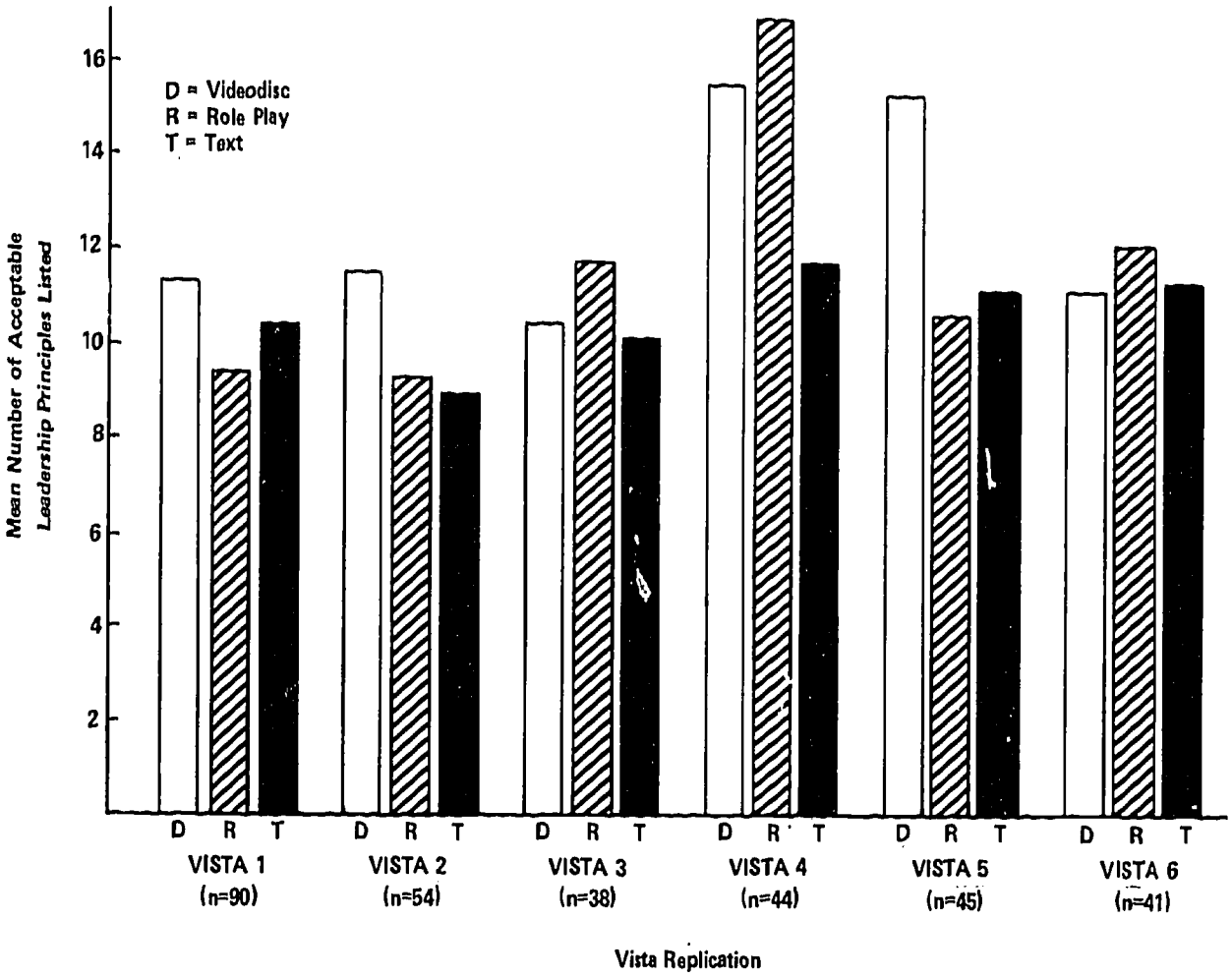
Following the major test, all subjects were given brief, 10-min. exposures to the other two conditions. Thus, all subjects were exposed to all three conditions. Also, all possible orders of presentation were given (yielding the six groups in Table 8), in order to control for order and sequence effects. Following the two brief exposures to their secondary conditions, the students were given a preference inventory (see Appendix L). In this inventory students were asked to rate on a scale of 1 to 9, their subjective opinions on such topics as: (a) how much they thought they had learned, (b) how interesting, (c) how motivating, (d) how valuable the three instructional approaches were, and (e) how much they agreed with the training content. Analyses of variance were performed on measures from each of these subjective ratings.

Results

Listings of raw data and specific statistical analyses for VISTA content areas one through six can be found in Appendix M, Parts one through six. Overall statistical analyses for all six content areas can be found in Appendix M, Part seven. The two major dependent measures for all content areas were scores on the Leadership Principles Test (which served as the measure of training effectiveness), and ratings on the subjective preference questionnaire (which served as a measure of user acceptance). The following two sections address the two major dependent measures.

Leadership Principles Test

The Leadership Principles Test was graded by three independent judges for each of the six content areas. The mean agreement across all combinations of three judges taken two at a time for all content areas was 82%. More specific agreement statistics for separate evaluations can be found in Appendix M. The mean scores for each of the three instructional mode conditions for all six content areas are shown in Figure 5 (page 36). The scores represent the mean number of acceptable leadership principles stated in the test for all three judges. The means for all three conditions across all six content areas is shown in Figure 6 (page 37). A corresponding statistical overview of each content area and for all six content areas collapsed together is shown in



ure 5. Final results for each replication.

e: Mean scores on Leadership Principles Test for all six replications (averaged across all three judges).

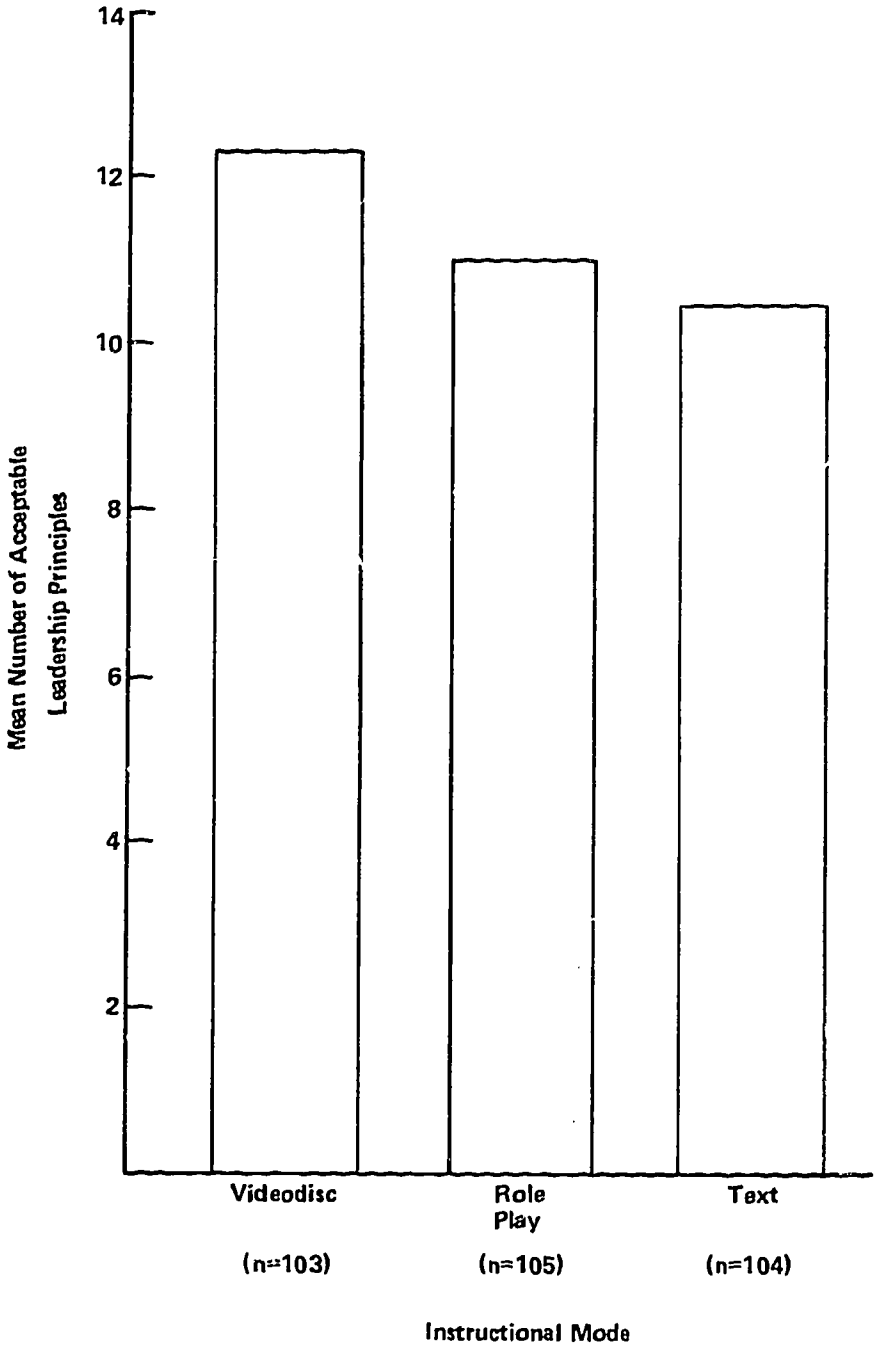


Figure 6. VISTA: Overall test results.

Note: Mean scores on the Leadership Principles Test for the three instructional modes averaged across the six replications.

Table 9 (page 39). As indicated, the only content area showing a significant main effect due to mode of instruction was "Insubordination." Newman-Keuls multiple comparisons tests indicated a statistically significant superiority of Videodisc over both Role Playing and Text in "Insubordination."

An overall Analysis of Variance was conducted on raw scores (means for the three judges). The appropriate test was a two factor Analysis of Variance with the three modes of instruction forming the three levels of one factor (Mode of Instruction), and the six content areas forming the six levels of the second factor (Content Area). As shown in Table 9 (page 39), the main effect due to Mode of Instruction was significant. A Newman-Keuls multiple comparisons test indicated a statistically significant overall superiority of Videodisc to both the Role Play and Text conditions. Besides the significant effect due to Mode of Instruction, the analysis also indicated a significant main effect due to Content Area (F (5,294)=8.147, P<.001), and Mode of Instruction by Content Area interaction (F (10,294)=2.067, P=.027). The Content Area effect indicates that different content areas varied in terms of amount of principles reported. Similarly, the significant interaction probably indicates that optimum instructional mode depended on which content area was being taught. In order to remove variability in the data due to different topic content all raw scores (mean scores for the three judges) for each separate content area were transformed into T scores with a mean of 50 and a standard deviation of 10. Analysis of Variance on the T scores indicated a significant effect due to Mode of Instruction (F(2,294)=4.633, P=.01). As with the raw scores, a Newman-Keuls multiple comparisons test indicated a statistically significant superiority of the Videodisc condition relative to both the Role Play and Text conditions. Also, as with the raw scores, there was no significant difference between the Role Play and Text conditions. Of course, there was no effect due to Content Area because of the T score transformations. The Mode of Instruction by Content Area interaction was removed with the T score transformations (F (10,294)=1.638, P>.05).

Subjective Preference Ratings

On the Leadership Training Preference Test given at the end of the period of instruction, students were asked to rate each of the instructional modes on a scale of one to nine as to: (a) how much they had learned about dealing with people, (b) how useful the training was, (c) how it kept their attention, (d) how it motivated them, and (e) the quality of the content. A complete copy of the Leadership Training Preference Test along with specific statistical outcomes for each separate content area and the overall evaluation can be found in Appendix M. The overall mean ratings averaged across all five subjective dimensions and all six content areas are shown in Figure 7 (page 40). Statistical analysis of the overall scores indicated that the preference of Role Play over Videodisc was significant (Newman-Keuls, p<.050). However, none of the separate content areas revealed a statistically significant preference for Role Play over Videodisc. Also, the preference of both Role Play and Videodisc over the Text condition was highly significant (Newman-Keuls, P<.001). Similarly, all of the separate content areas indicated a highly

Table 9

Statistical Analysis of
Leadership Principle Test For
Content Areas 1-6 and Overall

VISTA Content Area	Main Effect	Role Play versus Videodisc (Newman-Keuls)	Role Play versus Text (Newman-Keuls)	Videodisc versus Text (Newman-Keuls)
#1 Verbal Abuse	$F(2,87)=2.24$ $p=.11$	-	-	-
#2 Taking Charge	$F(2,51)=3.09$ $p=.054$	$.05<p<.10$ (Videodisc> Role Play)	$p>.10$	$.05<p<.10$ (Videodisc> Text)
#3 Meeting the NCOs and Platoon	$F(2,35)<1.0$	-	-	-
#4 Performance Counseling	$F(2,41)=3.03$ $p=.059$	$p>.10$	$p<.05$ (Role Play> Text)	$.05<p<.10$ (Videodisc> Text)
#5 Insubordination	$F(2,42)=3.85$ $p=.029$	$p<.05$ (Videodisc> Role Play)	$p>.10$	$p<.05$ (Videodisc> Text)
#6 Personal Crisis	$F(2,38)<1.0$	-	-	-
OVERALL (1-6) RAW SCORES	$F(2,294)=$ 5.432 $p=.005$	$p<.05$ (Videodisc> Role Play)	$p>.10$	$p<.05$ (Videodisc> Text)
T Scores	$F(2,294)=$ 4.633 $p=.01$	$p<.05$ (Videodisc> Role Play)	$p>.10$	$p<.05$ (Videodisc> Text)

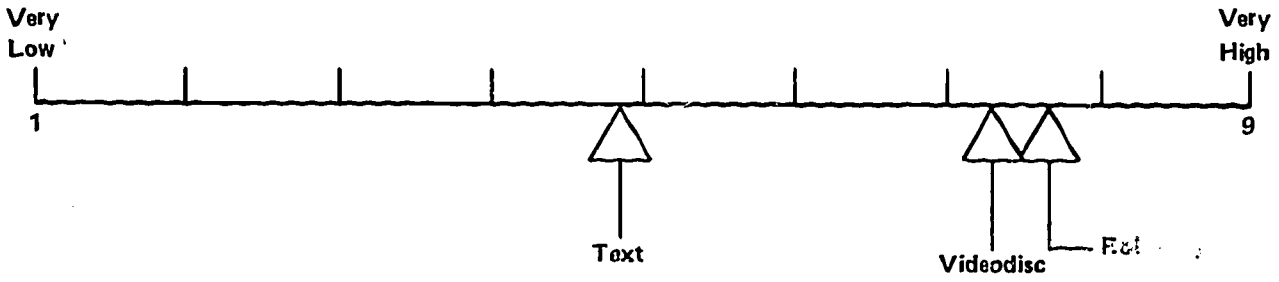


Figure 7. VISTA: Overall subjective ratings.

Note: Overall mean ratings for five questions on which students were asked to rate the quality of the three training procedures.

statistically significant preference for both Role Play and Vidoedisc over Text (Newman-Keuls, $P<.001$). When presented with a forced choice question as to which approach was the best in terms of learning about Army leadership, 58% chose Role Play, 37% chose Videodisc, and 5% chose Text. When presented a forced choice question as to which approach best kept their interest, 54% chose Role Play, 46% chose Videodisc, and 2% chose Text. Overall, 90.5% of the students felt that the three approaches should be combined with the Counseling Laboratory consisting of 17.6% Text, 36.8% Videodisc, and 45.5% Role Playing. When asked whether they preferred the Pedagogical or Experiential mode of instruction, 70.2% indicated a preference for the Pedagogical mode (only the Videodisc subjects were included in this analysis since they were the only students with exposure to both modes). This last comparison is probably unfair to the Experiential mode since students only received 15 min. of exposure to the Experiential mode while receiving 35 min. of exposure to the Pedagogical mode. Overall, 67.4% indicated that they thought the two instructional modes should be combined.

Students were also asked to rate various VISTA quality dimensions on a scale of 1 to 9. The four qualitative dimensions were rated relatively high. The median for writing was 6.86; the median for filming was 7.34; the median for acting was 6.60; and the median for feedback was 7.38. Finally, the students had relatively high agreement with the content of the training for both Role Play and Videodisc (mean ratings were 7.29 and 7.24 respectively), but a significantly lower agreement with the Text (mean rating was 5.92). The disparity between programmed Text and Videodisc was interesting (given that the actual content was identical for the two), and probably reflected a general dislike for the programmed text.

Conclusion and Recommendations

The major purpose of the VISTA project was to determine if current computer-assisted videodisc technology could teach soft skills in the Army. The evaluation results suggest that soft skills can be effectively taught with Videodisc technology. One important point needs to be made. In the final evaluation, the videodisc programs were matched against both a programmed test and role playing in order to make a relative comparison. The results do not necessarily imply that the VISTA products should replace role playing and written material for the following reasons. First, the results did indicate a general VISTA superiority overall, but inspection of the separate content areas revealed differences in the effectiveness of the videodisc programs on different topics. Second, the students indicated a preference for the role playing and felt that ideally, the three approaches should be combined. Third, the major dependent variable was the score on a cognitive acquisition of leadership principles test. It could be argued that a performance test such as role playing would have been more appropriate and may have indicated that role playing is the superior method. However, because of time limitations, it would have been impossible to test every student using role playing. Also, the traditional problems of obtaining qualified raters, how to structure the ratings, and the general unreliability of such measures precluded role playing as the dependent variable. Fourth, the VISTA products were never intended to replace role playing but rather to supplement role playing.

For the above four reasons, it is suggested that the videodisc products should be used in conjunction with role playing and written material. In order to demonstrate leadership, one must know the correct solution or strategy (cognitive component) and also must be able to carry it out (performance component). For this reason, it is suggested that the VISTA products be used early in the training (e.g., during the first Counseling Laboratory), and that the more performance-oriented role playing be used later (e.g., during the second Counseling Laboratory).

Because of the success of the VISTA project and other Army videodisc projects, it is recommended that more videodisc training/simulation efforts be considered. It is very important that careful front-end analyses be completed before trying to apply the new technology (i.e., the videodisc should not be considered a general panacea for all training/simulation areas). In addition, the quality of the content must be maintained at a high level (i.e., presenting poorly written material on a videodisc will not make the material acceptable).

Although the VISTA products were designed for the Infantry Officer's Basic Course, there may be other potential uses for them. One possibility is a refresher course for Company Commanders. Another possible application is other Officer's Basic Courses. There may be enough similarity between leadership problems encountered among different branches that a more general distribution is warranted. This possibility should be examined.

Further research is currently in progress to develop three additional videodisc leadership programs, to develop a trainer's manual to determine optimal group size for training, and to determine if the Pedagogical or Experiential mode is better. In addition, other training areas are being considered by the Army to determine if they would be appropriate domains for videodisc.

REFERENCES

Bandura, A. (1965). Behavior modifications through modeling procedures. In L. Krasner & L. P. Ullman (Eds.), Research in behavior modification (pp. 310-340). New York: Holt.

Blake, R. R., Mouton, J. S., & Bidwell, A. C. (1962). Managerial grid. Advanced Management Office Executive, 1, 12-15, 36.

Bowers, D. G., & Seashore, S. E. (1966). Predicting organizational effectiveness with a four-factor theory of leadership. Administrative Science Quarterly, 11, 238-263.

Carkhuff, R. R. (1969). Helping and human relations (Vols. 1-2). New York: Holt, Rinehart & Winston.

Carlyle, T. (1910). Lectures on heroes, hero-worship and the heroic in history (P. C. Pan, Ed.). Oxford: The Clarendon Press.

Ellis, A. (1962). Reason and emotion in psychotherapy. New York: Lyle Stuart.

Fiedler, F. E. (1967). A theory of leadership effectiveness. New York: McGraw-Hill.

Frankl, V. (1963). Man's search for meaning. New York: Washington Square Press.

Galton. (1879). Hereditary genius. London: MacMillan and Company.

Gardner, D. (1979). The influence of response mode, reading ability, and preference on six measures of recall. Unpublished doctoral dissertation, Boston University.

Glasser, W. (1965). Reality therapy: A new approach to psychiatry. New York: Harper & Row.

Graen, G., Dansereau, F., & Minami, T. (1972). Dysfunctional leadership styles. Organizational Behavior and Human Performance, 7, 216-236.

Hemphill, J. K. (1949). Situational factors in leadership. Columbus: Ohio State University, Bureau of Educational Research. (b)

Henriksen, K. F., Jones, D. R., Hannaman, D. L., Wylie, P. B., Shriver, E. L., Hamil, B. W., & Sulzen, R. H. (1980). Identification of combat unit leader skills and leader-group interaction processes (Technical Report No. 440). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1-66. (AD A084 977)

Hersey, P., & Blanchard, K. H. (1977). Management of organizational behavior: Utilizing human resources. Englewood Cliffs, NJ: Prentice-Hall.

Holmgren, J. E., Dyer, F. N., Hilligoss, R. E., & Heller, F. H. (1979-80). The effectiveness of Army training extension course lessons on videodisc. Journal of Educational Technology Systems, 8(3).

House, R. J., & Dessler, G. (1974). The path-goal theory of leadership: Some post hoc and a priori tests. In J. G. Hunt (Ed.), Contingency approaches to leadership. Carbondale, IL: Southern Illinois University Press.

Jacobs, T. O. (1974). Leadership and exchange in formal organizations. Alexandria, VA: Human Resources Research Organization.

Kierkegaard, S. (1944). The concept of dread. Princeton, NJ: Princeton University Press.

Krumboltz, J. D., & Thoresen, C. E. (1969). Behavioral counseling: Cases and techniques. New York: Holt, Rinehart & Winston.

Leveridge, L. L. (1980). Design of self-instructional materials for interactive videodisc systems. Proceedings of the Conference on Interactive Videodisc in Education and Training.

Leveridge, L. L. (1981). Electronic processing of medical visual information. Proceedings of the 14th Annual Hawaii International Conference on System Sciences.

May, R. (1953). Man's search for himself. New York: Dell (Delta).

McClelland, D. C. (1975). Power: The inner experience. New York: Halsted Press.

McGregor, D. (1960). The human side of enterprise. New York: McGraw-Hill.

Perls, F., Hefferdine, R., & Goodman, P. (1958). Gestalt therapy. New York: Julian Press.

Rogers, C. (1942). Counseling and psychotherapy. Boston: Houghton Mifflin.

Rogers, C. (1951). Client-centered therapy. Boston: Houghton Mifflin.

Rumsey, M. G., & Creskoff, B. F. (1982). Junior officer: A tough job. Soldier Support Journal, May/June, 32-38.

Schroeder, J. E. A pedagogical mode of instruction for interactive videodisc. Journal of Educational Technology Systems, 12(4), 311-317.

Sgro, J. A., Pence, E. C., & Orban, J. A. (1979). Performance-based leadership development in organizational settings (ARI Research Note No. 80-7). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A081 707)

Skinner, B. F. (1958). Teaching machines. Science, 128, 969-977.

Skinner, B. F. (1968). The technology of teaching. New York: Appleton-Century-Crofts.

Spencer, G. J., Hausser, D. L., Blaiwes, A. S., & Weller, D. R. (1975). Use of computer-assisted instruction for interpersonal skill training--A pilot study. Technical Report NAVTRAEQUIPCEN 73-C-0133-1.

Stogdill, R. M. (1948). Personal factors associated with leadership. Journal of Psychology, 25, 35-71.

Stogdill, R. M. (1974). Handbook of leadership. New York: Free Press.

Stogdill, R. M., & Coons, A. F. (1957). Leader behavior: Its description and measurement (Monograph No. 88). Ohio State University, Bureau of Business Research.

Tillich, P. (1952). The courage to be. New Haven, CT: Yale University Press.

Ullman, L. P., & Kasner, L. (1969). A psychological approach to abnormal behavior. Englewood Cliffs, NJ: Prentice-Hall.

vonFeldt, J. R. (1978). A description of the DAVID interactive instructional television system and its application to post high school education of the deaf. In: Videodisc and microcomputers in education and job training. Warrenton, VA: Learning Technology Institute.

Vroom, V. H., & Yetton, P. W. (1973). Leadership and decision-making. Pittsburgh: University of Pittsburgh Press.

Wolpe, J. (1973). The practice of behavior therapy (2nd ed.). New York: Pergamon.

Young, J. I., & Tosti, D. T. (1981). Equipment-independent training program final report (Report No. TDI-TR-3-81). Fort Monroe: U.S. Army Training and Doctrine Command.

Yukl, G. A. (1971). Toward a behavioral theory of leadership. Organizational Behavioral and Human Performance, 6, 414-440.

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