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EVALUATION OF INTERACTIVE VIDEO DISC SYSTEM FOR TRAINING THE OPERATION OF THE DCT-9000 IN THE MOS 72G COURSE

FINAL REPORT

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OCTOBER 1984

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   THE TRAINING OF THE DATA COMMUNICATIONS TERMINAL (DCT-9000) OPERATORS WAS HINDERED BY THE SHORTAGE OF END-ITEM SYSTEMS. THE LOW DENSITY AND HIGH COST OF THE DCT-9000 MAKE IT UNECONOMICAL TO OBTAIN ADDITIONAL SYSTEMS TO PROVIDE SUFFICIENT HANDS-ON TRAINING IN THE ALLOTTED TRAINING TIME. THE USE OF GENERIC MICROCOMPUTER/VIDEODISC (MC/VD) SYSTEMS PART-TASK TRAINERS WAS SEEN AS A VIABLE ALTERNATIVE. THIS PROJECT WAS INITIATED IN RESPONSE TO A REQUEST BY THE UNITED STATES ARMY SIGNAL CENTER AND FORT GORDON (USASC&FG).
THE CONCLUSIONS DRAWN FROM THE TEST ARE:

- Practice time is significantly increased.
- The experimental group made significantly higher test scores in a significantly smaller test time than the control group, on the Thursday test.
- On the Friday test, the experimental group worked faster than the control group, but their scores were not significantly different.
- Student and instructor attitudes toward the MC/VD delivery system were highly positive, and they recommend its application to other modules.
- The MC/VD delivery system is low in cost and high in reliability.

Recommendations are that the MC/VD delivery system be used regularly in this DCT-9000 module, and that is to be adapted for use in similar modules and for sustainment and refresher training in the field.
SUPPLEMENTARY TRAINING IN THE OPERATION OF THE DCT-9000 DATA COMMUNICATIONS TERMINAL BY MEANS OF AN INTERACTIVE, TWO DIMENSIONAL (2D) MICROCOMPUTER/VIDEODISC (MC/VD) DELIVERY SYSTEM IN THE MOS 72G COURSE

FINAL REPORT

CHRISTIE D. VERNON, ED.D.

OCTOBER 1984

The views, opinions, and/or findings contained in this report are those of the author and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

Prepared for: U.S. ARMY COMMUNICATIVE TECHNOLOGY OFFICE, Fort Eustis, Virginia
EXECUTIVE SUMMARY

The training of the data communications terminal (DCT-9000) operators was hindered by the shortage of end-item systems. The low density and high cost of the DCT-9000 make it uneconomical to obtain additional systems to provide sufficient hands-on training in the allotted training time. The use of generic microcomputer/videodisc (MC/VD) systems part-task trainers was seen as a viable alternative. This project was initiated by the Training Developments Institute in response to a request by the United States Army Signal Center and Fort Gordon (USASC&FG). It was later transferred to the Army Communicative Technology Office (ACTO) at Fort Eustis.

The basic method of providing training in operation of the DCT-9000 is a one-week module in the Automatic Data Telecommunications-Center Operator, MOS 72G10, Course which is group-paced and conducted for approximately 18 students per group per week. The course consists of lecture and workbook instruction as well as limited individual instruction on the DCT-9000 system. Logs of student hands-on training time revealed that students only received from 80 to 150 minutes per week for actual practice on the equipment. In addition to a concern that this amount of practice was not sufficient for high confidence or retention levels, there was the problem that once the students were in the field there was little capacity to give them sustainment or refresher training without using operational end-item equipment. Therefore, the possibility of an inexpensive, portable system, which was interactive and simulated the operation of the DCT-9000 so that it could be used both in the classroom and in the field prompted a strong interest in the development of an MC/VD delivery system.

The basic purpose of this test was to determine the effectiveness of using an MC/VD delivery system as a supplement to classroom training, for example:
* Would practice time be substantially increased?
* Would student competency levels, as shown by test scores, rise?
* Would student facility in operating the DCT-9000, as shown by test times, rise?
* Would student attitudes improve? Would they show greater interest, motivation, and enthusiasm?
* Would the MC/VD delivery system be cost effective?

The testing procedures began in July, 1983 and continued through the weekly classes until 74 subjects were secured for the Control Group. The Experimental Group of 76 subjects was tested during the period February to May, 1984. The groups consisted of the regularly assigned students on a first come, first served basis. A comparison of the ASVAB scores of the two groups showed no significant difference between them. Each group was instructed in the usual way during the full week, with the difference that a "practice test" was given to them on Thursday in addition to the usual "performance test" on Friday. The Experimental Group used two MC/VD delivery systems in each classroom in addition to the DCT-9000, and was introduced to instruction on that system on the first day of class so that it could be used throughout the week.

The data collected were: student ASVAB scores; student test scores and times for the Thursday test; student test scores and times for the Friday test; student practice time in minutes; student and instructor opinion surveys; cost data for both the MC/VD delivery system and the DCT-9000.
EXECUTIVE SUMMARY (Continued)

Generally speaking, the findings of this test were very positive. The student practice time increased more than two and one-half times, to 4.4 hours. The Experimental Group scored significantly higher on the Practice Test (87.78 to 82.29) and took the test in a significantly lower time (16.66 to 20.18 min.). The Experimental Group was also faster on the Performance Test (14.87 to 16.24 min.); and the Control Group's Friday time was about the same as the Experimental Group's Thursday time. However, the scores of the two groups evened out on the Friday test. The Experimental Group scored 96.01 and the Control Group scored 95.79.

Moreover, the attitudes of the students toward the new form of instruction were very enthusiastic. Almost all of them expressed interest in the DCT-9000 instruction and appreciation for their instructors, but the students in the Control Group complained frequently about the lack of practice time, and the boredom of waiting for others. Both students and instructors remarked on the importance of the increased practice time, the stimulation and motivation, and the higher confidence level attained by the Experimental Group as a result of the MC/VD delivery system used as a supplement to instruction. They spontaneously recommended that this technology be applied to the SRT and DSTE modules of the course.

The cost data for the two systems were provided by the USASC&FG and ACTO personnel, and in the case of the MC/VD system include the production and programming work done in-house by those offices. Hardware units were off-the-shelf items. The estimated cost per year for the DCT-9000 was $44,988 and for the MC/VD delivery system it was $6,067. The DCT-9000 presents some reliability problems since it must be constantly powered up in training, and its use is not significantly reduced by the presence of the MC/VD systems since there is a minimum of hands-on training that must be accomplished in any case. But the reliability of the MC/VD systems is very high, and with minor programmatic improvements will be virtually trouble free.

The conclusions drawn from the test are:
* Practice time is significantly increased, to a mean of 4.4 hours.
* The Experimental Group made significantly higher test scores in a significantly smaller test time than the Control Group, on the Thursday test.
* On the Friday test, the Experimental Group worked faster than the Control Group, but their scores were not significantly different.
* Student and instructor attitudes toward the MC/VD delivery system were highly positive, and they recommended its application to other modules.
* The MC/VD delivery system is low in cost and high in reliability.

Recommendations are that the MC/VD delivery system be used regularly in this DCT-9000 module, and that it be adapted for use in similar modules and for sustainment and refresher training in the field.
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INTRODUCTION

This is the final report on a project designed to test and evaluate, in operational classroom conditions, a microcomputer-controlled video disc (MC/VD) delivery system as a means of providing an equipment-independent training program on the DCT-9000 electronic communication system. The low density and high cost of the DCT-9000 equipment made "hands-on" equipment training potentially uneconomical and unnecessarily time consuming for students and staff. The project was implemented by the Training Developments Institute, Fort Monroe, Virginia, in response to the request of the Deputy Assistant Commandant for Educational Technology at the United States Army Signal Center and Fort Gordon (USASC &FG). Later the effort was transferred to the Army Communicative Technology Office (ACTO) at Fort Eustis, for which this report is prepared.

Background

This project follows other developmental efforts conducted by the Staff and Faculty Development Division of USASC&FG and ACTO, in which efforts have been made to apply new technologies to several areas of military training at USASC&FG.

The basic method of providing practical experience on communications-electronics equipment has been training on the actual equipment. Training for the DCT-9000 module of the MOS 72G10 Course is group paced and conducted for approximately 18 students per group per week. For practical purposes, only one DCT-9000 system has been available. Logs of student hands-on training time revealed that, with over 2,000 minutes available for the course, student time for practice on the equipment has ranged from approximately 80 minutes per week per student, to about 150 minutes per week per student. This range is the result of truncated training schedules, equipment downtime, and class size.

This course consists of lecture and workbook instruction as well as limited individual instruction on the DCT-9000 system. The DCT-9000 is a complex communications terminal with several components. Operation of it must include the start-up routines, the receiving and initiation of communications, and a variety of troubleshooting activities in both the transmitting and receiving modes. It has long been a concern of the school personnel that students, although adequately trained, do not have sufficient practice to attain the confidence or retention levels which they need to carry the proficiency acquired in this module into the field.

Once the trained personnel are in the field, there is little capacity to give them sustainment or refresher training without using end-item equipment. The possibility of a portable system, which is interactive and simulates the operation of the DCT-9000, for training in the field has been one of the strong reasons for interest in the development of an MC/VD delivery system.

The present mode of instruction, which is almost totally dependent on
the instructor for lectures, directions in support of workbook exercises, and individual guidance in the use of the equipment, is very sensitive to any reduction in instructional personnel and to the turnover of experienced instructors. A supplementary, simulated, interactive instructional system would provide students with an opportunity to continue to learn at approximately the same rate, even with a relatively inexperienced instructor. It would also supply a back-up system in the event of machine downtime.

The exposure of the high cost DCT-9000 to the normal wear and tear of training not only involves additional parts and maintenance costs to the school but significantly interrupts the training when downtime occurs. Supplementing the students' practice time on a less expensive system holds the potential for cutting school costs as well as enhancing the students' training and consequent retention and expertise.

The video disc provides optical storage and laser readout of video signals on a disk, which can then be displayed on a video tube. Tens of thousands of still pictures can be combined with motion programming and a stereo audio sound track. The materials can be viewed in several modes: freeze frame; frame-by-frame; and slow motion, normal, and fast speeds. In the MC/VD delivery system, a microcomputer provides the control system for the stored material and the instructional logic. The system developed for training on the DCT-9000 provided a simulation of the actual equipment operation and a touch panel control, by means of which the student could select and touch specific controls in sequence as they are displayed on the video screen. As necessary, the system can provide branching and remedial instruction for the student. The logic of the instructional system, and the sequence and timing of operations play an important part in the success of this system.

Purpose of the Test

The basic purpose of the test was to determine the effectiveness of using an MC/VD delivery system to provide equipment independent training as a supplement to the current mode of delivering instruction in the operation of the DCT-9000 electronic communication system. A number of specific questions are related to this purpose:

* How much will the students' hands-on practice time increase?

* Will time on the console be reduced, thus reducing problems of wear and maintenance?

* Will increased practice time raise student competency levels and skill retention?

* Will the availability of two dimensional (2D) simulators result in reducing training time or ultimately aiding in the reconfiguration of this training module?

* How will the students' attitudes be affected? Will they express greater interest and enthusiasm? Higher motivation? Greater confidence in their ability to operate the DCT-9000? An improved attitude toward the instructional environment?
* Does the MC/VD delivery system show potential for application in the field?

* Is the use of the MC/VD delivery system cost-effective, as compared to the current equipment-dependent system?

**Evaluation Design**

Generally, all procedures for the conduct of the test were developed to conform to the normal training situation, so that the students would not be aware that they were participating in a testing situation and their opportunity for regular, thorough training would not be impaired in any way.

Training in the DCT-9000 module of the MOS 72G course is conducted in two adjacent classrooms, each equipped with the DCT-9000, student seating, and other routine equipment. The two rooms are open to each other, and students may pass freely between them. Lectures, workbook assignments, a hands-on instruction and practice take place in each room for the students assigned to that room. Testing is conducted individually by the instructor at the end of each week.

Beginning in July, 1983, a series of DCT-9000 classes were to be taught in the usual manner until approximately 72 subjects were secured. This was to be the Control Group. At the end of Control Group training, three MC/VD delivery systems were to be placed in each classroom. Training which incorporated use of these systems would then be conducted until approximately 72 subjects were obtained. This would be the Experimental Group.

This group was to cover the same material, hear lectures and make use of workbooks. However, on the first day of instruction they would be introduced to the use of the MC/VD delivery system, and would use it as fully as possible to acquire proficiency in the operation of the DCT-9000. The instructor would be responsible for integrating the use of the MC/VD delivery system and the hands-on use of the DCT-9000 in an optimal manner for each student. While this was taking place, the instructors were requested to be sensitive to any problems with the MC/VD programming, or those dealing with transfer-of-training, if any. It was one of the assumptions of the test that the instructors for these classes would be experienced on the MC/VD delivery system and qualified to introduce students to it effectively.

**Testing Procedures: Control and Experimental Groups**

In the regular testing procedure, each student is assessed individually by means of a hands-on, performance based demonstration of proficiency on the DCT-9000. This is administered to the student, individually, by the instructor, who times and scores each step of the operation by means of a check list. A numerical value is assigned to each item on the check list. It is, therefore, possible to determine the total number of minutes for test completion, and the total numerical score of the student. This same check list was to be used for both the Control and Experimental Groups during the testing period.

Since, for purposes of this test it was important to determine whether
the addition of the MC/VD delivery system significantly affected the length of time in which a student was able to achieve proficiency in operation of the DCT-9000, an important additional step was added to the testing procedure.

Both the Control and Experimental Groups were to be given the standard individual test on Thursday morning. Upon completion, the students were to be told that it was a practice test and that a final test would be given Friday afternoon. No student was to have his instructional week shortened; and the instruction was to continue through Friday.

The completed check lists (the test instrument) for both tests for all students were to be collected by the test monitor and provided to the evaluator.

TABLE 1: Illustration of Procedures and Data to be Collected for the Test

<table>
<thead>
<tr>
<th>Control Group</th>
<th>Experimental Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Subjects: 72</td>
<td>No. of Subjects: 72</td>
</tr>
<tr>
<td>Time: Approximately 4 instructional weeks</td>
<td>Time: The same</td>
</tr>
<tr>
<td>Pretest Data:</td>
<td>Pretest Data: The same</td>
</tr>
<tr>
<td>High school grade attained</td>
<td>Class Test Data: The same</td>
</tr>
<tr>
<td>ASVAB: General Technical Electronics Clerical</td>
<td>Class Test Data: The same</td>
</tr>
<tr>
<td>Class Test Data: Score and Time</td>
<td>Hands-on Practice Data:</td>
</tr>
<tr>
<td>Thursday test scores</td>
<td>Time on DCT-9000 (in minutes)</td>
</tr>
<tr>
<td>Friday test scores</td>
<td>Time on MC/VD System (in minutes)</td>
</tr>
</tbody>
</table>
| Hands-on Practice Data | Surveys: Student Survey (plus supplement) 
Instructor Survey |
| Time on DCT-9000 (in minutes) | Cost Data: 
Initial cost of DCT-9000 
Programming costs 
Log of downtime Maintenance costs |
| Surveys: Student Survey 
Instructor Survey | Initial cost of MC/VD delivery system, including equipment and program development 
Log of downtime (MC/VD) Maintenance costs (MC/VD) |
Forms for the Collection of Data. Student rosters for each class were to be provided by the school. The logs of hands-on practice time and logs of maintenance data were to be those currently in use, as were the student final test forms. The summary form for each student's data, and the student and instructor opinion forms are part of the appendix of this report.

Population Description and Treatment

The subjects for this test procedure were selected on a first-come, first-served basis as they arrived for training in the MOS 72G10 Course at the USAS&FG. They were active Army personnel of the rank of private, generally recent graduates from basic training. The assignment to the Telecommunications Equipment Operator Course was their first experience with Army MOS training. The students participating in the Control and Experimental class groups can be considered a representative, or random, sample since no effort was made to specially select them.

Nine rounds of classes were held for the control group; and a total of 74 subjects with complete data were secured. A total of seven rounds of classes were held using the experimental training method; and a total of 76 subjects with complete data were obtained.

To make sure that the subjects in each group were comparable for purposes of this test, the following data were made available to the Evaluator: ASVAB (Armed Services Vocational Aptitude Battery) scores for the General Technical, Electronics, and Clerical components. Students who are admitted to this MOS training generally have higher mean scores on ASVAB tests than the Army population as a whole. To be sure that the scores of the Experimental and Control groups did not differ significantly, T-tests were made. The following table shows the results.

TABLE 2: Comparison of ASVAB Scores for Control and Experimental Groups

| Component          | Control Group $\bar{X}$ | Experimental Group $\bar{X}$ | t  | p <  
|--------------------|--------------------------|------------------------------|----|-----
| General Technical  | 107.905                  | 108.737                      | .35| .724|
| Component          |                           |                              |    |     |
| Electronics Component | 104.324                  | 104.645                      | .13| .897|
| Clerical Component | 111.162                  | 113.171                      | 1.10| .272|

The scores in two cases are virtually identical; and the clerical component only varies by two points. There was no significant difference between the two groups on the basis of their ASVAB scores.
DISCUSSION

Conduct of the Test

The test was conducted according to the plan, with a few exceptions which will be noted in this discussion.

A Test Monitor from the Staff and Faculty Development Division was assigned to the project at Fort Gordon. The Monitor was responsible for gathering entry, process, and output data on students for both the Control and Experimental groups, and for monitoring the testing conditions. The Monitor provided to the Evaluator:

* Student ASVAB scores for the Clerical, Electronic, General Technical tests. The high school attainment levels were not made available, and did not appear to be needed.
* Logs of student practice time on the DCT-9000 and on the MC/VD delivery systems.
* Student scores and time on both the practice and the final tests.
* Student and instructor end-of-course opinion surveys.
* Cost data for both the DCT-9000 and the MC/VD delivery system. This was secured cooperatively with ACTO.
* Logs of downtime for the equipment for both the Control and Experimental classes were very sketchy due to the extended period of time over which the test was conducted. Problems with downtime were inferred from student and instructor comments. Maintenance costs were secured by using the fixed, contractural costs for maintenance.

The test was conducted in the two adjacent classrooms regularly used for DCT-9000 instruction, in the same time frame, and using the usual mode of instruction. The Control Group data gathering began in July, 1983 and ended in February, 1984. This length of time became necessary in order to secure the 72 subjects agreed upon in the test plan.

The Experimental Group data collection began in May, 1984 and continued until August, 1984. All training conditions were the same as that of the Control Group except for the introduction of the MC/VD delivery system into the classroom as a supplement to the training. It should be noted that four of these systems (2 in each classroom), rather than the three called for in the test plan, were made available. Lectures, workbook exercises, and hands-on training on the DCT-9000 continued in the same way as for the Control Group.

The responsibilities of the Monitor in supervising the conduct of the test and maintaining communication with the Evaluator were discharged quite well in spite of the extended period of the test and the necessity for a change in personnel. The classes were arranged as agreed and end-of-course
Testing was conducted as described in the plan. Baseline data were gathered as agreed, insofar as it was available. Contact was maintained with the instructors to encourage consistency in the treatment of the classes. Student times and scores information was collected and transcribed and made available to the evaluator; and student and instructor opinion forms were collected and forwarded. Not all students completed opinion forms; but most did, and these forms contained extensive comments.

The instructors carried out their responsibility to conduct the classes in the usual mode and with a normal atmosphere. They kept detailed logs of both hands-on and MC/VD practice times. They planned and carried out the Thursday and Friday schedule of testing which made their instructional week significantly more complicated. With a few exceptions, they supplied complete responses on the student opinion forms; and they all completed their own forms. The only problem in the data gathering process was in the logs of downtown for the two kinds of equipment. Some of this information is inferred from student comments.

Findings

Generally speaking, the findings support the assumptions behind the development of the project. The Experimental Group was able to benefit from a substantially larger amount of practice time than the Control Group. They showed faster gains in competency, as reflected in their Thursday (practice) test scores and times. However, at the end of the week, these gains tended to even out with those of the Control Group. The costs associated with the addition of the MC/VD delivery system were minimal; and reliability was high. In addition, both the students and the instructors were enthusiastic about the use of the new system and strongly recommended its continued use and application to other courses.

Practice Time

The mean practice time logged for students before this evaluation varied from 80 to 150 minutes. It was hoped that by means of the introduction of the MC/VD delivery system that time might be increased to as much as four hours per student. That hope was vindicated, as shown in the table below.

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Experimental Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \bar{X} ) Time on</td>
<td>112.66 min.</td>
<td>106.21 min.</td>
</tr>
<tr>
<td>DCT-9000</td>
<td></td>
<td>156.51 min.</td>
</tr>
<tr>
<td>( \bar{X} ) Time on</td>
<td></td>
<td>262.72 min.</td>
</tr>
<tr>
<td>MC/VD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Practice Time</td>
<td>112.66 min.</td>
<td>262.72 min.</td>
</tr>
</tbody>
</table>
Practice time for the Experimental Group was almost 2.5 times that of the Control Group. It does, in fact, exceed 4.4 hours. The following observations can also be made.

1. The time spent on the console (DCT-9000) by the Experimental Group did not reduce appreciably; nor does it appear that it can easily be reduced. Students in that class expressed a need for even 'more' hands-on practice. Therefore, it is not anticipated that introduction of the new system would have any immediate effect on the cost or maintenance factors of the DCT-9000 system presently in use.

2. While it is clear that the increase in practice time resulted in faster acquisition of competency, the size of that increase is so large for the Experimental Group in relation to that of the Control Group, that there is no meaningful way to place it into statistical expression. That is, the increase in competency is very small when compared to the increase in practice time.

Measures of Effectiveness

The heart of this evaluation is the determination as to whether or not the introduction of the MC/VD delivery system resulted in improved test scores and reduced test times on the part of the Experimental Group. The table below indicates that significant improvement did result in some cases, but not in others.

**TABLE 4: Comparison of Mean Output Variables - Between Groups**

<table>
<thead>
<tr>
<th>Output Measures</th>
<th>Control Group (N=74)</th>
<th>Experimental Group (N=76)</th>
<th>t</th>
<th>p &lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Test (Thurs.): time</td>
<td>20.176</td>
<td>16.658</td>
<td>4.72</td>
<td>.0001*</td>
</tr>
<tr>
<td>Practice Test (Thurs.): score</td>
<td>82.297</td>
<td>87.789</td>
<td>2.02</td>
<td>.045*</td>
</tr>
<tr>
<td>Performance Test (Fri.): time</td>
<td>16.243</td>
<td>14.868</td>
<td>-2.08</td>
<td>.040*</td>
</tr>
<tr>
<td>Performance Test (Fri.): score</td>
<td>95.797</td>
<td>96.013</td>
<td>.15</td>
<td>.883</td>
</tr>
<tr>
<td>Control Group Performance (Fri.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test compared to Experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice (Thurs.) Test: scores</td>
<td>95.797</td>
<td>87.798</td>
<td>3.50</td>
<td>.001*</td>
</tr>
<tr>
<td>Control Group Performance (Fri.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test compared to Experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice (Thurs.) Test: times</td>
<td>16.243</td>
<td>16.526</td>
<td>-.54</td>
<td>.589</td>
</tr>
</tbody>
</table>

* The difference between groups is statistically significant.
The extra practice time showed very good results in the Thursday tests. The times of the Experimental Group were significantly lower (16.526 to 20.176) than the Control Group, and their test scores were significantly higher (87.789 to 82.297).

In addition, the mean time which the Experimental Group used for test completion on Friday was significantly lower: 14.868 to 16.243. But it must be noted that the Friday performance scores of the two groups were practically the same (95.797 and 96.013) and not statistically distinguishable. Further, the Friday scores of the Control Group (95.797) were significantly higher than the Thursday scores of the Experimental Group (87.789). In other words, the Control Group had 'caught up' by the time of the test on Friday, and performed as well.

It is particularly relevant to this evaluation that the students in the Experimental Group, having had substantial practice opportunities, clearly are able to go through the test much faster on both Thursday and Friday, and get significantly higher scores on Thursday.

A comparison of the mean output variables within each group further illustrates the situation.

TABLE 4: Comparison of Mean Output Variables - Within Each Group

<table>
<thead>
<tr>
<th>Output Measures</th>
<th>Thursday Data</th>
<th>Friday Data</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group: Mean Test Scores</td>
<td>82.297</td>
<td>95.797</td>
<td>-7.50</td>
<td>.0001*</td>
</tr>
<tr>
<td>Mean Test Times</td>
<td>20.176</td>
<td>16.243</td>
<td>5.72</td>
<td>.0001*</td>
</tr>
<tr>
<td>Experi. Group: Mean Test Scores</td>
<td>87.789</td>
<td>96.013</td>
<td>-3.55</td>
<td>.001*</td>
</tr>
<tr>
<td>Mean Test Times</td>
<td>16.658</td>
<td>14.868</td>
<td>3.08</td>
<td>.003*</td>
</tr>
</tbody>
</table>

*Statistically significant.

All of these differences are strongly statistically significant, indicating that the improvement shown by both groups increases in an important way between the Thursday, practice testing, and the Friday, performance testing. Their scores go up; and their times come down. In all cases the scores and times of the Experimental Group are better.

However - and it is an important observation - both groups seem to benefit materially from the extra day of training. The final scores of the Experimental Group are not significantly higher than those of the Control Group. However, their speed is.

In an effort to understand what these mean scores and times meant in terms
of individual performances, the number of scores of 90 and above on each day were counted, as shown below.

TABLE 5: Number (Percent) of Students from Control and Experimental Groups Scoring 90 and Above

<table>
<thead>
<tr>
<th></th>
<th>Thursday Test</th>
<th>Friday Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scores 90-100%</td>
<td>Percent</td>
</tr>
<tr>
<td>Control Group</td>
<td>31 (42%)</td>
<td>65 (88%)</td>
</tr>
<tr>
<td>Experimental Group</td>
<td>56 (76%)</td>
<td>69 (91%)</td>
</tr>
</tbody>
</table>

This table confirms the changes that take place in the class competencies which are reflected in the statistics above, in Tables 3 and 4. In the Experimental Group, 76% of the class have done very well on Thursday; but not as well as the Control Group on Friday. And their Friday scores are very similar to each other. A dramatic improvement takes place among Control Group Students between Thursday and Friday.

Measures of Cost Effectiveness

For purposes of this evaluation, there were two DCT-9000 consoles and 4 MC/VD student stations available, 2 in each classroom. Since the testing period became rather extended and downtime data were not available for the whole time, it is difficult to draw conclusions about reliability of the equipment for these particular classes. The cost and maintenance data, however, are quite self-evident, as shown in the following table.

TABLE 6: Summary of Equipment and Maintenance Costs for DCT-9000 and MC/VD Delivery Systems

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>DCT-9000</th>
<th>MC/VD</th>
</tr>
</thead>
<tbody>
<tr>
<td>HARDWARE COSTS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial Cost: console</td>
<td>$ 300,000</td>
<td></td>
</tr>
<tr>
<td>Initial Cost: Apple II microcomputer, 48K; Pioneer Video Disc Player Model No. PR7820; Sanyo monitor with a 114 AT touch panel; Thunderclock card; VMI Interface; I floppy disk drive; 16K RAM card.</td>
<td>$ 6,000</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 6: Continued

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>DCT-9000</th>
<th>MC/VD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOFTWARE COSTS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning and Development: workbooks and auxiliary materials</td>
<td>$5,880</td>
<td>$5,880</td>
</tr>
<tr>
<td>Planning and Development: personnel; TV studios; production and post production</td>
<td>$13,810</td>
<td></td>
</tr>
<tr>
<td>Mastering and Replication: two discs</td>
<td>$3,000</td>
<td></td>
</tr>
<tr>
<td>Programming (not applicable)</td>
<td>$18,550</td>
<td>$18,550</td>
</tr>
<tr>
<td>TOTALS:</td>
<td>$305,880</td>
<td>$47,240</td>
</tr>
</tbody>
</table>

Life Cycle Expectancy

<table>
<thead>
<tr>
<th>Life Cycle Expectancy</th>
<th>10 years</th>
<th>8 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>One time costs /- life:</td>
<td>$30,588</td>
<td>$5,905</td>
</tr>
<tr>
<td>Annual maintenance costs:</td>
<td>14,400</td>
<td>162</td>
</tr>
<tr>
<td>TOTAL COST PER YEAR:</td>
<td>$44,988</td>
<td>$6,067</td>
</tr>
</tbody>
</table>

The cost data were provided by USASC&FG and ACTO personnel and, in the case of the MC/VD system, include the production and programming work done in-house by those offices. The hardware units were off-the-shelf items and did not require special developmental costs. The cost per unit of the MC/VD is clearly substantially less than the unit cost for the DCT-9000; and the maintenance costs for the MC/VD are insignificant by comparison.

In terms of reliability, reports from both the USASC&FG personnel, as well as the students and the instructors, indicate that the MC/VD system is very reliable. Occasionally a debugging of the program was required.

The DCT-9000 presents some reliability problems because it is necessary in training to constantly power up and power down a piece of equipment which is designed to be in a constant power up condition. Its use in the classroom creates more problems than its use in the field. Nevertheless, the hands-on experience with the equipment itself is essential to training.
Measures of Acceptance

Students in both groups wrote extensively in the remarks sections of the opinion surveys. The effect of these comments is to illuminate the tallies which appear in the table below.

All students received the first 12 questions; and the Experimental Group had an additional 5 questions which related to the MC/VD delivery system. On the whole, all students showed interest in the course and a real appreciation of the instructors' efforts. The statements which related to the sufficiency of practice time (Nos. 3 and 11) were paired (stated in the opposite manner and repeated) in order to check the consistency of student responses. As can be seen, in both cases, the Experimental Group was much more satisfied with the amount of practice time.

### TABLE 7: Summary of Student Survey Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree</th>
<th>Agree</th>
<th>No</th>
<th>Disagree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My speed of learning the operation of the DCT-9000 was as fast as it could be.</td>
<td>(C) 66%</td>
<td>26%</td>
<td>1%</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>(E) 56%</td>
<td>31%</td>
<td>5%</td>
<td>7%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>2. The way in which this module was taught kept my interest and attention at all times.</td>
<td>(C) 60%</td>
<td>31%</td>
<td>1%</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>(E) 60%</td>
<td>30%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>3. I had plenty of hands-on practice time.</td>
<td>(C) 40%</td>
<td>29%</td>
<td>0%</td>
<td>20%</td>
<td>11%</td>
</tr>
<tr>
<td>(E) 76%</td>
<td>17%</td>
<td>0%</td>
<td>6%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>4. I am confident that I have developed a high level of skill in operating the DCT-9000.</td>
<td>(C) 29%</td>
<td>57%</td>
<td>4%</td>
<td>9%</td>
<td>1%</td>
</tr>
<tr>
<td>(E) 45%</td>
<td>48%</td>
<td>1%</td>
<td>5%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>5. The training module in the operation of the DCT-9000 was as effective as it could be.</td>
<td>(C) 60%</td>
<td>23%</td>
<td>6%</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>(E) 56%</td>
<td>29%</td>
<td>5%</td>
<td>10%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>7. The instructor gave me all the personal attention and information that I needed.</td>
<td>(C) 76%</td>
<td>17%</td>
<td>3%</td>
<td>1%</td>
<td>3%</td>
</tr>
<tr>
<td>(E) 77%</td>
<td>19%</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>9. The arrangement of classroom space and equipment was efficient and just right for class needs.</td>
<td>(C) 71%</td>
<td>17%</td>
<td>4%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>(E) 87%</td>
<td>9%</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 7: Continued

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree</th>
<th>Agree</th>
<th>No</th>
<th>Disagree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. I think I needed more hands-on practice with the equipment.</td>
<td>(C) 30%</td>
<td>36%</td>
<td>11%</td>
<td>13%</td>
<td>10%</td>
</tr>
<tr>
<td>(E) 16%</td>
<td>27%</td>
<td>12%</td>
<td>15%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>12. The testing process allowed me to show the best I could do.</td>
<td>(C) 53%</td>
<td>33%</td>
<td>6%</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>(E) 67%</td>
<td>26%</td>
<td>5%</td>
<td>2%</td>
<td>0%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Much Better</th>
<th>Better</th>
<th>Same</th>
<th>Less Effect</th>
<th>Much less Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Compared with other modules in this course, this module was:</td>
<td>(C) 70%</td>
<td>20%</td>
<td>9%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>(E) 43%</td>
<td>29%</td>
<td>22%</td>
<td>5%</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Too Much</th>
<th>Some too Much</th>
<th>Right Amount</th>
<th>Too Little</th>
<th>Much too Little</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. The time allocated for instruction in DCT-9000 operation was:</td>
<td>(C) 1%</td>
<td>1%</td>
<td>66%</td>
<td>19%</td>
<td>11%</td>
</tr>
<tr>
<td>(E) 2%</td>
<td>5%</td>
<td>76%</td>
<td>13%</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Excel</th>
<th>Very Good</th>
<th>No</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. The reliability of the equipment was:</td>
<td>(C) 43%</td>
<td>49%</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>(E) 35%</td>
<td>50%</td>
<td>6%</td>
<td>2%</td>
<td>6%</td>
<td></td>
</tr>
</tbody>
</table>

**Questions for Experimental Group Only**

<table>
<thead>
<tr>
<th>Question</th>
<th>Very Much</th>
<th>Some-what</th>
<th>No</th>
<th>Did not Enjoy</th>
<th>Dis-liked</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. I enjoyed using the MC/VD delivery system:</td>
<td>66%</td>
<td>25%</td>
<td>5%</td>
<td>5%</td>
<td>0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree</th>
<th>Agree</th>
<th>No</th>
<th>Disagree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. The directions for using the system were clear and easy to follow.</td>
<td>61%</td>
<td>23%</td>
<td>8%</td>
<td>8%</td>
<td>0%</td>
</tr>
<tr>
<td>Question</td>
<td>Extrem. Reliable</td>
<td>Reliable</td>
<td>No Reliable Opin.</td>
<td>Not Reliable</td>
<td>Undependable</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>----------</td>
<td>-------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>15. The MC/VD delivery system was reliable and did not break down or malfunction.</td>
<td>25%</td>
<td>54%</td>
<td>10%</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. It was easy to operate the DCT-9000 after receiving instruction on the MC/VD delivery system.</td>
<td>34%</td>
<td>49%</td>
<td>7%</td>
<td>10%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. The MC/VD is a very good training aid and I recommend that it be used for future classes.</td>
<td>74%</td>
<td>16%</td>
<td>3%</td>
<td>5%</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Analysis of the Student Surveys.** Students in both the Control and Experimental Groups showed a strong approval of the DCT-9000 training module: the interest level, the way it was taught, the personal attention given by the instructors, the classroom arrangements, and the testing process. In addition, both groups indicated a need for more hands-on practice with the equipment. The Experimental Group indicated a 93% agreement that they had enough practice; yet they showed (on Question 11) a 43% agreement that they also needed more.

It is in the differences in the survey answers that the results of this evaluation procedure are pointed up. As indicated, the Experimental Group gave a 93% positive response to "I had plenty of hands-on practice time" compared to a 69% positive response by the Control Group. They also gave a 45% "agree completely" response to Question 4 (confidence in their skill level) compared to a 29% response by the Control Group. They also felt more positively about the classroom arrangements and the testing procedure. This latter seems to reflect the additional confidence in their skill level. The times needed for the testing process were significantly shorter for the Experimental Group than for the Control Group.

There were a few discrepancies in the survey results for which there is no obvious explanation. On Question 1 (My speed of learning...was as fast as it could be), the Control Group gave a more positive response than the Experimental Group. Yet, as a matter of fact, the Experimental Group's speed of learning
was significantly greater. Perhaps the possibilities for faster learning which opened up to the students with the use of the MC/VD system created a higher expectation among them.

Question 6 (Compared with other modules, this one was "Much better...to... Much less effective") resulted in a more positive response on the part of the Control Group, with 22% of the Experimental Group saying it was "About the same." It is possible that a change in the order in which the training modules (DCT-9000, SRT, and DSTE) which involve data terminals were presented may have affected the Experimental Group, giving them a more experienced view of the training.

Analysis of Student Comments. Students' comments for both groups were voluminous, interesting, and are included in the Appendix. This section will provide a brief summary of the positive and negative acceptance factors for both groups, as well as a review of comments which involve transfer-of-training problems.

I. Positive Factors. Both the Control and Experimental Groups showed an interest in the training and a strong appreciation of their instructors' efforts. Many expressed an enjoyment in using the equipment. They thought the training aids were good, the procedures understandable; the class adequately paced, and the rotation of the activities helpful. They commented on the amount of personal attention, the 'normalcy' of the class ("no screaming"), the fairness and good humor of the instructors, and the general reliability of the equipment. Several commented that the interest of the course kept them awake in spite of the rigor of their schedules. The expression "I enjoyed the training" occurred frequently.

2. Negative Factors. Both groups commented often on the importance of class size, placing it in both a positive (we had a small class, therefore...) and a negative (we had a large class and I didn't get to...) context. The feature of class size is a very prominent one in the students' minds. Many complained that classes became boring when: they had to wait to use the equipment; they had already learned the operation and had to wait for others; the workbooks fell short of creating interest. Complaints about equipment reliability or needing more equipment were more frequent in the Control Group, as might be expected; but such complaints occurred also in the Experimental Group. Several students expressed the need for more time for transmitting, since most time was spent in learning to power-up and program; and several students felt that some parts of the training were not covered. Several held the opinion that the training provided a good base, but that on-the-job training would be necessary in order for confidence to be attained.

3. Transfer-of-Training. Complaints about the MC/VD delivery system were fairly rare, and largely confined to its being extremely "picky" about the area that was touched, and therefore inappropriately responsive. There were several comments about the system "going haywire" or "locking up." There was a complaint that the beginning instructions were inadequate and that the student didn't "know what to look for." However, the basic comment which is most relative to transfer was that "it was not the same as hands-on" and that the student could become confused as a result. As one student stated, "If every step that was done on the DCT was done on the MC/VD...." There also
appeared a concern about the timing of certain steps, which are instantaneous on the MC/VD system and take some seconds on the equipment. The students seemed able to understand the differences between a simulation and the actual equipment, and to compensate; but they were sensitive enough to it to remark about it on the surveys. On the positive side, they were generous in their comments about the interest and motivation the MC/VD system provided, especially through the fun of the competition.

Analysis of Instructor Opinions. All of the instructors agreed that their confidence in their students' learning progress improved "very much" with the use of the MC/VD delivery system. The system held the students' interest and gave them immediate feedback. They agreed that the system "much improves the course" by giving added practice, feedback and reinforcement, instant remediation, and by reducing student stress resulting from the need to learn a great deal in a short amount of time. They stated that the students' hands-on performance was "very much better" after MC/VD training. Even though two systems for the class tended to keep everyone busy, there was still time for the workbook. All the instructors agreed that they would "very much" prefer to use the MC/VD delivery system in the future modules. They believe that the motivation for both the student and the instructor increases with their use.

On the following questions, the instructors split three-to-one on the highest and next highest ratings. They agreed that students learned more thoroughly and accurately with the MC/VD system as a supplementary mode of instruction. The students also adjusted quickly or fairly quickly to the video system and were on their own after the first few tries. The motivation provided by the video system resulted in independent work and interest. Instructors observed that although most students benefited equally, actually the borderline students, who might have otherwise failed, were enabled by the new system to obtain passing test scores in most cases. They found the system generally reliable except for getting "stuck" occasionally, and that when they became non-functional, the systems were corrected in a very short time.

The instructors split two-to-two on the following questions, between the highest and the next highest ratings. They answered agree/somewhat agree to the question of the MC/VD delivery system attracting student interest to a greater degree than the DCT-9000. Although the MC/VD system eliminated the boredom of waiting, it is not exactly the same as the equipment, and some students simply preferred the hands-on experience. On the question of the simulations being accurate and clear, they suggested that a few corrections in the program and the small print clarity would be helpful. Interestingly, the instructors split two-to-two on the question of whether the students learned "much faster" or "faster" with the supplementary MC/VD system. They wrote at length about the opportunity to walk between and compare the two systems, and the additional motivation and interest the video system provided.

The one question on which the instructors suggested improvement was Question 9, concerning their own training. They expressed a need to be more fully informed about both the hardware and the software.
Conclusions

This evaluation has provided several useful conclusions:

Practice Time: The practice time of the Experimental Group was increased two and one-half times over that of the Control Group, to a mean total of 4.4 hours. This clearly met the expectations of the testing agency.

Test Scores: The mean test scores of both groups increased significantly from Thursday to Friday, indicating that the last day of instruction - and possibly the testing process feedback on Thursday - is important to both groups.

The mean test scores of the Experimental Group on Thursday were significantly higher than the scores of the Control Group, indicating that the use of the MC/VD delivery system enhances the development of competence.

The mean test scores of the Experimental and Control Groups on the Friday (performance) test were not significantly different, indicating that the Control Group rises to approximately the same competence level as the Experimental Group on the last day of instruction.

The mean test score of the Control Group on Friday was significantly higher than the mean test score of the Experimental Group on Thursday, indicating that the reduction of instruction to four days (for example) would not be indicated at this time.

Test Times: The mean test times of the Experimental Group were significantly lower than the Control Group on both Thursday and Friday, indicating a greater facility and confidence in performing the test on both occasions.

Further, the mean test time of the Experimental Group on Thursday was virtually the same as the mean test time of the Control Group on Friday.

Acceptance: The students in the MC/VD supported classes expressed much higher satisfaction with the amount of practice time and a higher degree of confidence in their mastery of the training.

Both groups expressed a need for "more" hands-on time on the actual equipment. In spite of the supplementary practice, there is still anxiety about mastering the actual end-item equipment.

In both groups, students commented frequently on the effect of large versus small classes. Even with the supplementary MC/VD stations, the effect of large class size was to produce frustration about practice time on both the video system and the DCT-9000 console.

Cost: The cost for the installation of the MC/VD delivery system is small compared to the installation of the DCT-9000 equipment: $6,067 per year compared with $44,988 per year.
Recommendations

The MC/VD delivery systems installed in the DCT-9000 training module enhanced the speed of skill acquisition and confidence of the students and this system should be used wherever possible in similar training modules. It has a very low cost in comparison to the value of its use.

When this is done, particular attention should be paid to the programming of the system, so that the student is told when operations and timing are slightly different than the actual equipment. That is, the program should include explanations of these differences and make allowances for them. The simulation should represent the equipment operation very closely, and must function appropriately when the student makes a suitable response.

The MC/VD system can be used in the field for sustainment and refresher training. It does not seem indicated at this time that it can be used as a stand alone training system without the actual equipment for those students who have never used the actual equipment before.

The MC/VD system has a potential for reducing the cost of training, over time, in two ways:

* The use of several video disc units in combination with the actual equipment will reduce both the number of pieces of equipment necessary, and the wear and tear on the equipment, which is significant.

* It is possible that the refinement of the training, using the MC/VD as a supplementary unit, may eventually result in the possibility of reducing training time. This should only be done when a shorter time allows the class to reach nearly full competence, as shown by mean test scores of 95% or above, and to achieve a high confidence level.

Specifically, the application of the MC/VD technology to the planned SRT training in the 72G10 Course appears to be an appropriate follow-on project. The students and instructors have recommended this, and have also recommended that the technology be applied to the DSTE module, for which plans are also underway.
Test and Evaluation of the DCT-9000 Training
72G Course

Control Group _______  Experimental Group _______  Class Number _______  Class End Date _______

STUDENT DATA SHEET

Name: ___________________________  SSN: ___________________

Total Practice (Hands-On) Time __________

Practice Test
Time __________  Score __________

Performance Test
Remarks:
Time __________  Score __________

Total Practice on MCVD, if Experimental Group
Time __________

ASVAB SCORES:
EL _________
CL _________
GT _________
STUDENT END-OF-COURSE OPINION SURVEY (FORM A)

COURSE: DCT-9000 Module of the MOS 72G10 Course

DATE: ________________  CLASS STARTING DATE: ________________

NOTE TO STUDENT: This is your opportunity to express your opinion and to help in the improvement of this class. Please fill out each question to the best of your ability and tell why you liked or did not like this type of instruction.

1. My speed of learning the operation of the DCT-9000 in this module was as fast as it could be.

   ______ Agree completely
   ______ Agree somewhat
   ______ No opinion
   ______ Disagree somewhat
   ______ Disagree completely

   COMMENT: ______________________________________________________

2. The way in which this module was taught kept my interest and attention at all times.

   ______ Agree completely
   ______ Agree somewhat
   ______ No opinion
   ______ Disagree somewhat
   ______ Disagree completely

   COMMENT: ______________________________________________________

3. I had plenty of hands-on practice time.

   ______ Agree completely
   ______ Agree somewhat
   ______ No opinion
   ______ Disagree somewhat
   ______ Disagree completely

   COMMENT: ______________________________________________________

A-2
4. I am confident that I have developed a high level of skill in operating the DCT-9000.

_______ Agree completely
_______ Agree somewhat
_______ No opinion
_______ Disagree somewhat
_______ Disagree completely

COMMENT: __________________________________________

5. The training module in the operation of the DCT-9000 was as effective as it could be.

_______ Agree completely
_______ Agree somewhat
_______ No opinion
_______ Disagree somewhat
_______ Disagree completely

COMMENT: __________________________________________

6. Compared with other modules in this course, this module was:

_______ Very much better
_______ Somewhat better
_______ About the same
_______ Somewhat less effective
_______ Much less effective

COMMENT: __________________________________________

7. The instructor gave me all the personal attention and information that I needed.

_______ Agree completely
_______ Agree somewhat
_______ No opinion
_______ Disagree somewhat
_______ Disagree completely

COMMENT: __________________________________________
8. The time allocated for instruction in DCT-9000 operation was:

- Too much time
- Somewhat too much time
- Right amount of time
- Somewhat too little time
- Too little time

COMMENT: ________________________________

9. The arrangement of classroom space and equipment was efficient and just right for class needs.

- Agree completely
- Agree somewhat
- No opinion
- Disagree somewhat
- Disagree completely

COMMENT: ________________________________

10. The reliability of the equipment was:

- Excellent (Never broke down)
- Very good (Occasionally went down but was promptly repaired)
- No opinion
- Fair (Quite a bit of down time)
- Poor (Down enough to interfere with instruction)

COMMENT: ________________________________

11. I think I needed more hands-on practice with the equipment.

- Agree completely
- Agree somewhat
- No opinion
- Disagree somewhat
- Disagree completely

COMMENT: ________________________________

12. The testing process was a good one, which allowed me to show the best I could do.

- Agree completely
- Agree somewhat
- No opinion
- Disagree somewhat
- Disagree completely

COMMENTS: ________________________________
SUPPLEMENTAL QUESTIONS FOR EXPERIMENTAL STUDENT GROUPS

13. I enjoyed using the microcomputer/videodisc delivery system.

_____ Very much
_____ Somewhat
_____ No opinion
_____ Did not enjoy using it
_____ Disliked the system

COMMENTS: ________________________________________________________

14. The directions for using the system were clear and easy to follow.

_____ Agree completely
_____ Agree somewhat
_____ No opinion
_____ Disagree somewhat
_____ Disagree completely

COMMENTS: ________________________________________________________

15. The MC/VD delivery system was reliable and did not break down or malfunction.

_____ Extremely reliable
_____ Fairly reliable
_____ No opinion
_____ Not very reliable
_____ Undependable

COMMENTS: ________________________________________________________

16. It was easy to transfer back and forth from using the MC/VD delivery system to the DCT-9000 equipment.

_____ Very easy to transfer
_____ Somewhat easy to transfer
_____ No opinion
_____ Some problems in transferring
_____ Difficult to transfer

COMMENTS: (Please list any problems you noticed in using both systems alternately.)

____________________________________________________________________

____________________________________________________________________

17. I would recommend the use of the MC/VD delivery system for future classes in DCT-9000 operation.

_____ Recommend it highly
_____ Recommend it somewhat
_____ No opinion
_____ Recommend it with some reservations
_____ Do not recommend it

COMMENTS: ________________________________________________________
INSTRUCTOR END-OF-COURSE OPINION SURVEY (FORM C)

COURSE: DCT-9000 Module of the MOS 72G10 Course, Including the 2D, Generic MC/VD Interactive Delivery System

NAME ___________________________ JOB TITLE ___________________________

DATE ___________________________ CLASS STARTING DATE ___________________________

SYSTEM ASSESSED ___________________________

1. Did your students' speed of learning when they used the MC/VD delivery system vary from the regular hands-on instructional system?

   Learned much faster when using MC/VD
   Learned faster when using MC/VD
   Learned about the same when using MC/VD
   Learned slower when using MC/VD
   Learned much slower when using MC/VD

   COMMENT: ___________________________

2. Did your confidence in the students' learning progress improve with the use of the MC/VD delivery system?

   Very much
   Somewhat
   No change
   Had less confidence
   Had much less confidence

   COMMENT: ___________________________

3. Did you observe that the MC/VD delivery system attracted and held your students' interest to a greater degree than using the DCT-9000.

   Agree
   Somewhat agree
   No opinion
   Somewhat disagree
   Disagree

   COMMENT: ___________________________
4. Were the students in the Experimental Group able to learn the necessary procedures more thoroughly and accurately by using the MC/VD delivery system as a supplement to training in comparison to the students in the Control Group in the DCT-9000?

________ Learned more thoroughly than with hands-on training alone
________ Learned somewhat more thoroughly
________ No difference
________ Learned somewhat less thoroughly
________ Learned less thoroughly

COMMENT: ____________________________________________

5. How did the hands-on performance of the students in the Experimental Group increase on the DCT-9000 vary, if at all, after training on the MC/VD delivery system?

________ Very much better than hands-on training alone
________ Somewhat better than hands-on training alone
________ No difference apparent
________ Less satisfactory than hands-on training alone
________ Much less satisfactory than hands-on training alone

COMMENT: ____________________________________________

6. Were the MC/VD simulations accurate and clear?

________ Very accurate and clear
________ Satisfactory
________ No opinion
________ Less than satisfactory
________ Poor quality

COMMENT: ____________________________________________

7. What, in your opinion, is the effect on this DCT-9000 segment of instruction when the MC/VD delivery system is added to the hands-on training?

________ Very much improves the course
________ Somewhat improves the course
________ Makes little or no difference
________ Detracts from value of course
________ Causes difficulties in the course

COMMENT: ____________________________________________
8. Were the students able to adjust to the MC/VD delivery system and use them with little assistance from you?

- Adjusted very quickly and worked independently
- Adjusted fairly well with some dependence on instructor
- Not a noticeable factor
- Slow adjustment
- Poor adjustment

COMMENT: ________________________________

9. Was your training of the familiarization and use of the MC/VD delivery system adequate?

- Very good
- Good
- Adequate
- Inadequate
- Poor

COMMENT: ________________________________

10. In the future, would you prefer to instruct the DCT-9000 training modules which include the MC/VD delivery system?

- Very much prefer course with the supplementary MC/VD system
- Somewhat prefer it
- Have no preference
- Prefer the hands-on training on equipment alone
- Much prefer the hands-on training on the equipment alone

COMMENT: ________________________________

11. Were the three MC/VD delivery systems sufficient for the class size?

- Very good
- Satisfactory
- No opinion
- Unsatisfactory
- Very unsatisfactory

COMMENT: ________________________________
12. Were the MC/VD delivery systems reliable in the classroom?

- Very reliable
- Adequately reliable
- No opinion
- Somewhat unreliable
- Very unreliable

COMMENT: ________________________________

13. In your opinion, did all students in the Experimental Group benefit equally from using the MC/VD system?

- Virtually no difference
- Some differences
- No opinion
- Some students failed to benefit
- Many students failed to benefit

COMMENT: ________________________________

14. Were repairs and adjustments to the MC/VD delivery system easy to arrange and promptly received?

- Very prompt
- Adequate
- No opinion
- Inadequate
- Very unsatisfactory

COMMENT: ________________________________

15. In your own words, explain the instructional advantages/disadvantages to the use of the supplementary MC/VD system in this course.
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## RAW DATA: Experimental Group (Contd.)

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<th>ASVAB Scores</th>
<th>PRAC. TIME</th>
<th>PRACTICE</th>
<th>TEST</th>
<th>PERFORMANCE</th>
<th>TEST</th>
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<td>EL  CL  GT  DCT MC/VD</td>
<td>Time(min.)</td>
<td>Score(%)</td>
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<td>Time(min.)</td>
<td>Score(%)</td>
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</table>
INSTRUCTOR END-OF-COURSE OPINION SURVEY: RESPONSES AND COMMENTS*

QUESTION 1: Did your students' speed of learning, when they used the MC/VD delivery system, vary from the regular hands-on instructional system?

<table>
<thead>
<tr>
<th>Much Faster</th>
<th>Faster</th>
<th>About the Same</th>
<th>Slower</th>
<th>Much Slower</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
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</table>

Comments:

The students compared the DCT-9000 with its picture on the videodisk. They physically walk between the two during video disc operations to compare.

MC/VD allows increased hands on. Students progress into a stage after getting a task down where there is an increase incidence in errors possibly because as they gain confidence with the task sequence they attempt to perform it by rote instead of thinking through the sequence before initiating it. The increased hands on time allows the students to progress beyond this stage and, in addition provides immediate feedback when a student performs a step out of sequence or omits a step. In all but a few isolated incidents, students can perform all tasks error free by the time they are tested out. I don't think that with the two DCT-9000 terminals alone that the same percentage of students could become this proficient in the allotted time frame.

Students have more hands-on practice. A lot more motivation.
Increased hands-on practice. Stimulated motivation.

QUESTION 2: Did your confidence in the students' learning progress improve with the use of the MC/VD delivery system?

<table>
<thead>
<tr>
<th>Very Much</th>
<th>Somewhat</th>
<th>No Change</th>
<th>Less Confidence</th>
<th>Much Less Confidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
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</table>

Comments:

Yes it seems that interest improved their learning. Holds their interest more than equip.
System allows more time per student and often can provide more immediate feedback because instructor has to also monitor equip. and other students.
Some of the faster students progressed beyond class teaching to the lessons ahead of each class.
Students' interest improved their learning process.

QUESTION 3: Did you observe that the MC/VD delivery system attracted and held your students' interest to a greater degree than using the DCT-9000?

<table>
<thead>
<tr>
<th>Agree</th>
<th>Somewhat Agree</th>
<th>No Opinion</th>
<th>Somewhat Disagree</th>
<th>Disagree</th>
</tr>
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<tbody>
<tr>
<td>2</td>
<td>2</td>
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</table>

Comments:

Immediate interest device. Eliminated the boredom of waiting for practice on actual equipment.
Some students prefered the hands on with the DCT-9000; others liked the video better.
Sys. not exactly the same as actual equipment but the students seem to be motivated to improve performance because of program that allows high scorers to be entered on a video game type hall of fame listing.
Students could get on equip. much quicker. No boredom waiting on equip.

* Wording and spelling are as given by instructors.
INSTRUCTOR SURVEY (Contd.)

QUESTION 4: Were the students in the Experimental Group able to learn the necessary procedures more thoroughly and accurately by using the interactive MC/VD delivery system as a supplement to training in comparison to the students in the Control Group in the DCT-9000?

<table>
<thead>
<tr>
<th>More Thorough than</th>
<th>Somewhat More</th>
<th>No</th>
<th>Somewhat Less</th>
<th>Less</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hands-on Alone</td>
<td>Thoroughly</td>
<td>Difference</td>
<td>Thoroughly</td>
<td>Thoroughly</td>
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<tr>
<td>3</td>
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</table>

Comments:

Increase in hands-on practice lends itself to a better trained student.

The video disc gave the students added practice. This was helpful in larger classes where each student had less hands-on.

There was a general improvement over control group because of increased access to something that would allow students practice at performing each task sequence.

More hands on helps a student to learn faster.

QUESTION 5: How did the hands-on performance of the students in the Experimental Group increase on the DCT-9000 vary, if at all, after training on the MC/VD delivery system?

<table>
<thead>
<tr>
<th>Very Much Better</th>
<th>Somewhat Better</th>
<th>No</th>
<th>Less</th>
<th>Much Less</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difference</td>
<td>Satisfactory</td>
<td>Satisfactory</td>
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<td>4</td>
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</table>

Comments:

Frees the instr. to help slower students during P/E.

More confidence and less instructor guidance during practical exercises.

The students with no problems practiced. The students that weren't sure of the classes listened to the video talk-through which helped their comprehension.

Less likely to omit task sequence and increased ability to maintain correct sequence of each task.

QUESTION 6: Were the MC/VD simulations accurate and clear?

<table>
<thead>
<tr>
<th>Very Accurate</th>
<th>Satisfactory</th>
<th>No Opinion</th>
<th>Less Than</th>
<th>Poor Quality</th>
</tr>
</thead>
<tbody>
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</table>

Comments:

One or two omissions in program remedied when noted by Mr. Congleton.

Some of the small print in the pictures were fuzzy on the DCT-70.

QUESTION 7: What, in your opinion, is the effect on this DCT-9000 segment of instruction when the MC/VD delivery system is added to the hands-on training?

<table>
<thead>
<tr>
<th>Much Improves</th>
<th>Somewhat Improves</th>
<th>Little</th>
<th>Detracts From</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
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<td>Course</td>
<td>Course</td>
<td>Difference</td>
<td>Course</td>
<td>Difficulties</td>
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</table>

Comments:

The added practice and reinforcement of the video disc's greatly added to the students confidence.

Remediation for students, instant feed back.
INSTRUCTOR SURVEY (Contd.)

Comments (No. 7 Contd.):

Improvement of overall instructional block. Provides instant remediation for all students.

This segment of the course as it presented because of time and equipment limitations is more stress inducing than other segments of the course. There is a great deal of information concerning the system and procedures such as administrative procedures that is presented in four days. The MC/VD reduces the stress by allowing at least hands on time for equipment procedures. This seems to improve proficiency and help students gain confidence.

**QUESTION 8:** Were the students able to adjust to the MC/VD delivery system and use them with little assistance from you?

<table>
<thead>
<tr>
<th>Adjusted Quickly</th>
<th>Adjusted Fairly Well</th>
<th>Not a Slow Factor</th>
<th>Slow Adjustment</th>
<th>Poor Adjustment</th>
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</thead>
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3 1

Comments:

Motivation interest resulted in independent work plus group involvement.

The first few tries the students asked for assistance but as their confidence increased they picked up the other lessons.

Student interest and motivation resulted in independent work as well as group involvement.

Very seldom required instructors except for instructor intervention on "stuck" programs on a few occasions.

**QUESTION 9:** Was your training on the familiarization and use of the MC/VD delivery system adequate?

<table>
<thead>
<tr>
<th>Very Good</th>
<th>Good</th>
<th>Adequate</th>
<th>Inadequate</th>
<th>Poor</th>
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Comments:

I was able to train on delivery system sufficient for students' use. I would probably feel more confident if I had more knowledge of hardware and software so the technology wouldn't be so remote to my experience level.

I was only instructed on explaining use.

**QUESTION 10:** In the future, would you prefer to instruct the DCT-9000 training modules which include the MC/VD delivery system?

<table>
<thead>
<tr>
<th>Very much Prefer</th>
<th>Somewhat Prefer</th>
<th>No Preference</th>
<th>Prefer Hands-on Equipment</th>
<th>Much Prefer Hands-on Equipment</th>
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4

Comments:

Due to the classroom set up, the video disc's increased student motivation and involvement.

I would like to see additional programs for some of the procedural aspects including classes in DCT-9000 now taught solely with tech manuals.

Student and instructor motivation is increased. Hands-on practice leads to a better trained product.

Motivation for instr. & students increased.
QUESTION 11: Were the three MC/VD delivery systems sufficient for the class size?  
(Note: there were actually 2 systems in each classroom.)

<table>
<thead>
<tr>
<th>Very Good</th>
<th>Satisfactory</th>
<th>No Opinion</th>
<th>Unsatisfactory</th>
<th>Very Unsatisfactory</th>
</tr>
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Comments:

Except we could only use two.

Between 3 MC/VD sys. & 1 DCT-9000 students were kept busy and still allowed some time to work on workbook assignments.

QUESTION 12: Were the MC/VD delivery systems reliable in the classroom?

<table>
<thead>
<tr>
<th>Very Reliable</th>
<th>Adequately Reliable</th>
<th>No Opinion</th>
<th>Somewhat Unreliable</th>
<th>Very Unreliable</th>
</tr>
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</table>

Comments:

No problems.

No problems.

The program would get stuck on a picture & have to be reset at least twice a day. Otherwise good.

No major malfunctions. I have no knowledge of the hardware or software systems yet needed no outside assistance to date.

QUESTION 13: In your opinion, did all students in the Experimental Group benefit equally from using the MC/VD system?

<table>
<thead>
<tr>
<th>Virtually No Difference</th>
<th>Some Differences</th>
<th>No Opinion</th>
<th>Some Did</th>
<th>Many Did</th>
<th>Not Benefit</th>
<th>Not Benefit</th>
</tr>
</thead>
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Comments:

Allowed borderline students who might have been cat-Xed in the past to obtain passing test scores in most cases.

It was a good reinforcement & confidence builder.

QUESTION 14: Were repairs and adjustments to the MC/VD delivery system easy to arrange and promptly received?

<table>
<thead>
<tr>
<th>Very Prompt</th>
<th>Adequate</th>
<th>No Opinion</th>
<th>Inadequate</th>
<th>Very Unsatisfactory</th>
</tr>
</thead>
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</table>

Comments:

Equipment never non-functional more than a short time since I have had contact with it.

Mr. Congleton arranged adjustments.
QUESTION 15: In your own words, explain the instructional advantages/disadvantages to the use of the supplementary MC/VD system in this course.

Comments:

Advantages include increased hands on time to gain proficiency through repetition and limited feedback on involved sequential tasks. The media is closer to actual task because progression is two dimensional through student media interaction (this isn't possible with workbooks or printed program texts such as tech manuals.)

In correct response feedback on program here is limited because if a student makes an error he has to either determine correct response on his own or randomly perform steps until program receives the response it was waiting for. Still, this is preferable to the untimely feedback student would receive from instructor when workbook is graded or the one dimensional 'incorrect' then repetition that may or may not appear in succeeding pages of tech manual. Students need a timely 'why' they erred as well as feedback that an error response has occurred.

The MC/VD is not a panacea. If it was we would r.p. out both DCT-9000 systems and install several more MC/VD systems and probably save money in the process. However with existing equipment & space limitations the MC/VD systems are excellent instructional aids by their flexibility of programs and their similarity to actual hands on performance responses. The student cognitive and psychomotor behaviors that are learned here and practiced cannot be approximated as closely on any training aids available to us at this time as they can with the MC/VD.

The only disadvantage I found was prying the occasional student away; who was an Atari bug. Otherwise the comparisons done by the students with the equipment provided a faster comprehension. Without the equipment present the video disc is a great review for someone who has previously worked the equipment and the talk-through instructions combined with the simulations helps a wider variety of student.

Availability of equip. to provide instant remediation MC/VD system advantages is the increase of students hands on motivation and enthusiasm increased.

The advantages of MC/VD system is the increase of students hands on practice, student motivation and enthusiasm increased, availability of equipment to provide instant remediation and the overall increase in student confidence.
STUDENT END-OF-COURSE OPINION SURVEY: COMMENTS

QUESTION 1: My speed of learning the operation of the DCT-9000 in this module was as fast as it could be.

COMMENTS (CONTROL GROUP)*

I thought the instructors taught quite well & thoroughly.
We had 10 people and one DCT-9000 my learning could have been faster if we had more equipment.
I think a little more time would be helpful but not necessary.
The instructors taught the class very well and help me learn the DCT-9000 that much quicker.
This class dragged on all week learning the DCT-9000 would have been quicker for me if I had a written test on it and just studied the book.
I wish I could have spent more time, but I have learned the equipment well enough to operate.
Perhaps 1-2 days to fast.
Was very quick but wanted to learn more about 9000.
It was taught in a language that was very understandable.
It was a little too fast to try to retain everything.
If I had more class time it could have been faster.
The speed of learning was a bit to fast.
Could have been faster if you didn't have to wait for other people.
It seemed like there was to much expected to soon.
I really did learn something, and thanks to the instructors who helped me accomplish one more step to my future goals.
It is a fast and easy system to catch on to.
5 days was enough time, but seem to be a little pushy.
In the time given we did very well. We were given excellent instruction which aided us to succeed.
I think it could have been cut a few days if we had another set of the DCT-9000.
For the short amount of time we had on the unit the learning was fast but very accurate.
The operations are easy to learn because of memory aids you can use.
Lack of sleep due to excess company activities led to sleeping in class.
I missed a lot of class which made it difficult on me.
There was time that we sat around and did nothing.
I never felt lost at all.
Didn't get enough time on machines.
Good environment to work in and very good instructors.
Didn't take me long at all the learn equipment.
I would have liked to have had a little more practice.
Couldn't have been taught better or simpler.
The way the instructors taught, and helped us use the training aids.
Any faster it couldn't be learned or at least not comprehended as well.
Somewhat "pushed" through the course.
I'm slower than others.
With more equipment, I would have had more hands-on. As it was, I was barely more than familiarized.

COMMENTS (EXPERIMENTAL GROUP)*

It might have been faster if more equipment was provided (i.e. 2 students per DCT-9000)
Class to large
We learned something new every day and still passed
Our instructor made sure we understood all of the procedures and equipment so we learned at a steady pace
I think this class was taught the at a real good pace.
Because I use the video disc and my instructors explained the equipment very well.
This equipment is the one I am suppose to use in my duty assignment. I wished more practical time could be used on the devices we actually be using.
Need more classrooms with extra equipment for large groups of 12 or more students
Would have to wait on the slower learning people to catch on to each step (went as fast as the slowest person could)
Although it seems to me it was taught in such a way it was presumed that the students knew from the start about the equipment
The video MC/VD screens helped a lot
The visual aides were very helpful.
(The instructors) presented the class instruction where all could understand the operation of the DCT-9000.
I learned it faster than any other equipment.
To me, with the help of instructor and the video machines I think I learn this operation even faster.

* Comments are in chronological order, but not identified as to class, to assure anonymity.
Instructors' names are changed to read (my instructor). Wording and spelling are as given by the students.
STUDENT SURVEY (Cont'd.)

Size of class & video helped greatly in grasping information quickly. The video helps you a great deal.

Although had time to practise in class on video and on equipment, class periods cut short due to payday, etc., and no time available after school to study procedures learned in class. Our class was rather small, so that meant we got a lot of time on the equipment. Powering up & programming was fine.
The class was muddled up a little because of the payday activities. Class should have been every thing at once then broken down and reinforced.

QUESTION 2: The way in which this module was taught kept my interest and attention at all times.

COMMENTS (CONTROL GROUP)

I didn’t fall asleep at all. The DCT-9000 interested me pretty good. Nobody could afford to not pay attention because (the instructor) would deal with them.

I was interested and attentive because I only had 5 days to learn what I needed to know, not necessarily because of the way I was being taught.

I enjoyed working on the DCT-9000 but after I learned it, it was just a little boring.

Standing up by the 9000 watching people program lost my attention at times.

I had some personal problems because of lack of sleep before an inspection, but the instruction was colorful and interesting.

Due to the fact that if you did not pay attention you will not know what to do when you test out on it.

Instructor and material kept my interest.

Very interesting - instructors made the class enjoyable and easy to remember details.

The instructors always found a way to keep us awake and interested in what was being taught.

It amazed me on what it could do.

When on the equipment I agree, but it was a little boring when you were waiting for your turn.

The hand on kept my attention and the work book kept my interest but as far as orally No.

I disagree because with 8 people in a class a lot of your time is spent either watching or doing a workbook.

Difficult to understand at the beginning.

"Yes it did," because I never had worked with this equipment before, all knew to me.

There is too much time available to do nothing. These times are the times when my interest fade:

I was very awake as he went through the steps.

Yes because when I wasn’t working on the machine I was either watching someone else or doing my work book.

The DCT-9000 is a very interesting piece of equipment. I enjoyed learning about it.

It did most of the time because there was always a chance to learn because there was always someone on the 9000.

It was somewhat monotonous sitting and watching others, interest level low, but it did help to learn what other mistakes were being made.

It was not as hard as it seemed it would be.

(The instructors) taught well.

The method of teaching was great.

Great instructors - unique way of teaching which keeps your attention and makes class interesting.

Excellent instructors!!

It was easier when you were actually at the equipment, but when you were waiting it was hard to pay attention.

No comment needed. Excellent instructors.

Agree, it wasn’t drawn out too long to be boring.

Need more equipment or smaller classes.

When you were not on the equipment it got very tiresome though.

The method of instruction could be greatly improved with better workbooks (more instruction) and more equipment.

COMMENTS (EXPERIMENTAL GROUP)

Due to the large number of students, there was a small amount of time that was wasted.

The waiting periods between use of equipment allowed for boredom.

There was no time to sleep everything was in my very best interest.

The instructor kept my attention when he was teaching. But there was some time that I wasn’t on the equ.

The video disc provided me with more learning time.

We always had the opportunity to learn the system. The videos were a great help also.

It seems that a lot of time was wasted when not on the machines.

About as much as could be expected.

The laser disc t.w. help a tremendous amount and actually made the week enjoyable.

It was very interesting, but a lot of the time we weren’t actually on the equipment itself.
STUDENT SURVEY (Cont'd.)

Being this my final week I was able to understand more completely some of the procedures in handling messages that were unclear before.

Because I had a good instructor for the week and I like the DCT-9000 a lot.

We were given a lot of hand on

(My instructor) has the ability of making the class interesting which kept my attention

Constantly moving for practice purpose.

Too much waiting

Effort of teacher to make class interesting & enjoyable helped very much

With the video aid to practice each new procedure could be applied providing an excellent

learning tool.

(As the instructors) were extremely knowledgeable on the subject matter. Never a dull or boring

moment.

(The instructor) kept class very interesting

We spent more time on powering-up and programming than we did transmitting

The instructor always had my interest and when she didn't the video disc helped a lot.

It is not easy to keep a class's attention at all times, but w/videos, breaks monotony of the

same old thing.

The video disk was very helpful in inhibiting boredom.

QUESTION 3: I had plenty of hands-on practice time.

COMMENTS (CONTROL GROUP)

I wish I could have had more hands-on time. But that was not the instructor's fault.

I feel like I could have used more time.

The group I'm in was rather larger and we did not get all that much time on the machine but we

did get enough.

We got to use the machines a lot more the way (our instructors) worked out the arrangement.

I had just enough time to learn it if I read my workbook many times. More time would have

helped considerably.

I enjoyed working with this equipment and would have liked more time with it. To learn of Its

full capabilities.

I had enough to do well on the test, but probably not enough to operate at a comman with

maximum efficiency.

I had to much time.

Need perhaps to set up simulated comm-can operation to get a clear overview.

Would've liked to have had more practice on faults.

The class doesn't last long enough (1 week)

Small class.

We could have had more but it was sufficient enough to know the basics of the equipment & units

as whole.

On dealing with faults we probably could have had a little more hands on.

Wished I could have had more hands on.

We all had plenty of practice.

We worked with the equipment over and over until we knew everything.

Enough said. (Student marked Response 5 "Disagree Completely")

I had plenty of training.

In groups that have five to eight persons there isn't enough time to get confidence in the

system.

I don't believe I had plenty but enough to understand the DCT-9000.

Well with only one piece of equipment it is very difficult to have a lot of hands on practice.

With only 1 machine for 8 guys the practice time was limited, however, I did learn a lot

watching them do it to.

I had enough of practice but some people take longer to learn the operation so they take up

more time.

Wanted more experience fixing faults.

The time I had was all I needed.

I thought it was good the way we rotated, it kept interest.

During the faults and transmission. There isn't enough time to get plenty of hands on.

Could have had a bit more time but am satisfied.

I feel that you can never have plenty of time to practice on equipment like the DCT-9000,

however I feel I had the most ample time allowed for hands-on was the most it could of

been through out the week.

Would have liked to have had more practice.

Could always use more.

When there's a lot of people, you have to pay attention to every detail.

Not enough time. Course to short!

Everyone had an equal chance and plenty of time.

More equipment, more time.

Could have used more.

I was bored somewhat because I was waiting a lot for my turn.

Because of my abnormally large class, insufficient hands-on time was a large problem. Again,

more equipment is needed, and also perhaps more time.

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STUDENT SURVEY (Cont'd.)

COMMENTS (EXPERIMENTAL GROUP)

Again the number of students involved was entirely too high. The instructors made sure everyone had equal time. You could have 3 people up at one time one on DCT-9000 2 on TV's The class was a medium sized class and this gave me (us) the opportunity to get up on the equipment more often. If we were not directly working on the system we could be on the videos. With our smaller class, we had plenty of opportunities. Being in a small class help a lot on the time of hands on practice, I had quite a bit of hands-on practice but I think there should be a little more My small group had vast amount of practice time. No enough equipment Yes, in regards to the length of the class, but I would have preferred more time. because everyone in the class understood what they was doing so, therefore everyone got finished faster We needed some more time on some of the operations It was the most hands on training I have had with the computers The HC/VD helped me get more time & experience Definitely With the video module and actual practice on the equipment there was more than enough practice time. The class was small and again with the assistance of the video aid no one became stagnant. The class size made it possible for everyone to get plenty of hands-on. Could have always used more hands-on practice. Class time available reduced due to payday activities. Refer to answer above (We spent more time on powering-up and programming than we did transmitting.) I especially appreciated the time on the video disc - even though the program was so picky about the area being touched. As I said before our class was rather small. If I wasn't working on the DCT-9000 I was on the video, except, again for transmission, The DCT-9000 was inoperable for a while and that hurt the hands on time but the video disks helped compensate

QUESTION 4: I am confident that I have developed a high level of skill in operating the DCT-9000.

COMMENTS (CONTROL GROUP)

I feel that I have just learned the necessity & basics of operating the DCT-9000. I feel that I have a good base. But I would need a great deal of practice to become highly skilled. Must pay attention to other students faults to learn by. We spent such a short time on it I will be lucky to remember it when I graduate. The basics of operating the DCT-9000 were taught not the other haws and why's. I have a pretty high level of skill but there is always times when I get a dummy attack and forget important things. I feel I have developed the basic skills in the operation of the DCT-9000 not a high level. I think you should have an extra day or two to transmit and power up and program all together. See Comment # 3 (Had enough time to do well on test; but not enough to function in a CONCERN with efficiency.) I learned the skills but it was very fast paced. I am anxious to see how much I have retained once at perminate party. I would like to see more of what this equipment can do. I have not work with the equipment long enough. I would feel more comforterable with the DCT-9000 if I could learn more about the faults & the systems. Unfortunately although I barely learned what was required in the class, a little bit more info would help overall understanding. I really can't say that but in a CONCERN doing this will somewhat come familiar with this. Thanks to the work book and also working with the equipment. Would have like to participate in more real messages. I feel I learned all that I could have in the time I had to work with the equipment. I wish I could work with it more. I know what to look for and know how to read the hexadecimal system. I could have used a bit more hands on, but for the practice I got I am confident that I am proficient in this module. Yes, I develop a skill but not to my highest level. There are still certain problem that need to be solved. Yes, but there was buttons we weren't supposed to touch that I would like to know about.
STUDENT SURVEY (Cont'd.)

Yes, but I would have totally understood it if I could have been on the 9000 more.
I am confident that I have developed a high level of skill in operating the DCT-9000.
I feel I can operate it pretty good not error free.
No one is perfect.
Not enough experience.
More confidence when getting more experienced on it later.
I would call it a high level of skill more of an understanding.
The instructors did their job outstanding.
I'd like to know it like its "second nature" to me.
There will always be room for me to learn more and develop a higher skill level.
Actual experience needed.

COMMENTS (EXPERIMENTAL GROUP)

Only if O.J.T. is provided at my duty station
If you get it in your head it's easy to learn
I could use a little more experience.
I know what I am doing but need more time for a high skill level.
The only way to obtain a "high level of skill in op the DCT-9000" is through actual common experience.
Need to work on faults
There are still some functions of operation which I do not yet know. However, I do have sufficient knowledge of the system to operate and transmit messages.
I have learned a great deal about the DCT-9000 but I'm sure that I still have more to learn.
If there were more machines or less people in each class, then the time could be used more effectively.
We could have used a little more time on the faults.
I now feel that should I go somewhere there is a DCT-9000 I'd be able to pull my load.
I feel I am skilled enough to work it with little problems at all but not highly skilled.
I am familiar enough in the equipment that I know what is going on because I learned what was taught in the class but I know I have a lot more to learn.
I am not an expert, but plan to be soon! This was a good bases.

All students received the basic knowledge but can't state a high level of skill with only one week of training.
Not enough time correcting faults
With the fault procedures and applications taught, I feel confident in operating the DCT-9000.
Again, I know completely how to power-up & program but, transmission I just completely learned while testing.
I think I have developed a great deal of skill do to excellent effort put out by (my instructors.)
I don't feel that a very high level of skill can be developed in one week and with a pay-day activity to boot. However, (my instructors) did an excellent job in the time available.
I know how to operate the OCT-9000, but a little more time on it wouldn't hurt.

QUESTION 5: The training module in the operation of the DCT-9000 was as effective as it could be.

COMMENTS (CONTROL GROUP)

Perhaps sometime spent enacting operation as if in a CONCENTER would help.
For the time and equipment available it was.
The training module worked very good and it was easy to learn.
The more time allowed to me, would have made the training much more effective.
As long as you studied on your own time.
Not enough time for hands on exp.
Again, more time is needed, but in the time I had I learned a lot.
As I said before, perhaps too quickly.
"Yes, indeed!"
There is no listing of transmitting procedures.
Great.
You had opportunity to watch and learn and actually do it and learn all of the time.
Yes, everything came in just great.
Only one person at a time made it tiring.
The instructors were confident, and carried this confidence on to the students.
The training module in the operation of the DCT-9000 was as effective as it could be.
Was not told "why" faults occurred. Just that they happened.
No doubt! Couldn't be done any better with the amount of people and the time involved.
I am not well enough acquainted with this machine to know if it could be more effectively taught.
STUDENT SURVEY (Cont'd.)

More equipment, more time, more thorough instruction.
Instructors are super, very knowledgeable. We learned everything we needed to know.

COMMENTS (EXPERIMENTAL GROUP)

It was completely explained
No experience with real operating condition so I am unable to say how effective it was.
For only having 3 9000's, it was more effective than imagined.
One more video disc in operation would help (for a total of 3).
It helped to emphasize the steps to power up, program & transmission.
I feel more time should be spent on the DCT-9000. More like two or three weeks.
because, everything what out good and I learn a lot.
But, we (some people) could have spent more time on the DCT-9000 (2 more days.)
(Disagree somewhat) Though the instructors were as helpful as could be.
more practice correcting faults.
I enjoyed the training completely.
For the time we had
Very effective and comprehensive.
Toward the end of the week we did have some malfunctions which limited some peoples time on
the module.
Except the one side is broken.
I think the visuals help out a lot.

QUESTION 6: Compared with other modules in this course, this module was:

COMMENTS (CONTROL GROUP)

This module was more explanatory to me. I could understand it better.
It was interesting, lots of hand-on experience, and the instruction was through.
The module is much smarter than the DSTE and is a lot easier to operate.
It was very much better because it kept my interest more than previous modules.
It was more understandable, more comfortable.
The most interesting so far in the course.
I love the equipment.
The equipment is better to operate and also better to understand.
I found it a lot simpler to operate.
The whole thing was more interesting but I liked this system because it does most of the work.
On the whole I enjoyed myself more and learned more, than I would have in other modules.
Much easier and less work to do.
There were no boring lecture classes - everything was demonstration.
It was very simple to use, you didn't have to memorize how to correct faults on it. The book
helps you.
Easy to learn.
I was kept interested.
Machinery was more up-to-date more fun to work with.
This was something I enjoyed doing and I looked forward to the DCT-9000 every morning.
It is like a cross between DSTE and SRT. I liked certain things from each and the
DCT-9000 brought it all together.
It was advanced more than the DSTE and therefore better. I thought it may be about the same
as SRT.
Other classes had a sufficient POI and fairly sufficient aids and equipment.

COMMENTS (EXPERIMENTAL GROUP)

No comments.
I was always interested in the DCT-9000, also I never get bored with doing the functions.
Since we had the MC/VD delivery system. It made this course easier and better to understand.
The MC/VD was far superior to conference classes and view-graph simulations.
I thought they were all good except for the SRT.
Compared to most of the equipment here, yes I liked the DCT-9000 very much but not as much as
the SRT because, I learn it fast and I had a lot of hands on training.
The MC/VD helped greatly.
I liked this module the best. It is better than the DSTE & SRT combined. I wish to work with
this at my perm. party.
Wasn't explained as well.
More in depth hands experience which to me was very beneficial.
SRT MATE/SMART.
The class was split up and our class had always been taught together. The being separated
from classmates didn't help because we couldn't help each other.

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STUDENT SURVEY (Cont'd.)

For me it was less boring and much more simple. Video's was great ... the video's kept your interest - made learning a game instead of a task. I find all the modules exciting but I think I prefer the SRT. The DCT-9000 is much more convenient & much less time consuming. (Much more fun to operate also)

QUESTION 7: The instructor gave me all the personal attention and information that I needed.

COMMENTS (CONTROL GROUP)

Our class was small & every question I had they answered x/full attentiveness. No comment!!
Being in a classroom with (our instructor) was quite an experience in learning (The instructor) taught every thing I needed to know to get me through this course and then some. The instructors were great and made you want to learn. Yes but he didn't go into some things as much as I would have liked him to. The instructors knew the equipment well and taught us what we needed to know very quickly & efficiently. Job very well done. (My instructor) added humor to the course They were very helpfull. I wish we had more instructors like (the ones in this module). They were really good. No screaming everything was normal. Instructors were most helpful, partly due to small class size and partly because they are very knowledgeable about the equipment. And encouragement when needed. They were great (very) They both were very helpful took time explain and could relate to all the students. (all the personal attention and information that)he could afford. The instructors teach you as much as possible in the length of time we have. I learned it all proficiently but would've liked more practice. He was the one who taught this class very effective, and make me think positive about the things I can do with the equipment. The instructors covered a lot of things that the book didn't or was vague on. (My instructor) is an excellent instructor and I give him my most humble congradualatlon. Yes, any question asked was answered Went through every step and answered any question asked. Needless to say. The instructor gave me all the personal attention and information that I needed. The 8-man class is very effective. Did need much though. I felt if I needed help it was there. Both instructors made you think on your own. They made you answer your own question. Very good instructors. With a large class, this was nearly impossible. Very good instructions. The instructors didn't give that much individual attention, they gave group attention which didn't help. I really didn't get to have all the personal attention I needed because we had so many people.

COMMENTS (EXPERIMENTAL GROUP)

The instructors I had were excellent. I learned a lot from them compared to what I learned from other instructors in different modules Every individual question was answered Very good instructor The instructors were more than helpful in the hands on training portions. If I had a question my instructor would answer it to the best of his knowledge. There was few times were I need personal attention When I had a problem I was helped by my instructors because, if I asked a question or had a problem he helped me with it and I learn from the way he helped me. The instructor was very good but as I said really need less people in a group It also helped to have the class broken down, more individualized attention There were times when he let us make a mistake, so when corrected, we would never do it again. Sign of a good instructor. TOO much!! He's a damn good instructor and his assistant too. Outstanding instructor was willing to help anyone with a problem. outstanding instructors were proficient and helpful Extremely helpful and informative!! (My teachers) were excellent instructors!! I missed a half Day at first But when I got there I was brief and learned everything even faster
STUDENT SURVEY (Cont'd.)

(Our instructors) taught an outstanding class and their assistance made the learning process easy and understandable.
Instructor was very conscious of any problems we had and helped correct them right then.
If there was something I or another student didn't understand (our instructor) was always there to help us.

QUESTION 8: The time allocated for instruction in DCT-9000 operation was:

COMMENTS (CONTROL GROUP)

Instructor was always right to the point and gave each of us as much hands-on as possible.
Must pay attention to other students faults to learn by.
I think you should have an extra day or two to transmit and power up and program all together.
I think we could have used about 3 more days.
I think that everyone learned what we needed to know and didn't need any more instruction.
Why teach DSTE for 3 weeks and this for one when chances are greater that we'll use this?
Affore comments apply.
A week seems to rush and cramp a lot of information into one week.
There is a lot of information to be put out!!

COMMENTS (EXPERIMENTAL GROUP)

Of course, without my instructors, it would have been entirely too little time.
Although would have been better with smaller class.
I feel this class should be extended.
No comments.
It was the right amount of information at the right amount of time.
It was rushed but it was enough to learn everything, as long as we were paying attention.
Not enough experience. Not "in depth" enough.
I'd feel more confidence at my job with more time in class.
It was the right amount of time for the instructions we had.
Could have had a little more time and put more information in it.
Was not enough for me, because it takes me longer to "grasp" things than it does others.

COMMENTS (CONTROL GROUP)

Of course, without my instructors, it would have been entirely too little time.
Although would have been better with smaller class.
I feel this class should be extended.
No comments.
It was the right amount for the amount of people we had.
Although I am familiar with the equipment I felt I need more time to learn more.
Needs more hands on & fault correction.
The time allotted allowed individuals to analyze where and what the operation of DCT-9000 was.
Allowed enough time for plenty of hands-on after instruction.
Maybe without payday activities it would have been perfect for me, but some needed more time
with transmitting and correcting faults.
Because of payday
As I said before I know this equipment. How long would it take to learn the 72G course on
the outside?

QUESTION 9: The arrangement of classroom space and equipment was efficient and just right for class needs.

COMMENTS (CONTROL GROUP)

Most the time I could see everything the operator was doing so it helped me learn.
It was arranged to where everyone had plenty of room to work and watch.
spacious see the system run as each person got up their to run it.
A small class does better.
Plenty of room, room was very clean at all times and equipment was very near on sight.
Only one 9000.
The space was enough but not the equipment.
Since there was only one DCT-9000 it took time for everyone to go through it. They should have
more equipment.
The arrangement of classroom space and equipment was efficient and just right for class needs.
Machinery was not all easily accessible from a local point.
I could watch from my seat.
More equipment for larger classes. Space fine.
Classroom people were to many for classroom. Not enough equipment to go around. To much
time spent doing nothing.
There wasn't enough space for me. I felt closed in.
Very comfortable atmosphere.
STUDENT SURVEY (Cont'd.)

COMMENTS (EXPERIMENTAL GROUP)
Aside from the lack of other DCT-9000s
For a small group (6) it was very efficient for us
No comments
The apple computers helped a great deal
No problems here
Outstanding
Excellent classroom configuration
Except the last two days when one side broke down
Classes could have been combined for open group discussion concerning DCT-9000 operation and procedures

QUESTION 10: The reliability of the equipment was:

COMMENTS (CONTROL GROUP)
The other 1/2 of the class had an equipment problem, so they used our equipment, which cut down on all of us and our time on the 9000.
It went down just for minutes at times but was always working when I was working on it.
We had excellent service out of the system compared to the process or practising of unit.
Besides a couple lights.
Maintenance of keeping this equipment working 100%. Worked very good. "Perfect."
Only broke down on test day.
The test was a problem.
Except for final exam testing, but there (luckily) was an available 9000 not in operation for us to use.
100% better than other equipment.
Was always in good shape.
Sometimes we had to reprogram it and replace a switch that some students put through the machine.

COMMENTS (EXPERIMENTAL GROUP)
Never broke down that I noticed
Only two minor equipment malfunctions occurred and were quickly corrected.
Equipment continually locks up
The video discs went haywire from time to time
There were quite a few problem with the PTP & PTR
It still didn't hinder my learning process.
No comments
Visual module had a few faults, but was an excellent teaching aid.
No comments
One side went down completely
One side quite working (my instructor) made good use of what she had to work with after the side went down.

QUESTION 11: I think I needed more hands-on practice with the equipment

COMMENTS (CONTROL GROUP)
I could of had a bit more hands-on to make me feel more confident but I knew what I was doing.
If I am to remember it by the time I get to a comm. center.
I didn't get a 100 but that was my own fault but I had plenty of time to work with the equipment.
It cannot be expected of us to know everything about DCT-9000 operations in such a short time to become proficient operators.
I would have felt more comfortable on the test if I could of had a little more time.
To retain information longer.
I know the operation, would like to work more with it.
I learned it all proficiently but would've liked more practice.
Practice makes perfect.
I would like to know it a little more in depth.
I feel I could have more confidence in my self and the equipment if I had more hands on,
I would like to have more hands on just to make sure all my present knowledge is more retainable in the future, especially if there is a large gap between this class and actual on job use.
I feel a little more hands on training would have been good, but I'm satisfied with the time I got.

It was easy enough, I just wish I could have went through it more times.
I learned enough with the DCT-9000, thanks to the instructors who taught the class.
You could always use practice, but I'm confident enough about the operations of the machine.
Yes, I would like to learn about some of the channels I wasn't allowed to use.
STUDENT SURVEY (Contd.)

See comment on Question 9: "Since there was only one DCT-9000 it took time for everyone to go through it. They should have more equipment.

I think I needed more hands-on practice with the equipment. It'd feel more comfortable with it.

When I get back from leave I may need more practice. Had plenty of time to learn equipment. Only to get to know its capabilities more in depth. More experience would have made me feel more confident during test time.

You can only improve on what I know. I had plenty but more does not hurt. Yes because I can learn better and more if I am actually working with the equipment rather than listening to lectures. Besides that they make me fall asleep. Others in the class would check "agree completely," I should think.

COMMENTS (EXPERIMENTAL GROUP)

Only if the amount of time of the module was lengthened, or there was more equipment I know what I am doing but could always use more time Magnetic tape unit

I had sufficient practice on the equipment. Although able to pass test without difficulty would need more time before being able to operate comfortably in center environment. I would have been more confident if I had had more hands-on time The more you work with a device the better you get. I felt confident Could never "master" it in a week's time

One week of TNG, a student knows what to expect of the equipment but don't quite know the whole operations and capability of this equipment Agree, but we still had more hands on than any other classes I believe a person can never get enough hands-on practice repetition produces an excellent operator. I think I've learned it, but practices makes perfect More practice helps always I could test out now if I had to. I know what to do. This time I think it was the equipment I thought I had enough time. I had all the time I needed and if I needed more it was certainly there for me to take advantage of. Needed more time transmitting.

With the video there was plenty of hands on time, but, again, with transmission our instructor did not explain too well how to do it & only got to transmit on the equipment three times besides the test.

QUESTION 12: The testing process allowed me to show the best I could do.

COMMENTS (CONTROL GROUP)

I was a little nervous but I took my time and did what I was taught. I felt we were quite lucky to have (our instructors). They were friendly w/ everybody, etc. It was fair, what we practiced, and very effective.

The testing process was very good. It show that I will always get dummy attacks but pretty much the best I could do at the time. It helped me to realize what my weakness was and to correct myself before the actual test. Very good and understandable. No need to get nervous. Is a piece of cake. Test pattern didn't allow for much else than perfection according to instructor. Little to no room for improvisation which would show more (or less) understanding of overall DCT-9000. It only passed me to the next class. The best I could do will come after I reach my permanent duty station.

Sufficient amount of time. I was very confident thanks to the training on the equipment, instructors and the work book. It was a fair chance to prove my ability. I wished I could have corrected more errors to learn more about faults/hand on. If your too over confident you must take your time and cover everything you do.

The testing process (was a good one, which) allowed me to show the best I could do. I may have done better if I wasn't the only one there. Wanted to show ability to correct faults. (Marked "Disagree Somewhat")

I felt this week was one of the best at Fisher Hall. During transmission you rushed me through which made me think hard and gave me no time to make mistakes.
STUDENT SURVEY (Cont'd.)

I thought I could have done it better with power up and transmitting combined.
(General comment) Actually observation played a large roll in catching on to the DCT-9000.
That is left up to the individual students, the method and techniques of discussion were excellent.

COMMENTS (EXPERIMENTAL GROUP)

The waiting kept me nervous, thus causing me to speed through and make an error.
No comments
I passed.
No comments
It was adequate for the needs of the class & time allowed
Could have been a little harder.
Only one fault during test - should have been more
The instructor handled the test very well.
Yes it was but I kind of over-ran myself and flunk-out by going to fast
I liked the way the test was broke down in to two parts.
I did not know how much time I had to transmit.
It was in a relaxed atmosphere, where other times when we tested out, the instructors made you very nervous during the test. It allowed you to do your best.

REMAINING QUESTIONS FOR EXPERIMENTAL GROUP ONLY

QUESTION 13: I enjoyed using the microcomputer/videodisc delivery system.

COMMENTS:
It got boring after a while
Entertaining--The 'Hall of Fame' is a nice addition to the system.
Extremely helpful
It was not the same as hands on (too much microcomputer function) to confuse with hand on portion of video. The screen on picture hurts my eyes
Excellent training aid!!
All courses should offer this system.

QUESTION 14: The directions for using the system were clear and easy to follow.

COMMENTS:
At first you didn't understand. Lately you understood the system
One was never sure of the next move.
The system could be confusing at times. More in-depth instructions needed.
On some of the programs I wasn't sure on what it was looking for and often guessed to get the other screen
The directions were clear, after I had realized them.
Not very clear instructions. As a matter of fact no instructions.

QUESTION 15: The MC/VD delivery system was reliable and did not break down or malfunction.

COMMENTS:
Didn't work right when punched sometimes.
Programs some times did not perform proper and became 'lost' or failed to reset variables.
The only problem was the screen would not change sometimes when you did touch the right equipment or correct answer.
Only once or twice did it lock up on me.
Had a tendency to lock up at times and not advance. However, rarely.
It did stick and jump once in a while. But it's only a machine!
It often 'stuck' and had to be restarted. On the main menu, the /'s are too close to each other.
Sometimes it locked up data, but it was put back into operation immediately.
The system has a habit of locking up, but we had the extra time to be patient (being a small class)
It would lock up occasionally, by that I mean every other time it was used.
Although one system was shut-down entirely for maintenance.
Sometimes when you hit the screens you got the wrong thing or it would give you errors but overall the system helped me to learn the equipment a lot faster and more accurately.
The area where you touched the screen would vary too much.
sometimes it would fail to change screen when I touched the screen on the correct spot.
STUDENT SURVEY (Cont’d.)

It sometimes wouldn’t accept commands
It doesn’t work well
Never broke down but would occasionally get the wrong program or it would malfunction in the system.

QUESTION 16: It was easy to operate the DCT-9000 after receiving instruction on the MC/VD delivery system.

COMMENTS:

Again, it was somewhat confusing, because some steps were left out of the DCT-9000 operation. Special procedures and sequences used on the VD could result in slight confusion when operating the MC.
It helped a lot.
There are still major differences between actual machine-usage and simulated usage, although the MC/VD was helpful in learning the correct procedures.
It helped me learn the sequence of buttons.
It just not the same.
The time ... when you push the buttons (ex: power up) you don’t have to hold for ten seconds to power on like you do with the real thing.
It was more easier to operate after going through video disc.

QUESTION 17: I would recommend the use of the MC/VD delivery system for future classes in DCT-9000 operation.

COMMENTS:

The MC/VD is a very good training aid and highly recommend that it be used for future classes. If every step that was done on the DCT was done on the MC/VD. With large classes there is no other way to get enough practice. It helps in the beginning, but not too much afterwards.
As long as it's kept in good working condition.
It broke down a lot.
It was a good reviewing tool and helped a lot.
Particularly with large classes! This system could be a big help if adapted to DSTE, also.
It is a good practical learning tool.
One reason is the student never sits dormant when he/she finished powerup at the original piece he can move over to the video and practice what he did wrong.
It allowed additional time to practice basic operation, and kept interest by allowing competition.
The MC/VD was a helpful aid to help student be more knowledgeable of the equipment & operating.
I would recommend it for the SRT & S.SY also.
But it still does a lot better to have hands-on training.
It would also benefit other classes like SRT and DSTE.
Excellent training aid for the DCT-9000.
Interesting piece of equipment.
The MC/VD is also a good system because it allows the people who are not doing hands-on practice to work and learn more about the DCT instead of just sitting there. A MC/VD would be just great for the DSTE.
I would recommend this type of instruction for all students training.
Helps give you a lot more practice and practice makes perfect.
It helped practice while someone else was working on the DCT-9000.

GENERAL COMMENTS AT END OF SURVEY:

The videodisk training aids are a great help.
To make this course a better one, I suggest with no disrespect meant, that when there is a substitution, make sure the instructor knows what he is doing.
I had excellent instructors. I wish everyone (instructors) were as helpful as they were.
I think that the student work book should have illustrations on how to transmit at least more than what it has.
I really enjoyed this last week of the course, especially the video disk machines.
I would like to thank all the instructors for teaching me highly trained skill. And I feel that Lt. Gordon has the best instructors a trainee could. Thanks.
I enjoyed my 12th week more than any other wk the equipment is interesting. The instructor show pride in his job and is concern for the learning of each of his pupils he showed no favoritism and kept control at all times but never treated us like children. It was fun this week.
The instructor was also very good. Because he wasn't boring, he definitely kept us awake.
Keep up the good work!

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