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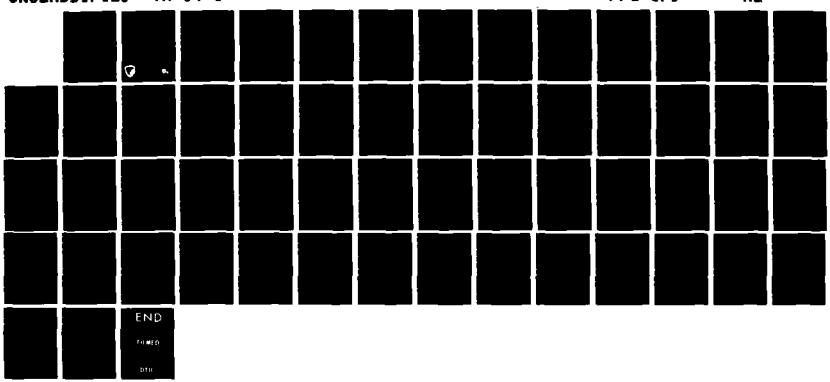

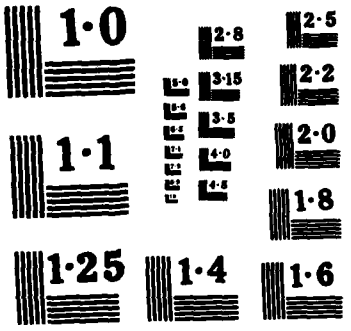

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AD-A157 856

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

FINAL REPORT

DEVELOPED BY:

CHRISTIE D. VERNON, Ed.D

OCTOBER 1984

APPROVED FOR PUBLIC RELEASE

DISTRIBUTION UNLIMITED

PREPARED FOR:

US ARMY COMMUNICATIVE TECHNOLOGY OFFICE
FORT EUSTIS, VIRGINIA

US ARMY SIGNAL SCHOOL
FORT GORDON, GEORGIA

NOTICES

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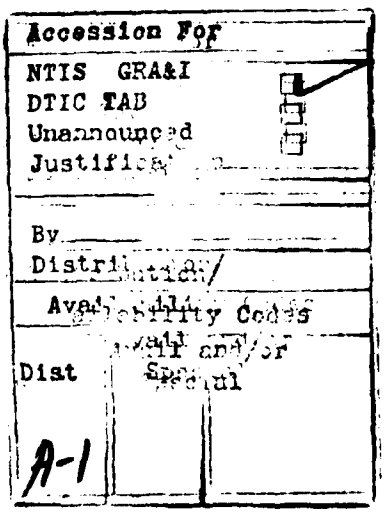

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

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).

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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

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.

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

Control Group	Experimental Group
No. of Subjects: 72	No. of Subjects: 72
Time: Approximately 4 instructional weeks	Time: The same
Pretest Data: High school grade attained ASVAB: General Technical Electronics Clerical	Pretest Data: The same
Class Test Data: Score and Time Thursday test scores Friday test scores	Class Test Data: The same
Hands-on Practice Data Time on DCT-9000 (in minutes)	Hands-on Practice Data: Time on DCT-9000 (in minutes) Time on MC/VD System (in minutes)
Surveys: Student Survey Instructor Survey	Surveys: Student Survey (plus supplement) Instructor Survey
Cost Data: Initial cost of DCT-9000 Programming costs Log of downtime Maintenance costs	Cost Data: Initial cost of DCT-9000 Programming costs Log of downtime Maintenance costs 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

	Control Group $\bar{X}$	Experimental Group $\bar{X}$	t	$p <$
General Technical Component	107.905	108.737	.35	.724
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 3: Comparison of Practice Times of Control and Experimental Groups

	$\bar{X}$ Time on DCT-9000	$\bar{X}$ Time on MC/VD	Total Practice Time
Control Group	112.66 min.	--	112.66 min.
Experimental Group	106.21 min.	156.51 min.	262.72 min.

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

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

* 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

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

*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

	Thursday Test Scores 90-100%	Percent	Friday Test Scores 90-100%	Percent
Control Group	31	(42%)	65	(88%)
Experimental Group	56	(76%)	69	(91%)

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

Cost Item	Cost Per Item DCT-9000	MC/VD
HARDWARE COSTS:		
Initial Cost: console	$ 300,000	
Initial Cost: Apple II microcomputer, 48K; Pioneer Video Disc Player Model No. PR7820; Sanyo monitor with a IIAT touch panel; Thunderclock card; VMI Interface; 1 floppy disk drive; 16K RAM card.		$ 6,000

TABLE 6: Continued

Cost Item	Cost Per Item DCT-9000	MC/VD
SOFTWARE COSTS:		
Planning and Development: workbooks and auxiliary materials	$ 5,880	$ 5,880
Planning and Development: personnel; TV studios; production and post production		13,810
Mastering and Replication: two discs		3,000
Programming	(not applicable)	18,550
TOTALS:	$305,880	$47,240
* * * * * * *		
Life Cycle Expectancy	10 years	8 years
One time costs ·/· life:	$ 30,588	$ 5,905
Annual maintenance costs:	14,400	162
TOTAL COST PER YEAR:	$ 44,988	$ 6,067

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

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

TABLE 7: Continued

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

		Much Better	Better	Same	Less Effect.	Much less Effective
6. Compared with other modules in this course, this module was:	(C)	70%	20%	9%	1%	0%
	(E)	43%	29%	22%	5%	1%

		Too Much	Some too Much	Right Amount	Too Little	Much too Little
8. The time allocated for instruction in DCT-9000 operation was:	(C)	1%	1%	66%	19%	11%
	(E)	2%	5%	76%	13%	2%

		Excel.	Very Good	No Opin.	Fair	Poor
10. The reliability of the equipment was:	(C)	43%	49%	4%	4%	0%
	(E)	35%	50%	6%	2%	6%

Questions for Experimental Group Only

	Very Much	Some-what	No Opin.	Did not Enjoy	Dis-liked
13. I enjoyed using the MC/VD delivery system:	66%	25%	5%	5%	0%

	Agree Compl.	Agree	No Opin.	Dis-agree	Disagree Compl.
14. The directions for using the system were clear and easy to follow.	61%	23%	8%	8%	0%

TABLE 7: Continued

Question	Extrem. Reliable	Reliable	No Opin.	Not Reliable	Undepend-able
15. The MC/VD delivery system was reliable and did not break down or malfunction.	25%	54%	10%	11%	0%
	Very Easy	**Easy**	**No Opin.**	**Some Prob.**	**Difficult to Oper.**
16. It was easy to operate the DCT-9000 after receiving instruction on the MC/VD delivery system.	34%	49%	7%	10%	0%
	Recommend Highly	**Recom-mend**	**No Opin.**	**Recom. Somewhat**	**Do not Recomm.**
17. The MC/VD is a very good training aid and I recommend that it be used for future classes.	74%	16%	3%	5%	0%

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.

1. 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 benefitted 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 _____ Class Number _____
Experimental Group _____ Class End Date _____

STUDENT DATA SHEET

Name: _____ SSN: _____

Total Practice (Hands-On) Time _____

Practice Test Time _____ Score _____

Performance Test Time _____ Score _____
Remarks:

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: _____
_____

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 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 confience

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 noticable 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.

RAW DATA: Control Group

Class Date	ASVAB Scores CL	GT	PRACTICE Time (min.)	PRACTICE TEST Time(min.)	Score(%)	PERFORMANCE TEST Time(min.)	Score(%)
12 Aug. '83	101	106	112	22	76	22	76
	106	116	115	23	96	17	100
	126	155	118	18	90	14	96
	126	155	81	17	90	19	100
	117	114	109	23	86	15	100
	119	105	110	19	90	22	95
7 Subjects	123	114	116	21	90	15	100
19 Aug. '83	117	120	72	20	96	14	100
	121	123	59	26	96	15	100
	128	126	65	22	86	15	100
	115	104	55	20	88	19	86
	106	122	58	28	87	17	96
	110	110	51	21	90	15	87
	126	115	78	29	76	17	94
	118	115	62	21	68	17	94
9 Subjects	129	114	95	19	76	28	69
26 Aug. '83	127	111	151	17	88	26	100
	123	128	149	25	63	20	100
	109	103	90	17	85	13	100
	113	85	104	19	86	11	100
	116	121	109	21	78	14	100
6 Subjects	127	111	119	15	87	15	100
2 Sept. '83	111	100	202	19	98	20	100
	90	81	175	15	100	18	100
	91	83	123	13	88	16	100
	103	115	115	16	91	15	100
5 Subjects	99	77	185	18	84	28	100
9 Dec. '83	113	105	139	20	100	15	93
	133	115	129	20	80	14	100
	104	98	134	21	60	15	98
	99	91	157	30	87	18	100
	89	110	153	15	96	17	92
	103	104	100	17	60	16	97
	116	125	134	19	29	12	100
8 Subjects	109	72	177	25	97	22	100
9 Dec. '83	95	90	121	16	90	21	97
	95	107	87	17	90	16	100
	110	103	155	24	92	15	100
	118	117	92	20	90	15	90
	118	109	109	15	97	17	97
	96	106	104	19	82	13	98
7 Subjects	105	115	110	30	70	13	100

RAW DATA: Control Group (Cont'd.)

Class: Date	ASVAB Scores EL	CL	GT	PRACTICE Time (min.)	PRACTICE TEST Time(min.)	Score(%)	PERFORMANCE TEST Time(min.)	Score(%)
16 Dec. '83	113	103	112	102	14	86	12	100
	121	118	119	97	15	100	10	100
	89	94	73	131	17	90	10	100
	83	104	91	150	21	90	10	100
	91	111	102	79	17	92	10	95
	80	102	93	162	26	80	9	100
7 Subjects	120	120	122	131	16	100	9	100
16 Dec. '83	90	91	98	101	19	92	17	98
	100	102	108	92	18	82	14	100
	123	127	126	125	25	65	17	100
	101	83	89	166	23	50	17	94
	99	112	104	166	19	80	17	100
	116	101	117	116	16	54	17	96
	119	111	109	88	18	84	16	100
8 Subjects	106	107	98	136	20	90	16	100
17 Feb.'84	123	130	125	84	16	100	12	100
	111	113	107	84	16	100	16	100
	118	112	113	93	23	86	17	97
	100	102	110	99	27	62	17	100
	99	100	128	96	18	100	12	100
	101	131	111	116	21	90	17	100
	126	97	123	123	22	80	12	100
	91	125	87	132	19	82	36	52
	102	128	107	86	22	76	16	100
	84	110	94	137	36	49	19	76
	111	127	115	67	17	90	15	90
	80	118	90	81	22	46	18	88
	93	113	102	113	21	54	21	80
	104	107	110	93	22	81	13	90
	86	108	106	91	16	82	13	86
	79	95	79	156	20	49	19	97
17 Subjects	121	124	121	65	19	79	12	95

TOTAL: 74 Subjects

RAW DATA: Experimental Group

Class: Date	ASVAB Scores			PRAC. TIME		PRACTICE TEST		PERFORMANCE TEST	
	EL	CL	GT	DCT	MC/VD	Time(min.)	Score(%)	Time(min.)	Score(%)
18 May '84	110	125	122	68	136	17	97	17	100
	93	100	109	111	118	27	60	15	100
	81	118	105	68	206	22	97	21	100
	88	104	83	93	168	15	100	14	100
	114	123	105	96	188	18	100	17	100
	97	98	92	72	179	15	100	12	100
	93	113	93	82	188	16	90	13	100
	113	105	113	87	133	21	60	16	100
	96	112	105	108	164	12	100	13	100
	127	117	126	115	169	17	100	11	100
	101	121	102	109	79	32	55	17	96
	106	131	118	99	259	12	100	11	98
	92	125	105	74	295	19	95	12	100
	130	124	130	99	182	16	98	14	100
	85	105	111	88	94	14	100	18	98
	99	118	111	76	159	17	58	15	100
17 Subjects	92	99	123	81	93	21	100	13	96
25 May '84	100	110	99	158	205	20	57	15	89
	116	101	122	246	230	10	100	10	100
	116	126	117	134	308	20	100	10	100
	99	117	115	118	126	18	96	17	88
	123	124	128	108	205	13	100	12	100
	97	126	103	57	283	15	100	12	100
	124	115	126	119	85	11	100	15	100
	115	110	111	112	205	13	100	13	100
	123	126	115	111	265	21	60	16	100
10 Subjects	99	103	105	174	260	13	97	21	100
8 June '84	94	106	108	77	216	20	90	16	100
	124	118	118	71	133	15	100	15	100
	110	113	114	119	130	26	54	21	90
	95	107	97	63	144	26	100	13	100
	120	122	122	57	136	14	98	14	100
	137	128	135	63	106	15	98	12	100
	129	121	119	81	104	17	100	13	100
8 Subjects	106	113	111	46	95	24	55	17	98
22 June '84	107	117	100	118	168	15	98	12	100
	108	98	107	145	91	27	45	23	95
	104	116	109	99	147	10	100	12	100
	113	126	112	161	131	20	97	13	100
	104	125	126	110	198	16	57	15	100
	116	103	107	83	44	12	100	10	100
	92	93	87	83	130	18	60	17	97
	111	85	92	71	97	13	100	16	91
	115	105	105	122	153	14	98	23	91
	121	127	117	40	153	11	100	9	100

RAW DATA: Experimental Group (Contd.)

Class:Date	ASVAB Scores			PRAC. TIME		PRACTICE		PERFORMANCE TEST	
	EL	CL	GT	DCT	MC/VD	Time(min.)	Score(%)	Time(min.)	Score(%)
22 June '84 (Cont'd.)	84	110	96	58	291	13	98	21	88
	118	106	117	118	153	20	60	16	96
	100	119	105	96	55	13	93	14	100
	85	99	98	123	122	14	100	13	100
15 Subjects	93	116	102	66	104	11	100	17	100
29 June '84	98	124	118	97	66	13	100	14	95
	137	113	126	151	222	13	100	13	100
	116	114	96	81	112	14	98	17	55
	94	125	119	109	196	29	42	18	94
	118	114	111	221	61	15	100	18	56
	84	101	84	134	42	23	62	22	96
	86	100	81	148	228	16	46	14	100
	129	121	128	76	229	14	98	15	90
	93	98	104	155	177	22	56	18	96
	113	120	122	110	230	15	98	14	100
	80	128	95	67	110	14	98	15	100
	92	123	95	106	120	12	90	10	100
13 Subjects	80	108	87	139	190	16	94	11	90
13 July '84	85	112	92	64	89	18	70	13	70
	121	124	128	35	101	18	92	10	100
	106	96	107	178	268	19	87	13	98
	92	112	100	90	119	25	60	12	100
	88	110	85	26	131	9	92	17	96
	102	110	105	69	68	9	98	10	100
	114	107	111	138	83	10	98	15	100
	108	119	110	272	81	12	100	14	100
	116	125	130	135	155	15	100	16	100
10 Subjects	99	99	102	77	133	20	94	16	100
3 Aug. '84	101	121	110	152	134	14	100	12	98
	82	103	90	201	190	16	88	28	52
	104	105	130	108	277	16	90	13	100

TOTAL: 76 Subjects

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?

Much Faster	Faster	About the Same	Slower	Much Slower
2	2			

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 profficient in the alloted 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?

Very Much	Somewhat	No Change	Less Confidence	Much Less Confidence
4				

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?

Agree	Somewhat Agree	No Opinion	Somewhat Disagree	Disagree
2	2			

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?

More Thorough than Hands-on Alone	Somewhat More Thoroughly	No Difference	Somewhat Less Thoroughly	Less Thoroughly
3	1			

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?

Very Much Better	Somewhat Better	No Difference	Less Satisfactory	Much Less Satisfactory
4				

Comments:

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

More confidence and less instructor guidence 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 ea. task

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

Very Accurate	Satisfactory	No Opinion	Less Than Satisfactory	Poor Quality
2	2			

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?

Much Improves Course	Somewhat Improves Course	Little Difference	Detracts From Course	Causes Difficulties
4				

Comments:

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

Remediation for students, instant feed back.

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 profficiency 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?

Adjusted Quickly	Adjusted Fairly Well	Not a Factor	Slow Adjustment	Poor Adjustment
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?

Very Good	Good	Adequate	Inadequate	Poor
2	1	1		

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?

Very much Prefer	Somewhat Prefer	No Preference	Prefer Hands-on Equipment	Much Prefer Hands-on Equip.
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.

INSTRUCTOR SURVEY (Contd.)

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

Very Good	Satisfactory	No Opinion	Unsatisfactory	Very Unsatisfactory
4				

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?

Very Reliable	Adequately Reliable	No Opinion	Somewhat Unreliable	Very Unreliable
3	1			

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?

Virtually No Difference	Some Differences	No Opinion	Some Did Not Benefit	Many Did Not Benefit
3	1			

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?

Very Prompt	Adequate	No Opinion	Inadequate	Very Unsatisfactory
3		1		

Comments:

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

Mr. Congleton arranged adjustments.

INSTRUCTOR SURVEY (Contd.)

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 prefereable 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 occured.

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 aides 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 invirement 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 simplier.
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 pase.
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 instructer 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 pay day, 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 bycause 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 instructers 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 to 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 interresting 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 boredome.
There was no time to sleep everything was in my very best interest
The instructer 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.v. help a tremendous amont 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 understant 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.
(My 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 manotony 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 time. 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 commcen with masimum efficiency.
I had to much time.
Need perhaps to set up simulated comm-cen 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 probly 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 it take longer to learn the opration so they take up 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.

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.
bcause everyon 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 MC/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 hows and whys.
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 COMCEN with efficienty.
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 comterferable with the DCT-9000 if I could learn more about the faults & the systems.
Unfortunately although I bearly learned what was required in the class, a little bit more info would help overall undersanding.
I really can't say that but in a COMCENTER doing this will somewhat come fimillar 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 wouldn't 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 feel I know everything that's beenpresented to us in this class.
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 commcen 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 tng.
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 DCT-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 COMCENTER 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 instructers 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 occured. 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 knowledgable.
We learned everything we needed to know.

COMMENTS (EXPERIMENTAL GROUP)

It was completely explained
No expirence with real operating condition so I am unable to say how effective it was.
For only having 2 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 somehwat) 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 comprehensiveable.
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 smartter 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
They're all very 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 to me 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/MART
The class was split up and our class had allways been taught together. The being separated from classmates didn't help because we couldn't help each other.

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 convenint & 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 encourgment 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 congradualation.
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 instructers 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 realy need less people in a group
It also helped to have the class broken down, more individuallzed 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.
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 concious 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!!
anough to know what the system does.
More hands on.
The instructor gave us 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 (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 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 [illegible] 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 corse 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 accessable 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 computors 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 continualy 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 wished I could have went through it more times.
I learned enough with the DCT-9000, thanks to the instructors who teached 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.
I'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 comfortable in comcenter enviroment.
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 weeks 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 impovision 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.
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 adequet 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 (to much microcomputer funtion) to confuse with hand on portion of vidio. 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 proberly 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 occasinly 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 its 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 addition 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 benifit 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 Ft. 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 favortism 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!

END

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