AD-787 429

SURVEY OF COMPUTER APPLICATIONS IN ARMY TRAINING

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Office of the Product Manager

Prepared for:

Army Training and Doctrine Command

August 1974

UNCLASSIFIED

Security Classification

AD-787 429

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY *(Corporate author)* Office of the Product Manager Computerized Training System US Army Communications Electronics School Fort Monmouth, New Jersey 07703	2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED 2b. GROUP

3. REPORT TITLE

Survey of Computer Applications in Army Training

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

Technical Report

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6. REPORT DATE	7a. TOTAL NO. OF PAGES 146	7b. NO. OF REFS
8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)	
b. PROJECT NO.	CTS-TR-74-3	
c.	9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*	
d.		

10. DISTRIBUTION STATEMENT

Distribution of document is unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY US Army Training and Doctrine Command Fort Monroe, Virginia 23651

13. ABSTRACT

The survey provides information on computer applications in training throughout TRADOC and DA training organizations and activities. Textual and tabular data are also included when the organizations or activities responded to the items in the questionnaires comprising the survey. Results show that about fifty percent of the responding organizations and activities use computers in some form of training. Findings also indicate that most of the sampled organizations and activities are desirous of either present or future orientation and instruction in either top management, middle management, or instructional programming concepts and principles embodied in a computerized training system (CTS).

DD FORM 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS OBSOLETE FOR ARMY USE.

UNCLASSIFIED

Security Classification

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Computer Assisted Instruction						
Computer Directed Instruction						
Computer Managed Instruction						
Computer Supported Instruction						
Drill and Practice						
Simulation and Gaming						
Logical Problem Solving						
Computation						
Dialogue						
Tutorial Logic						
Hard Skill						
Soft Skill						
Instructional Strategy						
Instructional Model						
Student Terminal						

NOTICES

This report has been reviewed and is approved.

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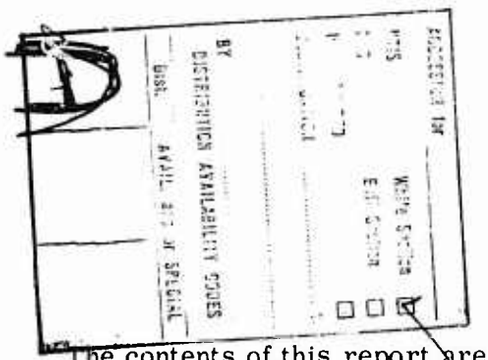

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FOREWORD

1. This report represents a first attempt at gathering information relative to past, present and proposed computer applications to training throughout TRADOC and DA organizations and activities. It further includes information relative to interest in orientations and courses of instruction on the principles of computerized training.

2. The information contained herein was obtained by means of a survey conducted entirely by questionnaires through the mail. It is anticipated that refinement of data will be accomplished by means of personal visits and conferences.

3. Recipients are invited to submit comments and suggestions to this office.

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EXECUTIVE SUMMARY

1. Introduction

a. Purpose of Survey

The purpose of the survey which is summarized in this report, was to collect data relative to previous, existing, and planned computer applications in training throughout US Army Training and Doctrine Command (TRADOC) and Department of the Army (DA) training organizations and activities. Computer application means the integration of the computer into the classroom as a teaching medium, surrogate instructor, and as a classroom management tool. This included the gathering of data on systems containing computer applications in training, course development and operation of such systems, and personnel and costs associated with these systems.

A further purpose was to survey interest and desired participation in an orientation and/or a course of instruction in the concepts and principles of computerized training as developed by the Product Manager, Computerized Training System (CTS) Project.

Information for the survey was obtained by mail from thirty-two (32) of the thirty-four (34) activities throughout TRADOC and DA training organizations/activities. No responses were obtained from two of the training organizations/activities due to the closing of one activity and the consolidation of an activity with another.

b. Background

In November 1971, the Computer Assisted Instruction (CAI) Division, US Army Signal Center and School (USASCS) was directed to chair a Computer Assisted Instruction Task Group to study the application of the computer to technical training. The primary recommendations emanating from the study (HQ, CONARC, Task Group Report, Subject: Computer Assisted Instruction, chaired by USASCS, Fort Monmouth, NJ, Vol I and Vol II, dated April 1974) called for the development, test and evaluation of a large scale prototype CAI system as a justifiable evolutionary step to capitalize on the growing potential of the computer in military education and training. Consequently, Project ABACUS was established at USASCS in August 1972 to develop and evaluate a 128 terminal Computerized Training System (CTS) for eventual utilization in US Army Training and Doctrine Command (TRADOC) training activities. The Product Manager, Computerized Training System (CTS) has been so tasked.

As the focal point for TRADOC and DA efforts in computer applications to training, the Product Manager has been further tasked to update information on the current status of existing and anticipated capabilities in this area throughout TRADOC and other DA training activities.

c. Objectives

The information presented in this report was prepared to assist in long-range planning for computerized training systems in the Army.

The diversity of course material, hardware, and approaches to computer implementation in training which are already in existence and detailed in this report are proliferating at an ever increasing rate. The data presented herein shows the necessity for coordination and management of resources at the earliest possible time.

Planners will find information in this document dealing with:

(1) Hardware facts such as cost, use factors, CPU types, terminal types, simulator types, carrels, media devices, and future activity.

(2) Software aspects which include models/strategies, languages, programs, course development facts, personnel/man-years of experience, and training requirements.

2. Survey Questionnaires

a. Two survey questionnaires were prepared by the Office of the Product Manager, Computerized Training System.

b. Questionnaire A was prepared to collect data relative to previous, existing, and planned applications of computerized training throughout TRADOC and DA training activities.

c. Questionnaire B was prepared to survey interest and desired participation in an orientation and/or course of instruction in the concepts and principles of computerized training as developed by the Product Manager.

d. A copy of both Questionnaire A and Questionnaire B can be found in Annex A.

3. Training Organizations/Activities Sampled

Thirty-four US Army TRADOC/DA training organizations/activities were contacted to provide the data required to meet the objectives of the survey.

Defense Information School, Ft. Benjamin Harrison, IN 46216	TRADOC
Defense Language Institute, Presidio of Monterey, CA 93940	TRADOC
Command and General Staff College, Ft. Leavenworth, KS 66027	TRADOC
Air Defense School, Ft. Bliss, TX 79916	TRADOC
Armor School, Ft. Knox, KY 40121	TRADOC
Chaplain Center and School, Ft. Hamilton, NY 11252	TRADOC
Engineer School, Ft. Belvoir, VA 22060	TRADOC
Field Artillery School, Ft. Sill, OK 73503	TRADOC
Infantry School, Ft. Benning, GA 31905	TRADOC
Administration Center Fort Benjamin Harrison, IN 46216	TRADOC
Intelligence Center and School, Ft. Huachuca, AZ 85613	TRADOC
Military Police School, Ft. Gordon, GA 30905	TRADOC
Missile & Munitions Center & School, Redstone Arsenal, AL 35809	TRADOC
Quartermaster School, Ft. Lee, VA 23801	TRADOC

Ordnance Center and School, Aberdeen Proving Ground, MD 21005	TRADOC
Communications Electronics School (Formerly US Army Signal Center and School) Fort Monmouth, NJ 07703	TRADOC
Signal School, (Formerly US Army Southeastern Signal School) Ft. Gordon, GA 30905	TRADOC
Transportation School, Ft. Eustis, VA 23604	TRADOC
Women's Army Corps Center & School, Ft. McClellan, AL 36201	TRADOC
Aviation School, Ft. Rucker, AL 36360	TRADOC
Primary Helicopter School, Fort Wolters, TX 76067 (NOTE: 1)	TRADOC
Institute for Military Assistance, Ft. Bragg, NC 28307	TRADOC
Sergeants Major Academy, Ft. Bliss, TX 79918	TRADOC
Brooke Army Medical Center, Ft. Sam Houston, TX 78234	DA
Letterman Army Medical Center, Presidio of San Francisco, CA 94129	DA
Logistics Management Center, Ft. Lee, VA 23801	DA
Management Engineering Training Agency, Rock Island, IL 61201	DA

Management School, Ft. Belvoir, VA 22060 (NOTE: 2)	DA
Medical Department Veterinary School, Ft. Sheridan, IL 60037	DA
Security Agency Training Center & School, Ft. Devens, MA 01433	DA
War College, Carlisle Barracks, PA 17013	DA
Institute of Research, Walter Reed Army Medical Center, Washington, DC 20012	DA
Military Academy, West Point, NY 10996	DA
Academy of Health Sciences, Ft. Sam Houston, TX 78234	DA

NOTE: 1. Closed
2. Consolidated with Logistics Management Center.

4. Definitions

Computer Assisted Instruction is a relatively new instructional method. Inherent in any new technique is a wide disparity in the use of certain terms and definitions. The following definitions have been used to establish and limit the scope of the report.

a. Technical Training: Technical training is defined within the assigned scope of work of any officer or enlisted specialist course which results in the award of a Military Occupational Specialty (MOS) and/or an Additional Skill Identifier (ASI) in which the major portion of training is devoted to the development of hard skills associated with the installation and maintenance of equipment.

b. Computer Assisted Instruction (CAI): A man-machine interaction in which most of the teaching functions are accomplished by use of the computer in direct support of a training situation. Both training material and tutorial logic are stored in computer memory. Computer assisted instruction techniques are frequently divided into, but are not limited to, the following modes:

(1) Drill and Practice: Use of the computer to guide, control, and monitor by repetition of a specific task or set of tasks. The purpose of this mode is to develop a predetermined level of proficiency in a skill. This proficiency may be acquired under a wide variety of constantly changing conditions or under a single set of consistent conditions.

(2) Simulation and Gaming: A model of a real-life situation represented by a given set of circumstances and parameters stored in computer memory. The instructional purpose is served by student reaction to a wide variety of situations synthesized by the computer. This technique has the elements of competition, of change, and offers alternate outcomes.

(3) Logical Problem Solving: Use of the computer for performing a series of computations necessary to arrive at a solution to a problem. In this technique, the problem is approached as an entity and the output from the computer is an end result.

(4) Computation: Performance of mathematical processes using the computer as a calculator. This technique can be a subelement of, or used independent of, the Logical Problem Solving technique.

(5) Tutorial: A technique in which instructional material is presented to the student according to an instructional logic formalized in detail. The material presented and its sequence of presentation vary to fit the individual characteristics of the student

(6) Dialogue: A mode in which the student and computer engage in a Socratic discussion to accomplish an instructional objective. Student responses, queries are relatively free in structure and normally are in natural language. This mode can be further classified as:

(a) Computer Inquiry where the computer questions the student, evaluates his answer, and modifies the succeeding dialogue to determine the depth of knowledge attained in a specific subject area.

(b) Student Inquiry in which the computer responds to specific questions by providing information germane to the subject. It is important to note that the Student Inquiry Dialogue is a tutorial process, not merely an information retrieval process.

(7) Monitor: An advanced version of the Dialogue Mode in which the student has almost complete control over the computer system. The monitor "looks over the shoulder" of the student, providing guidance and advice, and such assistance as the student may request.

c. Computer Supported Instruction (CSI): All computer applications in support of instruction in which the computer is used by a human instructor to assist him in the accomplishment of his instructional objectives; essentially, all uses of the computer as a classroom training aid. CSI encompasses the areas in which the computer is the subject of instruction or in which the computer is used as an aid in teaching other subjects.

d. Computer Managed Instruction (CMI): An overall system for educational management in which detailed student information (such as that information which can be obtained from CAI systems) complete curriculum data, and information on available resources are integrated. The purpose being to develop individualized programs of instruction, revise curriculum content, provide the necessary counseling and guidance, and facilitate optimum educational resource management. In short, CMI integrates the computer assisted instruction functions with the administrative functions.

e. Computer Directed Instruction (CDI): The interactive use of the computer as an adjunct to and a director of other media of instruction. In this mode, the computer is used to interact periodically to check the student's progress and provide remediation, if needed, and further directions on how to proceed. The computer may be one of several media used.

f. Computerized Training System (CTS): The integration of the computer into a totally self-paced training system. In a CTS, the computer serves as a teaching

medium, a surrogate instructor, a classroom management tool, as well as performing many school administrative functions associated with training.

g. Tutorial Logic: A program, or series of programs, developed to support tutorial modes defined in paragraphs b(5) and b(6) above.

h. Hard Skill: Job related skills involving actions to physical things such as adjusting rifle head space, timing an engine, operating a bulldozer, measuring voltage, conducting preventive maintenance, and welding.

i. Soft Skill: Job related skills involving actions affecting primarily people and paper such as inspecting troops, supervising office personnel, conducting studies, filling supply requisitions, and preparing reports.

j. Instructional Strategy: A decision mechanism that allows for selection from alternative plans of instruction the strategies that will lead to an optimal performance level. These instructional plans involve the characteristics of the learner, the structure of the curriculum material being developed, the behavioral processes being utilized by the student, as well as the student's coping behavior that results in maximizing his rewards and minimizing his efforts.

k. Instructional Model: A specific set of instructional strategies which structure the interactive process between the individual student and the subject matter.

l. Instructional Mode: Mode of teaching to include: tutorial, drill and practice, simulation and gaming, problem solving, and others.

m. Student Terminal : A configuration of input and output devices and their environment which have been human-engineered for use by a student in a CAI application.

5. Findings

a. Instructional Modes/Methods.

Representative applications of the computer in training are: drill and practice, simulation, problem solving, information retrieval, network analysis, report generation, curve fitting, cost estimation, and ADP operation and programming training.

Tutorial instruction is used rather insignificantly in spite of the fact that it has been demonstrated to be of considerable educational value and can be applied cost effectively. Of the 2,282 instructional hours reported, tutorial instruction only represents 299 hours of the total.

b. Activity

Eighteen respondents indicated use of the computer in some form of training in portions of one hundred and sixteen courses. Eighteen of these courses reported award of ASI or MOS in hard-skill courses in installation and maintenance of equipment. Seven of these courses were devoted to hard skills in operation of equipment. If anything, these figures indicate a fragmentary activity in the application of computers in support of training. An investigation of hardware/software design and cost of implementation versus command attitude/guidance should be of the highest priority in immediate and long-range planning.

(1) Assumptions

Possible contributory factors of no less significance than those mentioned previously and which should be carefully considered in future planning are:

(a) System capabilities with training rather than data collection and processing as the focal point, i.e., course designer parameters/software/system implementation/storage factors versus state-of-the-art/cost factors. The latter usually forces a compromise in training system design planning.

(b) Training system reliability, maintainability, replication, and potential versatility weighed against student/instructor/administrator/implementor needs.

(c) Human engineering aspects of student/course developer/instructor-proctor terminals and carrel configurations.

(2) Specifics

Very few of the obvious requirements for a truly versatile CTS appear to have been implemented in any of the existing systems either because of state-of-the-art/cost compromises and trade-offs or for other reasons unknown at this time. The impetus for increased computer activity in training will be derived from circumspect consideration, coordination, and building for the future on these cornerstones:

(a) Versatile student/author/administrator/proctor terminals must be designed and integrated to user specifications to interface and rapidly communicate each user's needs in a cohesive, effective manner.

(b) Software packages must be provided with special attention to user language for easy, in-house development of text, graphics, hard-copy literature, and evaluation programs.

(c) Certain media must be selected, at least for the time being, as appropriate for the display of lesson subject matter over and above that which is stored and presented by the computer directly. Some choices, not necessarily in order, are: randomly selected microfiche slides, randomly selected audio, 8mm stop frame/motion picture, 35mm slides, 16mm still cartridges, and video tape. All of these can be indirectly or directly computer-controlled but the emphasis should be on production of material in-house using local talent and equipment in order to minimize the high cost of developing this type of course material.

(d) Decisions must be made as to where hardware simulators with their peculiar-expensive interfaces should be traded off instead for a computerized two-dimensional exercise of the same activity. The proliferation of single-purpose, exceedingly expensive, simulation devices which play to rather limited audiences represents a huge sum of money, which if directed toward a generalized computer training system concept would result in a useful, versatile system, rather than the compromises which have been produced thus far.

(e) A rationale for training of personnel throughout the CTS hierarchy must be generated. Before this can take place, however, the CAI, CMI, CDI, CSI, CII, etc., hardware, software, philosophy, and terminology controversy which rages not only in the Army but interservice, must be resolved, or at least joined for information gathering purposes.

c. Instructional Models/Strategies

Very little information was supplied in the survey as to the use of models and strategies within the context of their use with a computerized training system. Most respondents indicated that teaching strategies/methods/media were selected from written textual guidance such as instructional flow charts, reference texts, and locally prepared material normally used in preparation of conventional classroom instruction.

d. Records

Five respondents (3 TRADOC, 2 DA) indicated that some form of computerized record processing or collection was accomplished in support of training activities. This would seem to indicate that computer support of training activities is not being effectively applied in the sampled organizations/activities, especially since this area is particularly well suited, easily implemented, and can be shown to substantially increase the return on the initial investment for hardware.

e. Personnel Organization for Course Development

Most organizations tend to use teams for course material development. The reason for this is most likely due to the fact that a simple, easy-to-use authoring language for preparation of lesson text and graphics by the teacher has yet to be developed. This system-imposed constraint places the burden of computer programming onto course developers who would probably prefer to implement their subject matter single handedly but have to settle for "teams" of writers to prepare the material and programmers to implement them. The closest approach to date to simple easy-to-use authoring languages which are oriented toward cost effective course development are TUTOR and the Army's CLASS I, and these languages are far from ideal for one reason or another. Much more attention to this critical area of system-software design is called for since course development is known to be a major negative factor in cost-effective application of computers to support training functions. Authoring language shortcomings are directly traceable to hardware/cost/state-of-the-art considerations.

f. Location of Computerized Training Activities in the Organizational Structure

It would seem from the survey that computerized training is an ADP or management information system function. This anomaly is a good indication of the present attitude toward computerized training systems and is most likely due to the ADP orientation of AR 18-1 in regard to system design, procurement, implementation, and improvement. Computerized training system design feedback should come from academic/educational/training sources and not be diluted by ADP policy and/or regulations.

g. Computer Hardware/Software

A wide variety of hardware/software systems now in use, and more to come, points up the need for positive action on standardization in training system hardware/software design. Core/disk/drum types and storage capacity variations abound. In some instances the compiler programs leave little room in the system for the subject material which the system was designed to execute.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont)

TABLE OF CONTENTS (Cont)

COMPUTER APPLICATIONS SURVEY RESULTS

Computer Utilization in Training

a. Table 1 (Annex B) shows the use of computers in training by the 22 TRADOC and 10 DA organizations/activities as indicated in replies to QUESTIONNAIRE A; SURVEY OF COMPUTER APPLICATIONS IN ARMY TRAINING (Annex A).

b. Table 1 indicates whether the respondent is currently involved in some form of computer application in training. The respondents were asked to indicate whether the computer is used in their training activity as a teaching medium, a surrogate instructor, a classroom management tool, or to perform administrative functions in support of training.

c. Sixteen of the respondents indicated that some form of computerized training is used within the context of Computer Assisted Instruction (CAI), Computer Directed Instruction (CDI), Computer Managed Instruction (CMI) or Computer Supported Instruction. It should be noted that 13 TRADOC, and 3 DA respondents indicated application of computers in training.

d. Although some of the respondents indicated that they do not use computers in training as defined in the glossary of the questionnaire, considerable computer activity exists in the modes of drill and practice, simulation, problem solving, information retrieval, network analysis, report generation, curve fitting, cost estimation, or as a training device in support of ADP operation and programming. Additional comments on computer activity in the various organizations/activities should be read to supplement Table 1. These comments will be found in Annex M.

Computer Applications Activity Table

a. Table 2 (Annex C) is a compilation of computer application activities extracted from 32 surveys returned. Only those organization/activities which indicated the use of computers in training are shown in this table.

b. The table shows the courses and the percentage of each course that uses one or more of the instructional methods of CAI, CDI, and CMI. Information was requested on four categories of courses which include hard skill MOS/ASI producing courses in installation or maintenance of equipment, specialist courses devoted to operation of equipment, specialist (other) courses, and all remaining courses of instruction which do not fit the above 3 categories.

c. The table also provides the number of hours required for the average student to proceed through the computerized portion of training using one or more of the instructional methods.

d. Respondents were requested to list the primary instructional modes used for that portion of the course where one or more of the computerized instructional methods were used.

e. Column E of the table provides the percentage of methods (CAI, CDI, CMI) used for each course. The percentages given for each course total 100 percent.

f. Total student contact hours (Column F) to the date of survey completion by the respondent reflects hours for that portion of each course which uses computerized training.

g. Provides the number of months of operation of the computerized portion of each course.

h. Column H indicates whether the course is systems engineered as prescribed in TRADOC REG 350-100-1, SYSTEMS ENGINEERING OF TRAINING.

Implications

a. Typical Applications to Training It is implied from Table 2 that the use of computers in training is primarily directed toward simulation and gaming, drill and practice, practical exerciees, problem solving, and in support of ADP training.

b. Tutorial Instruction A significant tutorial activity not shown on the table, and which consisted of 102 hours of instruction, was presented to 1300 students for a total of 132,600 student-contact hours at the US Army Signal Center and School, Fort Monmouth, New Jersey. This resulted in the establishment of a recommendation that action be taken to develop, test, and evaluate a large scale prototype Computer Assisted Instruction (CAI) System. The Product Manager, Computerized Training System (CTS) Project has been so tasked.

Summary of Instructional Mode

The following chart is a summary of the modes (Column D of Table 2) for TRADOC and DA organizations and activities.

Mode	Number of Schools		Number of Instructional Hours	
	TRADOC	DA	TRADOC	DA
Tutorial	6	2	261.0	38.0
Drill & Practice	2	2	345.5	73.0
Simulation and Gaming	5	1	378.0	218.0
Practical Exercise	1		3.0	
ADP Programming	1		100.0	
Other Instruction	1	1	688.0	177.0

Summary of Computer Application in Training

a. Approximately 18 respondents indicated that computers are used in some form of training.

b. One hundred and sixteen courses were presented in the activity table of computer applications. The percentage of use of CAI, CDI, CMI, or CTS for the 116 courses ranged from 0.01 percent to 100 percent. A further breakdown of the number of courses shows that 18 courses (Type A) result in the award of an MOS or ASI in which the major portion of training is devoted to the development of hard skills associated with the installation and maintenance of equipment. Seven courses (Type B) in which the major portion of training is devoted to hard skills in the operation of equipment. Thirty-five courses (Type C) are either tutorial, drill and practice, simulation and gaming, or a combination of modes utilizing one or more of the computerized instructional methods. These courses are not involved in the installation, maintenance, or operation of equipment. Fifty-six courses (Type D) are drill and practice, tutorial, problem solving, simulation and gaming, and other training functions.

Instructional Model and Strategies

a. In Table 3 (Annex D), respondents were asked to supply information pertaining to their instructional model and strategies as defined in the glossary of Questionnaire A.

b. Information requested concerning model, strategies, and description are listed on the left side of the table. Each responding organization/activity is shown on a separate page of Table 3.

c. Although the respondents in Table 3 indicated that same form of model is being used, it is interesting to note that the interpretation of the definition of "Instructional Model" in the glossary of Questionnaire A varies among the respondents. This reaction leads to the conclusion that standardized definitions of terminology should be of primary consideration in the implementation of computers for training.

Records

a. Table 4 (Annex E) provides a descriptive name for the records being maintained, the purpose for maintaining the record, and the method of collection and processing. The records may be collected automatically or manually. If automatic, the table shows whether they are processed on a real-time (RT) or a background-job (BJ) basis.

b. It should be noted that only five of the respondents indicated that some form of records are maintained by the computer in support of training activities. Three of these respondents are TRADOC schools, two are DA activities/organizations.

Personnel Organization for Course Development

The following respondents indicated the organization (teams, one-man concept, or assembly line) of personnel or provided an explanation of the manner in which personnel were used in course development.

a. US Army Command and General Staff College

An author/instructor, from an academic department, is assigned the responsibility to develop a block of instruction. If the block of instruction requires computer support, technical assistance is provided by the CGSC-MISO.

b. US Army Infantry School

Personnel for course development are organized as a team. This team consists of a Primary Instructor, a Computer Programmer, and an Educational Specialist or Project Officer.

c. US Army Missile and Munitions Center and School

Personnel for course development are organized as a team. This team consists of Subject Matter Specialists and Instructional Programmers.

d. US Army Quartermaster School

Personnel for course development are organized as a team. Systems Analysts work with Instructors to design Computer Assisted Instruction (CAI) applications. Instructors conduct the resulting simulation and games.

e. US Army Ordnance Center and School

Personnel for course development are organized as three 2-man teams.

f. US Army Communications Electronics School

Personnel for course development are organized under the one-man concept for course development: in the one-man concept for course development, an Instructional Programmer performs the basic operations required to prepare course materials for entry into the Computerized Training System (CTS). This requires specialized Display Planning Guides to facilitate the preparation of course material prior to entry into the Computerized Training System. Also, a simplified coding process must be implemented so that the Instructional Programmer can furnish the necessary commands to the computer to assure proper execution of the instructional strategies and techniques used to present the subject matter. This implies that the Instructional Programmer must have a practical knowledge of the Computerized Training System Language which contains the necessary commands for presentation of the subject matter.

g. US Army Signal School

Personnel organization for course development is determined by each academic course when they start development and will vary from course to course.

h. US Army Transportation School

Personnel for course development are organized as teams.

i. US Army Logistics Management Center

Personnel for course development are organized as teams.

j. US Army Security Agency Training Center and School

Personnel for course development are organized as teams.

k. US Army Academy of Health Sciences

Personnel for course development are organized under the one-man concept. Instructors are designers, authors, and implementors.

Location of Organization/Activity in the Organizational Chart

The following respondents have indicated, in the survey, the location of the computer application function within their organization.

a. US Army Command and General Staff College

The computer application function, from a technical assistance point of view, is located in the CGSC-MISO (a staff position which reports directly to the Deputy Commandant). From a concept development point of view, the function is located in the Academic Departments.

b. US Army Engineer School

ADPE instruction is given by the Department of Engineering Science. ADPE is managed by the Data Systems Branch of the Office of the Secretary.

c. US Army Field Artillery School

The computer application function is located in Target Acquisition Department.

d. US Army Infantry School

The program review and design of the computer application function is located in the DET. The operations portion of the computer applications function is located in the MISO.

e. US Army Military Police School

The computer application function of Computer Assisted Instruction is within the Media Branch which is under the Instructional Technology Division.

f. US Army Missile and Munitions Center and School

Currently, the CAI function is located within the Deputy Commandant, Training and Education Element of the organization.

g. US Army Quartermaster School

The Data Systems Branch is assigned to the Office of the Secretary and has the mission to support Computer Assisted Instruction.

h. US Army Ordnance Center and School

Personnel involved in the computer application function are located in the Office of the Deputy Commandant for Training and Education.

i. US Army Communications Electronics School

The Product Manager's Office, Computerized Training System Project, is an activity of the Training and Doctrine Command (TRADOC).

j. US Army Signal School

The computer application function is under the Deputy Commandant for Training and Education.

k. US Army Transportation School

The computer time-sharing system for educational use is controlled by the Automatic Data Processing (ADP) Section which is located in the Department of Military Arts which is one of the three Academic Departments in the School under the Commandant.

l. US Army Logistics Management Center

The computer application function is located in the Computer Science Department of the School of Management Information Systems (SMIS) (AMXMC-C).

m. US Army Security Agency Training Center and School

The Automatic Data Processing (ADP) function is part of the Organization of the Instructional Support Department under the Deputy Commandant for Training and Education.

n. US Army Academy of Health Sciences

The computer application function designated as the LRB, is located under the Assistant Superintendent for Resident Instruction and Extension Services.

Computer Hardware/Software

a. Table 5 (Annex F) shows hardware/software used where some form of computer application to training was indicated in the survey form by the respondent. The capacity of core memory and disk/drum storage units; the type of computer language (FORTRAN, COBOL, ALGOL, etc.) used in programming; and whether the system is owned, shared, or leased is shown in the table. If the system is shared, the respondents were asked to indicate percentage of time devoted to computerized training activities.

b. The table shows that a variety of hardware/software is presently being used in the various TRADOC and DA organizations/activities. This indicates that there is an apparent lack of standardization or direction on the use of computerized training systems.

c. The storage capacity of the available core and disk/drum units of the hardware is determined by the type of computer employed by the responding organizations/activities. It should be noted that the core memory capacity and the disk/drum storage capacity varies from very small to very large.

d. The survey requested that the respondents indicate the computer language used in programming or in support of training activities. There is a variety of languages used, however, the survey indicates a predominant use of FORTRAN as an ADP programming language. TUTOR is used in two of the responding activities and appears to be the only authoring language in use (other than the Army's CLASS I) which does not require extensive programming knowledge for Instructional Programmer implementation in a computerized training system.

e. The "System" column in Table 5 requested that the respondents indicate whether the hardware system is owned, shared, or leased. An overview of the table shows a predominance of ownership of hardware in the various organizations/activities.

Terminals, Carrels, Media, and Language

Table 6 (Annex G) shows types of student terminals and capabilities, carrel design and capabilities, media devices, whether or not these devices are computer controlled, and the available authoring language. The respondent organization/activity is shown at the top of each page in the table.

Teletypewriter terminals appear to predominate as interactive display devices. However, some use of CRT and plasma-type terminals is indicated in the table. There were no indications of computer-controlled media or secondary display devices other than at the Communications-Electronics School at Fort Monmouth, N.J.

Representative authoring languages indicated in the table are:

TEACH
CDTS (COBOL BASED)
TUTOR
CLASS I
CASPER
SOURCE (SYMBOLIC)
COURSEWRITER I

Course Material Entry Methods

Table 7 (Annex H) provides information on the method, or methods, for entering course material into the computer for training purposes. Nineteen of the thirty-two organizations and activities returning the survey indicated one or more methods of entry, i.e., cards, tape, or on-line direct.

Eleven of the respondents use cards as a means of entry. Nine respondents use either paper or magnetic tape. Eleven use the on-line direct method of entry. Seven of the respondents use both cards and tape as a means of entering course material. Four activities use both tape and the on-line direct method. Two respondents use all three methods; cards, tape, and the on-line direct method for entering training course material.

Personnel Involved with Computerized Training

a. Table 8 (Annex I) is a compilation of military and civilian personnel involved with computerized training at the various organizations and activities. The respondents were asked to indicate the number of personnel and the percentage of time devoted to their involvement with computerized training.

b. The table shows the requested information for the following personnel to include both military and civilian:

(1) Management

(2) System Analysts

(3) System Operators

(4) Instructional Programmers

(5) Instructors

(6) Education Specialists (Research and Evaluation)

(7) Other

c. The table also provides a column for the respondents to indicate the accumulative sum of man years of experience for all personnel mentioned in para b (1) through (7).

d. The entries from the respondents indicate that both military and civilian personnel are involved in computerized training. The following chart shows the breakdown of personnel involvement.

PERSONNEL	MILITARY	CIVILIAN
MANAGEMENT	18	21
SYSTEMS ANALYSTS	6	15
SYSTEM OPERATORS	12	14
INSTRUCTIONAL PROGRAMMERS	11	7
INSTRUCTORS	71	41
EDUCATIONAL SPECIALISTS (RESEARCH AND EVALUATION)	0	15
OTHER (PROGRAMMERS, INSTRUCTIONAL PROGRAMMER ENTRY SPECIALISTS)	7	6
TOTALS		

e. Of the 244 personnel involved in computerized training, there is a total of 250.21 man years in TRADOC and 148 man years in DA of computer training experience.

Costs

a. Table 9 (Annex J) shows an overview of the subsystem hardware, purchase cost, the year that hardware was obtained, the cost-per-month if the hardware is leased, operational starting date, and the operating costs for FY-74 and proposed cost for FY-75.

b. The table reflects the information supplied by 14 TRADOC and DA organizations and activities who made one or more entries in the table. The remaining 18 respondents either neglected to make entries, or the pertinent data was not available.

Time/Task to Author CAI Lesson Material

a. Table 10 (Annex F) shows how the respondents applied their time to the typical tasks involved in developing one hour (average student completion time) tutorial CAI lesson. Some respondents indicated elsewhere in Questionnaire A that their figures are estimates since no records were kept on course development time/task.

b. Probably one of the most accurate indications of time/task is given by the Communications Electronics School, Ft. Monmouth, New Jersey. These figures are based on those given in the TASK GROUP REPORT, CAI, VOL 1, April 1972, chaired by this activity. The "optimistic", "most likely", and "pessimistic" headings in the Average Time column are related to lesson complexity in the following manner:

(1) Optimistic. A tutorial, conceptual lesson composed primarily of simple slides, interactive display messages, and responses for dialogue, pretests, and post-tests. The strategies are predetermined by following a structured instructional model. No training aids, equipment, or supportive hard-copy literature required.

(2) Most Likely. A tutorial, conceptual lesson following a structured model as above. Some simple equipment operation and theory is involved in the lesson. The student must operate a multimeter or signal generator and learn to adjust a radio-receiver trainer. An Operation Sheet or short Programmed Instruction (PI) text must be generated and a training aid is designed to support the lesson. Some strategies must be developed (but not programmed) to interface the supportive hard-copy literature with the computerized portion of the lesson. Equipment must be set up to author and debug the lesson.

(3) Pessimistic. This type of lesson consists of a mix of conceptual ((1) and (2) above) as well as computer-controlled exercises where maintenance and theory of advanced, complex electronic equipment is taught by the computer as a surrogate instructor. A structured model is followed as above, however, considerably complex

strategies to interface the equipment exercises with the computer must be developed (but not programmed) thus causing the author to deviate extensively from the instructional model.

CTS Orientation and Instruction

a. Table 11 (Annex L) is a compilation of personnel expressing a desire for a orientation or training in Computerized Training Systems (CTS) as indicated in QUESTIONNAIRE B, Annex A.

b. The respondents were requested to indicate their desire for orientation and training at three different levels:

(1) Top Management

(2) Middle Management

(3) Instructional Programmers

c. Respondents were also asked to indicate the average military and civilian grade of the personnel who would attend the proposed courses.

Summary of Interest in Courses

The following chart is a summary of interest indicated in computerized training courses (TABLE 11).

Course	Personnel	Present (FY-75)	Future (FY-6-78)	Totals
A	Mil	67	72	139
	Civ	53	55	108
B	Mil	84	108	192
	Civ	77	97	174
C	Mil	21	54	75
	Civ	19	37	56

LEGEND:

Course A - Top Management (8-hour course)
B - Middle Management (3-day course)
C - Instructional Programming (2-4 week course)

Conclusions

The responses to Questionnaire A used in the survey indicate several important areas for which there is a critical need or guidance and direction in the application and implementation of Computerized Training Systems.

a. Terminology. Definitions of terms were a major stumbling block in interpreting the information supplied in the Questionnaire, the respondents tended to either misinterpret the terms, or use terms which were favored locally.

b. AR 18-1. It is evident from the survey comments that major changes must be made in this document, especially with regard to the use of computers in the training field. The AR encompasses Automatic Data Processing which is but one small segment of the total doctrine which is demanded by the application of the computer to training.

c. Course Development Standardization. Areas of prime consideration for standardization to attain effective utilization of the computer in the preparation and presentation of course material are:

(1) Language (i.e., the simple language the instructor must use to cause computer execution of his lesson).

(2) Models.

(3) Strategies.

(4) Personnel organization (one-man concept, teams, assembly line).

(5) Methods of preparation (on-line, off-line, display guides, cards, tape).

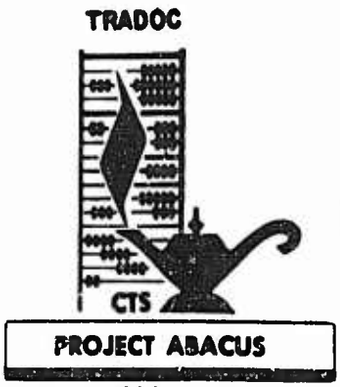
(6) Training (Instructional Programmers, Proctors, Entry Specialists, Programmers, Operators, etc.).

d. Duplication of Effort. It is obvious, from the information supplied in this report, that each organization/activity is acting autonomously in regard to the purchase, sharing, or leasing of hardware and the implementation of software to support their training effort. It is understandable that this would occur because of the proliferation of simulation and gaming activities and the course variables evidenced by the respondents. However, since training is the ultimate aim of the systems indicated in this report, the following points should be considered:

(1) Hardware designed to simulate, analyze, or drill must surely be capable of, and should possibly have as a minimal requirement, the ability to interface with the organization's classroom training activity or other functions.

(2) The design of the Training system, regardless of its application, should be questioned when it does not support the training activity in as many ways as can be effected. Administrative, tutorial, logistic, and evaluation are typical ways to insure maximum effective system use.

(3) When a simulator/trainer-type system is envisioned by an activity, consideration should be given to the integration of student/administrative-interactive terminals and software programs through designed-in system-expansion capabilities.



ANNEX A

QUESTIONNAIRE A

SURVEY OF COMPUTER APPLICATIONS IN ARMY TRAINING

January 1974

Office of the Product Manager
Computerized Training System
US Army Signal Center and School
Fort Monmouth, N. J. 07703

Responding Activity: _____

_____

_____

Purpose: To collect data relative to previous, existing and planned computer applications in training throught TRADOC and DA training activities. By computer applications in training, it is meant the integration of the computer into the classroom as a teaching medium, surrogate instructor, and classroom management tool. This will include data on systems containing computer applications in training, course development and operation of such systems, and personnel and costs associated with these systems.

Instructions: The information in this survey will be useful only to the extent that it is accurate and complete. Read each item carefully and then indicate your answer by marking or writing the information requested. Use-additional paper as required to clarify, expand or complete any response. If approximations are used, please so indicate. A comment sheet appears at the end of the questionnaire so that you can include any additional information pertaining to the items covered in this survey. Your cooperation in this survey is greatly appreciated.

Glossary: A glossary of terms used in this survey appears on the next page. Please refer to the glossary prior to completing the questionnaire.

GLOSSARY

This glossary is provided to clarify the use of terms within the context of this survey.

Course types:

Type	Definition
A	All courses requiring technical training; i.e., any course resulting in the award of a Military Occupational Speciality (MOS) and/or an Additional Skill Identifier (ASI) in which the major portion of training is devoted to the development of hard skills associated with the installation and maintenance of equipment.
B	All specialist courses which are excluded from Type A because major portion of training is devoted to hard skills in the operation of equipment.
C	All specialist courses which do not meet the definition of Type A or B.
D	All other courses which do not meet the definition for Type A, B, or C. These include but are not limited to such course types as Career, Refresher, Orientation, and Peripheral.

Instructional Methods:

CAI - Computer Assisted Instruction. The use of the computer as a multiple instructional mode teaching medium, functioning interactively with the student, providing him with lesson material and evaluating his interaction with the lesson memory.

CDI - Computer Directed Instruction. The interactive use of the computer as an adjunct to and a director of other media of instruction. In this mode, the computer is used to interact periodically to check the student's progress and provide remediation if needed, and further directions on how to proceed. The computer may be one of several media used.

CMI - Computer Managed Instruction. The use of the computer as a classroom management tool. In this mode, the computer is used to grade tests, prescribe remedial work, prescribe lessons to be studied, designate media to be used, schedule equipment and media, and monitor student progress.

CTS - Computerized Training System. The integration of the computer into a totally self-paced training system. In a CTS, the computer serves as a teaching medium, a surrogate instructor, a classroom management tool, and as well as performing many school administrative functions associated with training.

Instructional Mode - Mode of teaching to include: tutorial, drill and practice, simulation and gaming, problem solving and others.

Instructional Model - A specific set of instructional strategies which structure the interactive process between the individual student and the subject matter.

Instructional Programmer - The individual responsible for developing lessons for CTS. The instructional programmer's duties under the "one man concept" in a CTS encompass the following: Authoring of lesson text, both for on and off-line presentations; preparation of the computer coding essential to the execution of the on-line lesson material; testing, debugging and editing of the lessons; and design and development of associated graphics and training devices.

Instructional Strategy - Decision mechanism that allows for selection from the alternative plans of instruction the one that hopefully will lead to an optimal performance level. These instructional plans involve the characteristics of the learner, the structure of the curriculum material being developed, the behavioral processes being utilized by the student, as well as the student's coping behavior that results in maximizing his rewards and minimizing his efforts.

QUESTIONNAIRE A

Survey of Computer Applications in Training

SECTION I - ADMINISTRATIVE:

Organization/Activity_____ Date_____

1. QUESTIONNAIRE RESPONDENT

Name_____ Grade/Rank_____

Position/title_____ Tel #_____

2. Will the above serve as the point of contact for future matters pertaining to CTS? If NO, indicate the point of future contact:

Name_____ Grade/Rank_____

Position/title_____ Tel #_____

3. Is your organization/activity currently involved in some form of computer application in training? YES_____ NO_____
If NO, proceed to Section VII; otherwise, continue.

SECTION II - COMPUTER APPLICATIONS:

1. Complete the activity table at the end of the following instructions:

Column A (Courses) - Provide a brief descriptive title and/or MOS designation for each course currently in operation that utilizes the computer in the CAI, CDI, or CMI instructional methods. In parenthesis, indicate the percentage of the course that uses one or more of the above instructional methods. Example - 31E20 (70)

Column B (Course type) - Provide the letter indicator (A, B, C, or D) as defined in the glossary for each course. Example - A

NOTE: The following items refer only to that portion of the course that utilizes the computer as an instructional medium.

Column C (Course hours) - Provide the number of hours required for an average student to proceed through the computerized portion, using one or more of the instructional methods. Example - 50 hours

Column D (Instructional mode) - Provide the primary modes used as defined in the glossary for that portion of the course utilizing one or more of the computerized instructional methods. Example - Tutorial

Column E (Instructional method) - Provide the percentages of methods used (CAI, CDI, CMI) for each course with percentages for a given course totaling 100%. Example - 50/0/50

Column F (Student contact hours) - Provide the total student contact hours to date for that portion of each course which utilizes a computerized instructional method. Example - 2000

Column G (Operation) - Provide the number of months to date of operation of the computerized portion of each course. Example - 36

Column H (Systems engineered) - Indicate YES or NO if course is systems engineered as outlined in TRADOC REG 350-100-1, "Systems Engineering of Training." Example - YES

Activity Table

(A) Course (%)	(B) Type	(C) Hours	(D) Mode	(E) Method	(F) Contact Hrs	(G) Oper.	(H) Sys. Engr.

NOTE: The following questions apply to the above listed courses only:

2. Instructional model and strategies
   a. Are your courses developed utilizing an instructional model? YES____NO____
   If YES:
   1) Does the instructional model allow for high-middle-low aptitude students?
   Explain:

2) Is branching available both forward and backward?
Explain:

3) What criteria is used for branching; eg, prior experience, prior performance, test results, etc?
Explain:

4) Inclose any documentation on your instructional model or provide a brief description:

b. Inclose any documentation on your instructional strategies or provide a brief description:

3. Complete the Records Table at the end of the following instruction:

(a) Record - Provide a descriptive name for the record being maintained.
(b) Purpose - Provide the purpose for maintaining the record.
(c) Method of collection and processing - Are records collected and processed automatically or manually? If automatic, are they processed on a real-time or background job basis?

Records Table

Record (a)	Purpose (b)	Method (c)			
		Collection		Processing	
		Man.	Auto. RT-BJ	Man.	Auto. RT-BJ

NOTE: RT = Real Time, BJ = Background Job

4. Indicate how personnel are organized for course development; i.e., teams, one man concept, assembly line:

5. Where in the organizational chart of your activity is the computer application function located? (Inclose organizational chart if appropriate.)

SECTION III - COMPUTERIZED TRAINING SYSTEMS:

1. List hardware/software systems currently being utilized for some form of computerized training activity:
(Give Name and brief description of each and include literature, photos and sketches if available.

2. What is the available core and disk/drum units for use with each of the above systems?

3. What standard computer languages, i.e., FORTRAN, COBOL, Basic, Algol are available?

4. Is the system owned, shared or leased?
   If shared, what percentage is devoted to computerized training activity?

5. What type terminals are used, and what are their capabilities?

6. Are student carrels used, and if so, how are they designed?

7. What additional media devices are utilized in training and are they computer controlled?

8. Is there an authoring language available?
   YES_____ NO_____
   If YES, describe:

9. What method is used to enter course material: i.e., cards, tape, on-line direct?

SECTION IV - PERSONNEL

1. Complete the following table concerning personnel involvement with computerized training:

NOTE: % refers to the percentage of time devoted by individuals to computerized training activities; eg, 3 instructors utilized 100% and 2 utilized 50% would be 3 (1) + 2 (.5) = 4/5 = 80%.

Therefore, the table entry would be N/% or 5/80, where N is the number of individuals in the category.

Personnel Table

Type	Civilian N/%	Military N/%
Management		
Systems Analysts		
Systems Operators		
Instructional Programmers		
Instructors		
Ed Spec (Research & Eval)		
Other (Specify):		

2. For the above personnel, what is the total computerized training experience in man-years; eg, the sum of the total experience for all personnel?

SECTION V - COSTS

1. List major system hardware/software groupings:

Sub System	Purchase (cost)	Year	Lease Mthly Cost	Starting Date

2. What is your FY-74 and proposed FY-75 operating cost exclusive of costs included in the table above?

3. Complete the following based on your experience concerning average time/task required to author one hour of CAI material in the tutorial mode:

Task	Average Time
Preliminary Planning	
Develop Strategy	
Prepare Lesson Outline	
Equipment Set-up Procedures	
Authoring Text (writing, typing, coding)	
Training Aids	
Photography	
Debugging (Purify lesson)	
Trials (lesson reviews by second party)	
Revisions	
Evaluation (Analyze data and revise)	
Coordination	
Graphics (Sketch generation)	
Reference literature, advanced worksheets, etc.	
Other (Specify):	
	Total

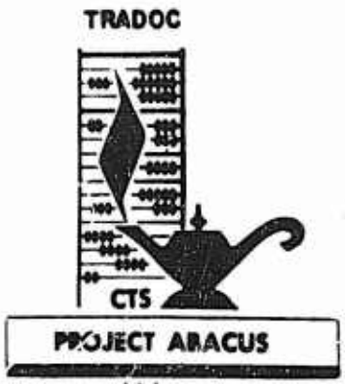
SECTION VI - DOCUMENTATION:

1. Please inclose any documentation concerning any of the above questions or any staff/technical reports concerning your computerized training activity.

SECTION VII - FUTURE ACTIVITY:

1. Describe any planned or anticipated computerized training activity to include scope, system identification and descriptions, course development and operation personnel, cost, scheduling and objectives:

2. Your comments concerning this survey or any additional topics in computerized training would be greatly appreciated.
Comments:



QUESTIONNAIRE B

ORIENTATION AND INSTRUCTION

IN

COMPUTERIZED TRAINING SYSTEM (CTS)

January 1974

Office of the Product Manager
Computerized Training System
US Army Signal Center and School
Fort Monmouth, N. J. 07703

Responding Activity: _____

_____

_____

Purpose: To survey interest and desired participation in an orientation and/or instruction in the concepts and principles of computerized training as developed by the Product Manager, Computerized Training System (CTS) Project.

Description: Courses are presently being considered for top managers (Command, Primary Staff, Department and Division Chiefs), middle managers (staff, course, branch, and section chiefs), and instructional programmers (course authors). The POI for these courses, described below, are in the developmental stages, and your comments and indicated interest would be appreciated.

Course A - Computerized Training System (CTS) Top Management

Purpose: To provide the top manager with an orientation on the concepts and philosophy of a Computerized Training System to include the system, its use and capabilities; the principles of instructional models and strategies; and future implications.

Prerequisites: None

Length: 8 hours

Location: Tentatively, US Army Communications Electronics School, Fort Monmouth, N.J. 07703

Course B - Computerized Training System (CTS) Middle Management

Purpose: To provide the middle manager with a working knowledge of the concepts of a Computerized Training System to include the system, its use and capabilities, and the principles of instructional models and strategies.

Prerequisites: None

Length: 3 days

Location: Tentatively, US Army Communications Electronics School, Fort Monmouth, N.J. 07703

Course C - Computerized Training System (CTS) Instructional Programming

Purpose: To provide the instructional programmer with a working knowledge of computerized training system instructional programming to include instructional principles and procedures, system engineering of training, graphics, program text writing, instructional models and strategies, effective writing for computer assisted instruction (CAI), instructional programming commands, and on-line operations.

Prerequisites:

1. Qualified and experienced in an MOS.

2. 115 or higher in GT aptitude area.

3. Expressed desire to become an Instructional Programmer.

Length: 4 weeks

Location: Tentatively, US Army Communications Electronics School, Fort Monmouth, N. J. 07703

Based upon the above tentative course descriptions please complete the following:

	Desirable Now		Desirable Future		Estimated Attendance		Estimated Avg. Grade	
Course	Yes	No	Yes	No	Mil	Civ	Mil	Civ
A								
B								
C								

Comments:

ANNEX B

TABLE 1. Computer Application in Training

Responding Organization/Activity	Yes	No
Defense Information School		X
Defense Language Institute		X
US Army Command and General Staff College	X	
US Army Air Defense School		X
US Army Armor School	Not as defined in Glossary for CAI, CDI, or CMI instructional methods.	
US Army Chaplain Center and School		X
US Army Engineer School	X	
US Army Field Artillery School	X	
US Army Infantry School	X	
US Army Administration Center		X
US Army Intelligence Center and School		X
US Army Military Police School	X	
US Army Missile and Munitions Center and School	X	
US Army Quartermaster School	X	
US Army Ordnance Center and School	X	
US Army Communications Electronics School	X	

TABLE 1. Computer Application in Training (Cont)

Responding Organization/Activity	Yes	No
US Army Signal School	X	
US Army Transportation School	X	
US Army Women's Army Corps Center and School		X
US Army Aviation School	X	
US Army Institute for Military Assistance	X	
US Army SGM Academy		X
Brooke Army Medical Center		X
Letterman Army Medical Center		X
US Army Logistics Management Center	X	
US Army Management Engineering Training Agency		X
US Army Management School	Consolidated with US Army Logistics Management Center	
US Army Medical Department Veterinary School		X
US Army Security Agency Training Center and School	X	
US Army War College		X
Walter Reed Army Medical Center Institute of Research		X
US Army Military Academy		X
US Army Academy of Health Sciences	X	

ANNEX C

TABLE 2. Activity Table of Computer Applications

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contract Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineered
Command and General Staff College	CGSO Course	(0.03)	D	688.0	CSI CBI	0/0/0 20/80/0	59.0	63.0	No
	NOTE. Common curriculum only. Elective courses depend on what each student takes. The CGSO course is designed and structured so that each graduate has obtained a certain level of expertise in the functions of a Commander/Staff Officer.								
Engineer School	Eng O Advanced	(80.0)	D	16.0	Drill & Practice	100/0/0		72.0	Yes
	Eng NCO Advanced	(15.0)	D	3.0	"	100/0/0		36.0	Yes
	Advanced Instr. Training	(5.0)	D	1.0	Tutorial	100/0/0		40.0	No
Field Artillery School	26B20	(3.0)	A	20.0	"	100/0/0	1,000.0	24.0	Yes
Infantry School	Infantry Officer Advanced	(0.7)	D	6.0	Drill & Practice	100/0/0	8,838.0	33.0	No
	IOAC (NR/R)	(1.4)	D	2.0	"	100/0/0	1,134.0	19.0	Yes
	Infantry Mort Plt	(6.5)	B	14.0	"	100/0/0	3,430.0	19.0	Yes
	Platoon SCOC (RC)	(2.6)	D	1.0	Drill & Practice	100/0/0	204.0	11.0	No
	OC (RC)	(0.2)	D	6.5	"	100/0/0	214.0	17.0	No
	BIOCC	(0.2)	D	1.0	"	100/0/0	479.0	34.0	Yes
	BNCOES	(5.0)	D	22.0	"	100/0/0	21,230.0	16.0	Yes

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] System Engineered
Military Police School	Criminal Investigators Course	(0.01)	A	1.0	Practical Exercise	100/0/0	500.0	10.0	Yes
	NCO Advanced Crs	(0.01)	A	0.5	"	100/0/0	100.0	3.0	Yes
	MP Investigators Course	(0.01)	A	0.5	"	100/0/0	50.0	3.0	Yes
	MP Officer Advanced Course	(0.01)	A	1.0	"	100/0/0	150.0	10.0	Yes
Ordnance Center and School	44E20	(10.0)	A	51.0	Tutorial	90/0/10	*0.0	0.0	Yes
	Test Construction	(50.0)	D	6.0	"	90/0/10	* 0.0	0.0	Yes
	Instructor Training	(50.0)	D	6.0	"	90/0/10	* 0.0	0.0	Yes
Missile and Munitions Center and School	4F04516	(4.0)	A	25.0	Simulation	100/0/0	4,575.0	38.0	Yes
	1-FM-C42A	(4.0)	A	21.0	"	100/0/0	525.0	32.0	Yes
	1-FM-C40A	(6.0)	A	30.0	"	100/0/0	2,175.0	30.0	Yes
	1-AD-C42B	(4.0)	A	21.0	"	100/0/0	1,008.0	24.0	Yes
	1-AD-C40B	(8.0)	A	30.0	"	100/0/0	2,940.0	26.0	Yes
	21L20	(1.0)	A	12.0	"	100/0/0	410.0	2.0	Yes

*Operational test to begin 1 July 1974.

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineered
Quartermaster School	551-76P20[a]	(11.3)	C	36.0	Simulation	100/0/0	16,272.0	46.0	Yes
	5 SU-C40A[b]	(0.83)	D	1.0	"	100/0/0	80.0	46.0	No
	8 B-4960[c]	(2.5)	C	12.0	"	100/0/0	60.0	60.0	No
	8-PT-C42[d]	(1.5)	D	6.0	"	100/0/0	18.0	16.0	No
	8-B-4201/761A/ 762A[e]	(9.5)	C	36.0	"	100/0/0	828.0	31.0	No
	551 F5[f]	(6.4)	C	23.0	"	100/0/0	69.0	10.0	No
	8-10-C22[g]	(2.4)	D	36.0	"	100/0/0	576.0	96.0	No
	8E-4112/021A, 800-00J50[h]	(2.9)	C	8.0	"	100/0/0	64.0	12.0	No
Signal School	SOAC	(0.07)	D	1.0	Tutorial	100/0/0	280.0	12.0	No
	SOBC	(0.4)	D	2.0	Prob Sol	0/100/0	300.0	12.0	Yes

LEGEND: [a]Stock Control & Accounting
[b]Supply NCO Basic
[c]Petroleum Officer Course
[d]Petroleum NCO Advanced Course
[e]Sup Mgt Off
[f]NCO Log Program
[g]Advanced Course
[h]Open Mess Mgt

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineered
Signal School (Cont)	W/O	(0.4)	D	4.0	Tutorial	100/0/0	80.0	6.0	No
	Faculty Development	(2.0)	D	2.0	"	100/0/0	480.0	9.0	Yes
	31Z40	(0.5)	C	4.0	"	100/0/0	120.0	6.0	Yes
	31J20	(0.3)	A	2.0	"	0/100/0	* 0.0	1.0	Yes
	NCOES	(0.4)	D	4.0	"	100/0/0	432.0	12.0	Yes
	35L20	(0.1)	A	1.0	"	100/0/0	50.0	10.0	Yes
	31N20	(0.2)	A	1.0	"	100/0/0	40.0	8.0	Yes
	SOAC**		D				28,000.0	12.0	No
Transportation School	Avionics Maint Off Crse Phase I	(0.4)	D	2.0	Sim & Gaming	100/0/0	2,905.0	60.0	Yes
	Mar Eng Off Adv Crs	(0.4)	D	2.0	"	100/0/0	63.0	36.0	No
	NCOES (A)	(0.4)	D	1.0	"	100/0/0	485.0	24.0	Yes
	Trans Off Adv Crs	(3.4)	D	39.0	" [a]	100/0/0	1,356.0	60.0	No

[a] Also includes writing and running simple BASIC Programs.

*This lesson has just been completed.

**This is a 100-hour block of instruction to teach Automatic Data Processing Systems and programming to SOAC. The computer is used in support of the training.

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineering
Aviation School	93H20 Control Tower Operator		B		Simulation		2,620.0	Starting Date April 71	Yes
	93J20 Ground Control Approach		B		"		28,944.0		Yes
	93K20 Approach Control		B		"		35,073.0		Yes
	NCOES for the 93 Career Management Field		B		"		6,480.0		Yes
	NCOES Advanced Course for 93 Career Management Field		B		"		2,835.0		Yes
	Officer W/O Air Traffic Control Crs		B		"		816.0		Yes
	NOTES: Starting date and totals of student contract hours are approximations. Refresher training is also provided in addition to courses for field units.								
Logistics Management Center	ADP Audit & Retrieval Techniques	(32.0)	D	13.0	Drill & Practice	100/0/0[1]	897.0[2]	13.0	No
	ADP for Audit Executives	(15.0)	D	6.0	"		138.0	6.0	No
	ADP for Auditors	(11.0)	D	13.0	"		1,235.0	14.0	No
	Advanced Decision Risk Analysis	(38.0)	D	30.0	Network Analysis		2,460.0	12.0	No

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineered
Logistics Management Center (Cont)	Army Installation Mgt 1B-F1	(2.0)	D	2.0	Report Generation		1,722.0	34.0	Yes
	Army Integrated Materiel Sys Mgt 8A-F16	(2.0)	D	4.0	Sim & Gaming		5,565.0	52.0	Yes
	Army Management Information Sys 7E-F21	(15.0)	D	6.0	Drill & Practice		2,940.0	32.0	No
			D	6.0	Sim & Gaming		2,940.0		
	Decision Risk Analysis	(38.0)	D	30.0	Network Analysis		12,900.0	6.0	No
	Decision Risk Ana. for Logisticians	(42.0)	D	4.0	Sim & Gaming		392.0	5.0	No
			D	30.0	Network Analysis		2,940.0		
	Hq Mgt Information System	(100.0)	D	24.0	Drill & Practice		1,320.0	3.0	No
	Logistician Seminar	(15.0)	D	12.0	Sim & Gaming		1,308.0	8.0	No
	Logistics Executive Development 8A-F17	(5.0)	D	5.0	Drill & Practice		2,185.0	48.0	No
			D	32.0	Sim & Gaming		13,984.0		
	Logistics Mgt Crs for Auditors	(25.0)	D	20.0	"	"	7,200.0	134.0	No
	Logistics Support Design Mgt	(9.0)	D	6.0	Network Analysis		1,878.0	42.0	No
			D	9.0	Sim & Gaming		2,817.0		

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] System Engineered
Logistics Management Center (Cont)	Maintenance Mgt 8A-F3	(14.0)	D	33.0	Sim & Gaming		45,309.0	202.0	Yes
	Associate Log Executive Development (RC) 8A-F19	(12.0)	D	10.0	" "		23,600.0	140.0	No
	Commodity Command Standard Sys Crses (CCSS)								
	CCSS Army Stock Fund	(7.0)	C	8.0	Tutorial, Drill & Practice	75/0/25		42.0	No
	CCSS PEMA	(7.0)	C	8.0	" "	75/0/25		42.0	No
	CCSS Cataloging	(7.0)	C	8.0	" "	75/0/25		42.0	No
	CCSS Procurement and Production	(7.0)	C	8.0	" "	75/0/25		42.0	No
	CCSS Provisioning	(7.0)	C	8.0	" "	75/0/25		42.0	No
	CCSS Stock Control	(7.0)	C	8.0	" "	75/0/25		42.0	No
	CCSS Supply Mgt	(7.0)	C	8.0	" "	75/0/25	Total 63,952.0	42.0	No
	Cost Analysis for Decision Making	(12.0)	D	20.0	Curve Fitting		860.0	6.0	No

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineered
Logistics Management Center (Cont)	Cost Estimating for Engineers	(52.0)	D	21.0	Cost Estimation		5,481.0	27.0	No
	Operations Research/ Systems Analysis Executive 5A-F4	(8.0)	D	12.0	Sim & Gaming		6,240.0	34.0	No
	Property Disposal Operations 8G-F1	(4.0)	D	6.0	Drill & Practice		1,014.0	20.0	No
	Research & Development Mgt 5L-F3	(8.0)	D	6.0	Sim & Gaming		5,088.0	96.0	No
	Defense Advanced Inventory Mgt 8B-F12	(12.0)	D	25.0	"	"	20,650.0	116.0	Yes
	Defense Depot Operations Mgt 8B-F10	(8.0)	D	18.0	"	"	15,552.0	118.0	Yes
	Defense Integrated Data Systems (DIDS)	(12.0)	D	2.0	See 3 below	0/0/100	300.0	2.0	No
	Defense Inventory Mgt 8B-F11	(11.0)	D	27.0	Sim & Gaming		30,132.0	117.0	Yes
	System Wide Project for Electronic Equipment at Depots Extended (SPEEDEX) Courses:								
	Shipment Planning (General Supplies-GS)	(10.0)	C	2.0	See 3 below	0/0/100		47.0	No

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course		(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineered
Logistics Management Center (Cont)	System Wide Project for Electronic Equipment at Depots Extended (SPEEDEX) Courses:								
	Stock Selection (GS)	(12.0)	C	2.0	See 3 below	0/0/100		47.0	No
	Receiving (GS)	(17.0)	C	2.0	" "	0/0/100		47.0	No
	Receiving Ammo	(20.0)	C	2.0	" "	0/0/100		47.0	No
	Quality Control (Supply)	(14.0)	C	2.0	" "	0/0/100		47.0	No
	Quality Control (Maintenance)	(17.0)	C	2.0	" "	0/0/100		47.0	No
	Location (GS)	(17.0)	C	2.0	" "	0/0/100		47.0	No
	Location (Ammo)	(20.0)	C	2.0	" "	0/0/100		47.0	No
	Transportation	(10.0)	C	2.0	" "	0/0/100		47.0	No
	Ammunition Surveillance	(18.0)	C	2.0	" "	0/0/100		47.0	No
	Ammunition Issues & Shipment Planning	(12.0)	C	2.0	" "	0/0/100		47.0	No
	Installation Operating Equipment Mgt	(14.0)	C	2.0	" "	0/0/100		41.0	No
	Property Book	(17.0)	C	2.0	" "	0/0/100		41.0	No

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization / Activity	(A)[1] Course		(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] System Engineered
Logistics Management Center (Cont)	Army Stock Fund	(12.0)	C	2.0	See 3 below	0/0/100		41.0	No
	Production Planning & Control (PP&C) (Maintenance)	(5.0)	C	2.0	" "	0/0/100		41.0	No
	Defense Integrated Mgt Engineering Sys (DIMES)	(17.0)	C	2.0	" "	0/0/100		41.0	No
	Procurement History	(17.0)	C	2.0	" "	0/0/100		41.0	No
	Installation Supply Accounting	(17.0)	C	2.0	" "	0/0/100		41.0	No
	PP&C (Supply)	(12.0)	C	2.0	" "	0/0/100	Total 25,870.0	41.0	No
Security Agency Center & School	98B20	(5.0)	C	20.0	Drill	0/0/100		120.0	No
	*98C20		C		"	0/0/100			No
	*33 Series		A		"	0/0/100			No
	Practice Message Manipulation		C		"	0/0/100			No
	Basic Morse Code		A	260.0	"	100/0/0		55.0	No

LEGEND:

1. 100/0/0 in every case except as indicated.
2. Since 1 Jan 65 for all entries.
3. Exam Grading and Student Record Keeping Only.

*Note: Developed as feasibility studies.

TABLE 2. Activity Table of Computer Applications (Cont)

Responding US Army Organization/ Activity	(A)[1] Course	%	(B)[2] Type	(C)[3] Hours	(D)[4] Mode	(E)[5] Method	(F)[6] Contact Hours	(G)[7] Operation (Months)	(H)[8] Systems Engineered
Academy of Health Sciences	91S10		A	3.0	Practice	100/0/0	Unknown	36.0	No
	C-22 Advanced Officer		D	3.0	"	100/0/0	"	42.0	No
	Faculty Development		A	2.0	Tutorial & Simulation	100/0/0	"	47.0	No
	Author Development		D	30.0	Tutorial	100/0/0	"	30.0	N/A

LEGEND:

1. Column A (Courses) - Provide a brief descriptive title and/or MOS designation for each course currently in operation that utilizes the computer in the CAI, CDI, or CMI instructional methods. In parenthesis, indicate the percentage of the course that uses one or more of the above instructional methods. Example - 31E20 (70).

2. Column B (Course type) - Provide the letter indicator (A, B, C, or D) as defined in the glossary for each course. Example - A.

3. Column C (Course hours) - Provide the number of hours required for an average student to proceed through the computerized portion, using one or more of the instructional methods. Example - 50 hours.

4. Column D (Instructional mode) - Provide the primary modes used as defined in the glossary for that portion of the course utilizing one or more of the computerized instructional methods. Example - Tutorial.

5. Column E (Instructional method) - Provide the percentages of methods used (CAI, CDI, CMI) for each course with percentages for a given course totaling 100%. Example - 50/0/50.

6. Column F (Student contact hours) - Provide the total student contact hours to date for that portion of each course which utilizes a computerized instructional method. Example - 2,000.

7. Column G (Operation) - Provide the number of months to date of operation of the computerized portion of each course. Example - 36.

8. Column H (Systems engineered) - Indicate YES or NO if course is systems engineered as outlined in TRADOC REG 350-100-1, "Systems Engineering of Training." Example - YES.

ANNEX D

TABLE 3. Instructional Model and Strategies

US Army Field Artillery School

Question	Response
Are courses developed using instructional model?	Yes
Does instructional model allow for High-Middle-Low aptitude students?	Yes Individual differences between students are minimized by careful selection of class members. This results in a class that is composed of individuals of similar aptitudes. This is necessary due to the limitations of the hardware.
Is forward and backward branching available?	Yes. Branching is automatic or at the student's discretion.
What criteria is used for branching?	Prior experience.
Documentation or brief description of model.	Instructional model is drill and practice.
Brief description of strategies.	Instruction is presented in a linear manner with reinforcement on an as-needed basis.

TABLE 3. Instructional Model and Strategies (Cont)

US Army Infantry School

Question	Response
Are courses developed using instructional model?	Yes
Does instructional model allow for High-Middle-Low aptitude students?	Yes
Is forward and backward branching available?	No - (Minimal)
What criteria is used for branching?	Branching is used only in practical exercise results. The student is recycled through a question 2 or 3 times for a wrong answer and is then given assistance by an instructor.
Documentation or brief description of model.	
Brief description of strategies.	

TABLE 3. Instructional Model and Strategies (Cont)

US Army Military Police School

Question	Response
Are courses developed using instructional model?	Yes
Does instructional model allow for High-Middle-Low aptitude students?	No
Is forward and backward branching available?	Yes
What criteria is used for branching	Prior performance and test results.
Documentation or brief description of model.	Instructional models are established by the instructor.
Brief description of strategies.	

TABLE 3. Instructional Model and Strategies (Cont)

US Army Missile and Munitions Center & School

Question	Response
Are courses developed using instructional model?	The instructional model is designed based on the simulation mode and is not applicable here.
Does instructional model allow for High-Middle-Low aptitude students?	No
Is froward and backward branching available?	No
What criteria is used for branching?	None
Documentation on brief description of model.	None
Brief description of strategies.	None

TABLE 3. Instructional Model and Strategies (Cont)

US Army Ordnance Center and School

Question	Response
Are courses developed using instructional model?	Yes
Does instructional model allow for High-Middle-Low aptitude students?	No
Is forward and backward branching available?	Yes. Forward branching is usually determined by student success and may be either student initiated or computer initiated. Backward branching is usually computer initiated.
What criteria is used for branching?	Prior experience, prior performance, and test results.
Documentation or brief description of model.	None
Brief description of strategies.	1. Provide a path directly from the Introduction to the Criterion Test as a student option. Success on the Criterion Test exits the student to the Index. Failure on the Criterion Test (as a pretest) takes the student to the first unit following the Introduction. 2. Provide a high-speed path which directly faces the student with each subcriterion in turn. Failure on any subcriterion branches the student to the low-speed teaching path. 3. In the low-speed teaching path, provide mandatory or optional drill in the conversion problems.

TABLE 3. Instructional Model and Strategies (Cont)

US Army Ordnance Center and School

Question	Response
Brief description of strategies. (Cont)	4. Divide the teaching path into three areas: (a) preliminary, (b) conversion of Metric measures into English measures, and (c) conversion of English measures into Metric measures. Provide a -RESTART- capability for each of these areas. Success on an area takes the student back to the high-speed teaching path. 5. Provide an error count for each area which is visible to the student. Presence of any errors within an area is to recycle the student through that area. 6. Piece-part the fourth area "Criterion Test" to force failures to return to Area "a" or Area "b", as appropriate. 7. Provide for complete data collection.

TABLE 3. Instructional Model and Strategies (Cont)

US Army Communications Electronics School

Question	Response
Are courses developed using instructional model?	Yes
Does instructional model allow for High-Middle-Low aptitude students?	Yes
Is forward and backward branching available?	Yes
What criteria is used for branching?	Prior experience, prior performance, and test results.
Documentation or brief description of model.	Advanced model using sophisticated teaching strategies is employed.
Brief description of strategies.	Strategies are determined by the structured Computerized Training System Model.

TABLE 3. Instructional Model and Strategies (Cont)

US Army Signal School

Question	Response
Are courses developed using instructional model?	Yes
Does instructional model allow for High-Middle-Low aptitude students?	Yes
Is forward and backward branching available?	Yes
What criteria is used for branching?	Test results
Documentation or brief description of model.	Advanced model using sophisticated teaching strategies is employed.
Brief description of strategies.	Strategies are determined by the structured Computerized Training System Model.

TABLE 3. Instructional Model and Strategies (Cont)

US Army Security Agency Center and School

Question	Response
Are courses developed using instructional model?	Yes
Does instructional model allow for High-Middle-Low Aptitude students?	Yes
Is forward and backward branching available?	Yes
What criteria is used for branching?	Prior experience, and test results.
Documentation or brief description of model.	None
Brief description of strategies.	In both experimental models, students' experience levels were known. All students had similar MOS training prior to CAI. Programs allowed students to solve various problems, increasing in difficulty under computer control. The program evaluates and notifies students of successful and erroneous performance. The instructor also receives notification of student's performance and is enabled to prescribe corrective measures.

TABLE 3. Instructional Model and Strategies (Cont)

US Army Academy of Health Sciences

Question	Response
Are courses developed using instructional model?	No
Does instructional model allow for High-Middle-Low aptitude students?	No
Is forward and backward branching available?	Yes
What criteria is used for branching?	Prior performance
Documentation or brief description of model.	None
Brief description of strategies.	Author's choice

ANNEX E

TABLE 4. Computer Application for Record Keeping

Responding Organization/ Activity	Record[1]	Purpose[2]	Method of Collection[3]			Method of Processing[3]		
			Manual	Automatic RT	Automatic BJ	Manual	Automatic RT	Automatic BJ
US Army Infantry School	Item Analysis Entire Class	Problem response frequency			X			X
	Student Progress Report	Student responses and time			X			X
	Problem Summary	Problem average time, number and % of errors.			X			X
US Army Ordnance Center and School*								
US Army Signal School	CAI Schedule	Schedule use of lab	X					X
	CE Maintenance Department	Student records	X					X
US Army Logistics Management Center	Course Evaluation	To maintain student ratings of objective achievement, methods of instruction, etc., by class. Cumulative centerwide and course averages are produced for evaluation.	X					X

*Records are not being initiated at this time but will begin on 1 July 1974. Records will be of two types: those required to evaluate the CAI system and those required for administrative purposes. Records will be primarily collected and processed automatically and on a background-job basis.

TABLE 4. Computer Application for Record Keeping (Cont)

Responding Organization/ Activity	Record[1]	Purpose[2]	Method of Collection[3]			Method of Processing[3]		
			Manual	Automatic RT	Automatic BJ	Manual	Automatic RT	Automatic BJ
US Army Logistics Management Center (Cont)	Exam Question Record	Store subject identification data, question text and performance data for exam analysis purposes.	X					X
	Course Record	Store identification data and exam structure for individual courses.	X					X
	Exam Answer Record	Store question structure and answers for specific exams.	X					X
	Logistics Career Program (LCP) Record File	Store data on members of the LCP for use in managing the LCP.	X					X
US Army Academy of Sciences	Log Book	Time Report	X		X			Analysis thru APL
	No response records are kept by the computer.							

LEGEND:
1. Record - Provide a descriptive name for the record being maintained.
2. Purpose - Provide the purpose for maintaining the record.
3. Method of collection and processing - Are records collected and processed automatically or manually? If automatic, are they processed on a real-time or background-job basis?

ANNEX F

TABLE 5. Computer Hardware/Software

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computerized training activity	Leased
US Army Command and General Staff College	CDC 6500 (located at TRADOC's DPFO)	131K Main Memory 500K Extended Core Storage 8 each 841 Disk Drives 4 each 844 Disk Drives	FORTRAN, BASIC, COBOL		X Percent used is estimated at 7% of system capacity.	
	24 each Direct Coupled Model 33TTY 6 each Acoustical Coupled Model 33 TTY 2 each Hazeltine 2000 CRT's					
US Army Engineer School	Dialcom, Inc. Honeywell 1648 and associated hardware	16K core, 28 million characters of disk storage	FORTRAN BASIC			X
US Army Field Artillery School	Computer-Burroughs B3500 (located at Sheppard AFB, TX)	300K core unlimited off-line storage	COBOL	AF lease at Sheppard AFB Base. No cost to Army. USAFS access in time-share mode.		
	Input/Output Device-Burroughs TC521 (located at USAAS, Ft. Sill, OK)		FORTRAN			

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computerized training activity	Leased
US Army Field Artillery School (Cont)	Software-Standard System for CAI undergoing development and usage by the Air Force.		Computer Directed Training System (CDTS) Language			
US Army Infantry School	Honeywell Series 200, Model 200 Computer 65K characters of memory; designed primarily for business applications and jobs involving combined business data communication, and scientific computing; 6 magnetic-tape units, 1 disk unit, console, printer, card reader, card punch, 50 Bunker-Ramo CRT display stations. Mod 1 (Mass Storage Resident) Operating System - designed for foreground/background programming as well as single program execution; COBOL and Easy-Coder assembly language programs.	32K Core, 9.2 million characters per disk.	FORTRAN COBOL		No sharing on system.	
US Army Administration Center	360/30 IBM 1401	128K memory 8 Disk Drives 16K memory 6 Tape Drives				

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computer-ized training activity	Leased
US Army Military Police School	Honeywell. Time sharing. Leased from GSA, Atlanta GA. Communications via Western Union send-received sets via accoustic coupler and five Federal Telecommunications system lines to Atlanta.	64K 24-bit words 12.5 run 18K runbig	FORTRAN BASIC XBASIC		Teleprinters leased from Western Union Data Service	
US Army Missile and Munitions Center and School	The RCA 110 is being used to support the CAI effort. This is the same system described in the CAI Task Group Report, dated APRIL 1972. Recently MMCS obtained approval from TRADOC to use the TREDS Terminal in support of CAI. The TREDS terminal is a DATA 100 Model 70-2 and is scheduled for installation 29 Mar 74. Time sharing support will be from Army Missile Command (IBM 360/65) located on this installation. The software system is described below.	RCA 110-4K core 32K drum	FORTRAN COBOL Machine or Assembler Language		Government owned excess equipment. The TREDS Terminal will be leased. (TREDS will use FORTRAN or COBOL Language.)	

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computerized training activity	Leased
US Army Missile and Munitions Center and School (Cont)	A magnetic tape was acquired from NASA which contained diagnostic programs facilitating checkout of the computer as well as assisting in locating hardware malfunctions. A copy of a magnetic tape containing other diagnostic programs was also obtained from NASA. The two diagnostic tapes are essentially similar but complement each other in some respects. The System Operating Software (SOS) obtained from NASA with the RCA 110 was called DOUP, Display Octal Utility Package. This package allows transfer of operator control of the system from manual control at the control panel to semiautomatic control from the display console. This DOUP system was retained, but with extensive modifications and additions. Original DOUP contained an execuitve routine					

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computer-ized training activity	Leased
US Army Missile and Munitions Center and School (Cont)	and several utility routines which allowed such things as: displaying contents of specified locations on CRT screen, typing same on type-writer, punching same on paper tape, zeroing or other-wise altering any memory locations directly from the display keyborad, tracking a program being executed by displaying register contents and contents of pertinent memory locations as instruc-tions are executed singly under display keyboard control, and several other utility functions. Improved DOUP was developed by MMCS CAI personnel to fa-cilitate the generation and ex-ecution of programs, particularly CAI type programs, at all times maintaining operator control at the display keyboard by mnemonic type entries.					

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computerized training activity	Leased
US Army Quartermaster School	A UNIVAC Series 70/45 computer is shared via an intraservice support agreement with the US Army Logistics Management Center (USALMC), another school at Fort Lee. The following terminal equipment is used by QMS students. IBM 1051 Controller 17 IBM 1052 Printer Keyboard 11 IBM 1053 Printer 6 IBM 1056 Card reader 6 IBM 1058 Card punch 6 UNI 740 Line printer 1	524K bytes core storage 131K for terminal operations	COBOL, Basic Assembly Language. FORTRAN is available.		X	
US Army Ordnance Center and School	14 PLATO IV Plasma Terminals with keyboards. 5 Microfiche Units on order. 4 Touch Panels on order. 1 Audio Unit on order.	Extended core storage and disk units. CDC-6400 U of I C.E.R.L. Urbana, Il.	TUTOR		X Nearly 100% devoted to CTS.	
US Army Communications Electronics School	4 PLASMA IV Terminals with keyboards. 3 Microfiche Units	Extended core storage and disk units. CDC-6400 U of I C.E.R.L. Urbana, Il.	TUTOR	X Terminals owned.	Nearly 100% is devoted to CTS.	

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computer-ized training activity	Leased
US Army Communi-cations Electronics School (Cont)	DEC PDP 11/35	32K Core 2 Disk Drives 1.2 million words per disk drive	MACRO-11 Assembler Language FORTRAN IV			
US Army Signal School	Honeywell G-225 Computer System-a second generation batch processing system with magnetic tape and disk.	G-225 16K 21-bit per word core 18.4 million character disk	FORTRAN BASIC ALGOL	X	G-225	
	General Electric Time-share service - a commercial time-share service with dial-up local connection to central computer in Cleveland, OH.	GE Time Share. No figures.			X 100% usage for CTS	
US Army Transportation School	Commercial Computer time-sharing system to support ADP instruction. CDC-6400 Computer for conversational time sharing.	32K core. Disk/drum units are unknown.	FORTRAN BASIC COBOL	Computer services procured by contract.		

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM Owned	SYSTEM Shared	SYSTEM Leased
US Army Aviation School	Synthetic Flight Training System (SFTS), 2B24, Singer-General Precision, Link Division, The Singer Company	2 Disk Storage Units; 3.6 million per disk	2 Honeywell DDP 516 FORTRAN and Assembly	X		
	No. 1 DDP 516, 16K No. 2 DDP 516, 24K Varian 620i 24K		1 - Varian 620i Assembly			
	The basic computer for device 15G16 is a Xerox Data Systems Sigma 6 System (GP Computer) and peripheral equipment.	8192 words of core memory	Xerox symbol 1 language for Sigma 5 Computer	X		
US Army Logistics Management Center	UNIVAC Series 70/45 Computer	Available core - 524,288 bytes. 8-594 disk units each with a capacity of 29 million bytes.	FORTRAN COBOL	Partly		Partly
US Army Security Agency Center and School	IBM 1401 with a batch tape operation system.	8K, 100K RAMAR	Autocoder FORTRAN	X		
	CDC 1700 with experimental in-house operating system	12K	FORTRAN Machine Language	X		

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared % devoted to computer ized trai.. activity	Leased
US Army Security Agency Center and School (Cont)	Honeywell 516 dedicated but capable of in-house operations.	12K	FORTRAN Digital assembly programming	X		
US Army War College	Honeywell 6060; BUDPRO Budget Projection Model which, when given a GNP growth rate and proposed percentage allocations for the various segments of the economy, calculates the Nation's budget.	BUDPRO Disk 19 blocks for data files, Core 20K	FORTRAN	X		
	Honeywell 6060: PANTHER. A model that computes the cost effectiveness of destroying a target with either bombs or Panther missiles. Users may change any of 16 parameter assumptions in the model. Sensitivity analysis of any one parameter over a desired range is provided.	PANTHER Core 20K	FORTRAN	X		

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC, ALGOL)	SYSTEM		
				Owned	Shared	Leased
US Army War College (Cont)	Honeywell 6060; NEXUS A simple political-economic model which, when given Federal revenue and outlay projections for each of four years, will predict a number of political indicators such as unemployment rate, US world influence, and administration popularity.	NEXUS Disk - 2 blocks for data files Core 20K.	BASIC	X		
	Honeywell 6060; USAWC FORCE COSTING MODEL- A Force Costing Model which calculates the cost of any proposed US Military Force. The data for this program is classified FOR OFFICIAL USE ONLY.	Disk - 100 blocks for data files Core 38K.	FORTRAN	X		
	Honeywell 6060; DIDBARS an information retrieval program which can provide 112 discrete items of information on each of 128 countries of the world, in a variety of formats.	Disk - 400 blocks for data files Core 30K	COBOL	X		

TABLE 5. Computer Hardware/Software (Cont)

Responding Organization/ Activity	Hardware/ Software	Available Core and Disk/Drum Storage Units	Standard Computer Language (FORTRAN, COBOL, BASIC ALGOL)	SYSTEM		
				Owned	Shared % devoted to computerized training activity	Leased
US Army War College (Cont)	Honeywell 6060; IRE - An International Relations Exercise in a hypothetical world consisting of eight nations. Each nation allocates portions of its GNP to various economic sectors in its own nation to maintenance of military and law-keeping forces, and if desired, to subversion of other nations. Interactions between nations are free-form and can consist of activities such as trade agreements, nonaggression pacts, cultural exchanges, U.N. support and many others. All these activities are evaluated by interest groups of varying influence in the nation. The results are measures of public reaction to the activities and are indexes of the ability of a government to stay in power.	Large core - 24K Three cores - 6-12K	FORTRAN	X		
US Army Academy of Health Sciences	IBM 1130/COURSEWRITER I	16K character; 1311 disk drives (4 each)	FORTRAN II COBOL (Compiler so large, programs will not fit.) APL from Trinity University		X 50% of duty day scheduled for CAI	

ANNEX G

TABLE 6. Terminals, Carrels, Media and Language

US Army Engineer School

Information Requested	Description
Terminal Type	16 each ASR 33 teletypewriters with keyboard and paper tape I/O. 1 each CRT (character) 2 each Syner-Data Beta terminals with keyboard I/O.
Terminal Capabilities	
Description of Student Carrels if Used	
Additional Media Devices Used and Description	
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	Yes. TEACH - A Honeywell language developed for writing tutorials.

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Field Artillery School

Information Requested	Description
Terminal Type	Only one terminal is available at USAFAS. It is a Burrough TC 521.
Terminal Capabilities	The TC 521 has a printout capability of 150 words/minute.
Description of Student Carrels if Used	The terminal is situated at the front of a room that has an approximate capacity of 15 students. This arrangement permits only one student at a time to interact with the computer. A closed circuit TV camera is focused on the terminal. Instructions and answers received at the terminal are projected onto two TV monitors for other students in the room.
Additional Media Devices Used and Description	Television and 35mm slide projector are used. These are not computer controlled, but are turned on and off at the instructor's discretion.
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	Yes. Authoring language is CDTS which is COBOL based. Only a simple format is used for program writing.

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Infantry School

Information Requested	Description
Terminal Type	Bunker - Ramo Model 312 CRT display stations.
Terminal Capabilities	Eight lines of 32 characters each, total of 256 character capacity.
Desciption of Student Carrels if Used	
Additional Media Devices	Educational Excellence (EDEX) - not computer controlled, Educational Television - not computer controlled.
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	No

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Military Police School

Information Requested	Description
Terminal Type	2 each Western Union EDT keyboard send-receive sets (EDT 33 ASR Model)
Terminal Capabilities	3 each Western Union EDT keyboard send-receive sets (EDT 33 ASR Model) have capability to receive as well as send information
Description of Student Carrels if Used	
Additional Media Devices Used and Description	None associated with CAI.
Are Additional Media Devices Controlled by Computer?	
Is Authoring Language Available?	No

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Missile and Munitions Center and School

Information Requested	Description
Terminal Type	One terminal is included with the RCA 110 and is used only on an experimental basis.
Terminal Capabilities	
Description of Student Carrels if Used	Student carrels are used in the school but not in CAI. They are used with other media in staff and faculty training.
Additional Media Devices Used and Description	Sony Videocassette Player with 14-inch monitor and and Telex Slide-Sync Player with projector. Nine student carrels with these devices are used in faculty development training.
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	No

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Quartermaster School

Information Requested	Description
Terminal Type	IBM 1050 System Terminals UNIVAC 740 Printer
Terminal Capabilities	IBM 1050: maximum capacity of 14.8 characters-per-second. UNIVAC 740: 300 50-character lines-per-minute.
Description of Student Carrels If Used	
Additional Media Devices Used and Description	
Are Additional Media Devices Controlled by Computer?	
Is Authoring Language Available?	No

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Ordnance Center and School

Information Requested	Description
Terminal Type	14 each PLATO IV Plasma w/keyboards
Terminal Capabilities	Displays written text or two-dimensional graphics.
Description of Student Carrels if Used	Four-foot by four-foot work area. PLATO IV terminal access cutout at rear of carrel. Each carrel separated by five-foot vertical partitions.
Additional Media Devices Used and Description	Black and white TV, Sony TV cassette, Sound/Slide projector, audio tapes and program texts.
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	Yes. TUTOR

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Communications Electronics School

Information Requested	Description
Terminal Type	4 each PLATO IV Plasma w/keyboards 4 each Microfiche projectors, P/O PLATO IV Plasma Display Terminals 1 each PDP 11/35 DEC w/teletypewriter
Terminal Capabilities	PLATO IV displays written text or two dimensional graphics PDP 11/35 DEC is capable of producing hard copy and paper tape
Description of Student Carrels if Used	Five-foot by five-foot work area. PLATO IV terminal access cutout at rear of carrel. Each carrel separated by five-foot vertical partition.
Additional Media Devices Used and Description	Color television set, Sony Videocassette; 3M Model 625 Sound-on-slide projector.
Are Additional Media Devices Controlled by Computer?	Yes. Indirectly
Is Authoring Language Available?	Yes. TUTOR and CLASS I

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Signal School

Information Requested	Description
Terminal Type	Hazeltine 2000 CRT terminals w/keyboard input and thermal printer. KSR 33 teletypewriter terminals.
Terminal Capabilities	
Description of Student Carrels if Used	Student carrels are being designed and developed at this time.
Additional Media Devices Used and Description	Audio notebooks 35mm Projectors TV cassette players
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	Yes. CASPER

TABLE 6. Terminals, Carrels, Media and Lan_ ge (Cont)

US Army Transportation School

Information Requested	Description
Terminal Type	6 each CDC 713 Visual Display Units w/noncontact printers
Terminal Capabilities	The terminals have the capability of operating at both 10 cps and 30 cps.
Description of Student Carrels if Used	
Additional Media Devices Used and Description	
Are Additional Media Devices Controlled by Computer?	
Is Authoring Language Available?	No

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Aviation School

Information Requested	Description
Terminal Type (15G16)	Peripheral: Keyboard/Printer, w/paper-tape punch/reader and controller (ASR-35). 10 each GCA consoles 10 each TCU consoles
Terminal Capabilities	Provides a simulation facility for the training of Army Air Traffic Control Personnel in surveillance and precision GCA Air Traffic Control procedures.
Terminal Type (2B24 SFTS)	8 each devices (SFTS). Each device consists of 4 each UH-1H model cockpits.
Terminal Capabilities	Simulates helicopter instruments and cockpit/emergency procedures
Description of Student Carrels If Used	
Additional Media Devices Used and Description	Television
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	Yes. SOURCE language, SYMBOLIC for 15G16 Device only.

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Logistics Management Center

Information Requested	Description
Terminal Type	UNIVAC 70/752 Video Data Terminals w/keyboard.
Terminal Capabilities	Capacity of 1080 characters (20 lines by 54 characters).
Description of Student Carrels is Used	Twelve rooms of 12-foot by 15-foot with movable tables accommodate up to 12 students per room for group exercise.
Additional Media Devices Used and Description	
Are Additional Media Devices Controlled by Computer?	
Is Authoring Language Available?	No

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Security Agency and School

Information Requested	Description
Terminal Type	CDC 1700: Teletypewriter input and output Honeywell 516: Teletypewriter and special dedicated keyboards.
Terminal Capabilities	
Description of Student Carrels If Used	MCT-4 employs individual student positions that contain visual displays and audio facilities.
Additional Media Devices Used and Description	Film
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	No

TABLE 6. Terminals, Carrels, Media and Language (Cont)

US Army Academy of Health Sciences

Information Requested	Description
Terminal Type	IBM 1050, Audio Visual
Terminal Capabilities	
Description of Student Carrels If Used	
Additional Media Devices Used and Description	Videocassette player Language lab teaching machines.
Are Additional Media Devices Controlled by Computer?	No
Is Authoring Language Available?	Yes. COURSEWRITER I.

ANNEX H

TABLE 7. Course Material Entry Methods

Responding Organization/ Activity	Method Used to Enter Course Material		
	Cards	Tape	On-line Direct
US Army Command and General Staff College	Secondary	Secondary	Primary
US Army Engineer School			X
US Army Field Artillery School	X	X	X
US Army Infantry School	X		
US Army Administration and Fort Benjamin Harrison	X	X	
US Army Intelligence Center and School		X	
US Army Military Police School			X
US Army Missile and Munitions Center and School	X	X	
US Army Quartermaster School	X		X
US Army Ordnance Center and School			X
US Army Communications Electronics School			X
US Army Signal School		X	X
US Army Transportation School			X

TABLE 7. Course Material Entry Methods (Cont)

Responding Organization/ Activity	Method Used to Enter Course Material		
	Cards	Tape	On-line Direct
US Army Aviation School	X	X (Paper) X (Magnetic)	X
US Army Logistics Management Center	X		
US Army Security Agency Center and School	X	X	X
US Army War College	X	X	
Walter Reed Army Institute of Research	X	X	
US Army Military Academy	X		
US Army Academy of Health Sciences			X

ANNEX I

TABLE 8. Personnel Involved with Computerized Training

Responding Organization/ Activity	Management Civ N/	Management Mil N/	Sys Anal Civ N/	Sys Anal Mil N/	Sys Op Civ N/	Sys Op Mil N/	Instr Prog Civ N/	Instr Prog Mil N/	Instrs Civ N/	Instrs Mil N/	Educ Spec (Rsch & Eval) Civ N/	Other (Specify) Civ N/	Other (Specify) Mil N/	Total Cmpt Tng Expc (Man-years)
US Army Command and General Staff College*	N/A (CGSC-MISO)	2/10	N/A (Academic Depts)	N/A	N/A (CGSO-MISO)	1/70	N/A (CGSC-MISO)	5/80	N/A (Academic Depts)	N/A	N/A (Dept of Eval/ Review)			15.0
US Army Engineer School		1/25							2/50					8.0
US Army Field Artillery School	1/0.5										1/0.5			22.0
US Army Infantry School	3/75	2/50	3/35		3/10	4/10					2/8	1/20	1/20	47.5
US Army Military Police		1/50						1/50		1/2			1-74F20 Pl Cmpt Prog.	2.0
US Army Mis and Mun Ctr and School	1/100				3/100				3/83	1/100				10.0
US Army Quarter-master School	1/100	1/100	4/100	2/100	3/100		1/100	5/100	4/50	38/77				

*The information in the personnel table reflects only the activity in support of the classroom and not for the CGSC administrative systems.

TABLE 8. Personnel Involved with Computerized Training (Cont)

Responding Organization/ Activity	Management Civ N/%	Management Mil N/%	Sys Anal Civ N/%	Sys Anal Mil N/%	Sys Op Civ N/%	Sys Op Mil N/%	Instr Prog Civ N/%	Instr Prog Mil N/%	Instrs Civ N/%	Instrs Mil N/%	Educ Spec (Rsch & Eval) Civ N/%	Other (Specify) Civ N/%	Other (Specify) Mil N/%	Total Cmpt Tng Expc (Man-years)
US Army Ord Ctr and Sch	1/100	1/100								3/100	3/100			6.0
US Army Comm Elct Sch	3/100		5/100	1/100		1/100	4/100	3/100		1/100	1/100	1/100 Instr Prog Entry Spec		64.66
US Army Sig Sch	1/80	2/100	2/30	1/10			1/100	2/100	15/30	6/20	1/20	Prof Prog 2/70	Prof Prog 5/35	38.0
US Army Transportation Sch										4/50				1.75
US Army Aviation Sch		2/75	1/100		2/100	4/55	1/100		2/100		1/5	Op Tng 4/100		50.3
US Army Logistics Mgt Ctr	8/37	2/10	5/75	2/75	6/75	2/75			15/35	7/30	5/5			130.0
US Army Sec Agency Ctr and Sch	1/50	1/75	1/10			1/89				1/89	1/30			4.0
US Army Acad of Health Sciences	1/60											Prog 1/100		14.0

ANNEX J

TABLE 9. Costs

Responding Organization/ Activity	Major Hardware/Software Groupings						
	Subsystem	Purchase (Cost)	Year	Lease (Monthly Cost)	Starting Date	FY-74 Operating Cost	Proposed FY-75 Cost
US Army Command and General Staff College	Terminals (32) and Communi-cations Equip.*			$6,200 (approx.)	7/73		
US Army Engineer School	Computer training service			$2,000 (estimated) (Charge is by hours of usage.)		$51,200 (Including mthly lease cost.)	$48,000
US Army Field Artillery School	TC 521 I/O Device only			$576	2/72		
US Army Infantry School	CRT's & UCU's			$4,761	6/68	$25,000	$25,000
	Honeywell equip re-quired for CAI			$614	6/68		

(NOTE: Costs are the only ones required strictly for CAI. Any other equipment costs would be incurred regardless of having CAI due to running 7 other computer applications on the Honeywell 200.)

*The present terminals will be purchased by the Government in November 1974.

FY-74	FY-75 Financed	FY-75 Unfinanced
OL $20,400	OL $20,400	OL $ 86,800
Non OL 32,650	Non OL 22,400	Non OL 142, 700

TABLE 9. Costs (Cont)

Responding Organization/ Activity	Major Hardware/Software Groupings						
	Subsystem	Purchase (Cost)	Year	Lease (Monthly Cost)	Starting Date	FY-74 Operating Cost	Proposed FY-75 Cost
US Army Military Police School	CAI Hardware	$26,000 Annual Contract				$100 Software	$100 Software
US Army Missile and Munitions Ctr & School	RCA 110	None (Excess govt owned equip)		N/A		$31,396	$31,558
US Army Quartermaster School	UNIVAC-70 (See comments concerning survey.)					(FY-73) $91,402 (Rental and Maintenance)	(FY-74) $62,240 (Rental and Maintenance)
US Army Ordnance Center and School	14 PLATO IV terminals 4 telephone lines 1 air compressor	$5,500 per terminal $640 per line $155	1974		5/73 8/73 10/73	$2,039 (TDY)	$1,194 (TDY)
	NOTE: The purchase cost indicated is an estimated purchase cost price. Lease funding for terminals, lines, and air compressor by Advanced Research Project Agency (ARPA).						
US Army Communications Electronics School	4 PLATO IV terminals 2 telephone lines				12/72	$2,000 (TDY)	$2,000 (TDY)
	1 air compressor 1 DEC PDP 11/35	$48,000 75,000	1974		4/74	$200	$2,000,000
	(NOTE: The purchase cost indicated is an estimated purchase cost price. Funding for terminals, lines, and air compressor by ARPA.)						

TABLE 9. Costs (Cont)

Responding Organization/ Activity	Major Hardware/Software Groupings						
	Subsystem	Purchase (Cost)	Year	Lease (Monthly Cost)	Starting Date	FY-74 Operating Cost	Proposed FY-75 Cost
US Army Transportation School	CDC 6400			$3,000 (Est average)	12/73	$180 (Terminal paper)	$180 (Terminal paper)
US Army Aviation School	2B24 - Singer Co. (Prototype)	$4,500,000	1970			$371,000	$2,000,000
	2B24 - Singer Co. (Production)	2,900,000	1974				
	2C35-Singer Co.	65,000	1972				
US Army Logistics Management Center	UNIVAC-70 System	$1,250,000		$19,000		$245,000	$250,000
	This installation's computer is partly owned and partly leased. The purchase price when installed was approximately $1,250,000. Each year, for the past 4 years, the government has purchased selected items of equipment. At the present time, that equipment being leased costs about $19,000 per month.						
US Army Security Agency Center and School	IBM 1401	$400,000			1960	Maintenance and supplies $25,000	
	CDC 1700	30,000			1971	Supplies - $1,000	
	Honeywell 516 (4 each)	1,200,000			1971	Maintenance and supplies $81,000	
US Army Academy of Health Sciences	IBM					To be removed during FY-75.	

TABLE 9. Costs (Cont)

Responding Organization/ Activity	Major Hardware/Software Groupings						
	Subsystem	Purchase (Cost)	Year	Lease (Monthly Cost)	Starting Date	FY-74 Operating Cost	Proposed FY-75 Cost
US Army Signal School	Honeywell G-225	Transferred from West Point	3/73			$10,000 An estimate based on percentage of computer time utilized for computer support of academic training.	$10,000
	GE time share			$2,500	3/72		

ANNEX K

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials

US Army Field Artillery School

Task	Average Time
Preliminary Planning	
Develop Strategy	
Prepare Lesson Outline	
Equipment Set-up Procedure	
Authoring Text (writing, typing, coding)	
Training Aids	
Photography	
Debugging (purify lesson)	
Trails (lesson review by second party)	
Revisions	
Evaluation (analyze data)	
Coordination	
Graphics (Sketch generation)	
Reference Literature (advance work sheets, etc.)	
Other (specify)	
Total (See note.)	40

NOTE: No individual time has been kept. Experience indicates that approximately 40 hours are required to develop one hour of computer instruction. This figure is based on the format designed for the Burroughs B3500 at Sheppard Air Force Base, TX.

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials (Cont)

US Army Infantry School

Task	Average Time
Preliminary Planning	9
Develop Strategy	6
Prepare Lesson Outline	50
Equipment Set-up Procedure	5
Authoring Text (writing, typing, coding)	30
Training Aids	N/A
Photography	N/A
Debugging (purify lesson)	40
Trials (lesson review by second party)	10
Revisions	40
Evaluation (analyze data)	40
Coordination	30
Graphics (sketch generation	N/A
Reference Literature (advance work sheets, etc.)	N/A
Other (specify)	N/A
Total	260

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials (Cont)

US Army Military Police School

Task	Average Time
Preliminary Planning	5
Develop Strategy	5
Prepare Lesson Outline	10
Equipment Set-up Procedure	1
Authoring Text (writing, typing, coding)	50
Training Aids	5
Photography	N/A
Debugging (purify lesson)	10
Trials (less r view by second party)	5
Revisions	2
Evaluation (analyze data)	2
Coordination	1
Graphics (sketch generation)	N/A
Reference Literature (advance work sheets, etc.)	2
Other (specify)	N/A
Total	98

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials (Cont)

US Army Missile and Munitions Center and School

Task	Average Time
Preliminary Planning	5
Develop Strategy	7
Prepare Lesson Outline	4
Equipment Set-up Procedure	6
Authoring Text (writing, typing, coding)	11
Training Aids	6
Photography	1
Debugging (purify lesson)	12
Trials (lesson review by second party)	5
Revisions	7
Evaluation (analyze data)	8
Coordination	6
Graphics (sketch generation)	9
Reference Literature (advance work sheets, etc.)	12
Other (specify	N/A
Total	99

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials (Cont)

US Army Ordnance Center and School

Task	Average Time
Preliminary Planning	24
Develop Strategy	16
Prepare Lesson Outline	16
Equipment Set-up Procedure	N/A
Authoring Text (writing, typing, coding)	130
Training Aids	N/A
Photography	0-32
Debugging (purify lesson)	40
Trials (lesson review by second party)	12
Revisions	40
Evaluation (analyze data)	To begin July 1974
Coordination	16
Graphics (sketch generation)	0-40
Reference Literature (advance work sheets, etc.)	0-20
Other (specify)	N/A
Total	294 (minimum) 386 (maximum)

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials (Cont)

US Army Communications Electronics School

Task	Average Time		
	Optimistic	Most Likely	Pessimistic
Preliminary Planning	8	16	24
Develop Strategy	0	4	8
Prepare Lesson Outline	4	4	4
Equipment Set-up Procedure	0	4	8
Authoring Text (writing, typing, coding)	40	50	70
Training Aids	0	4	4
Photography	6	6	6
Debugging (purify lesson)	4	6	8
Trials (lesson review by second party)	6	8	10
Revisions	6	8	8
Evaluation (analyze data)	4	4	4
Coordination	2	6	8
Graphics (sketch generation)	8	10	16
Reference Literature (advance work sheets, etc.)	0	20	40
Other (specify)	0	0	0
Total (See Note)	88	150	218

NOTE: Hours required to prepare one hour of CAI material in the tutorial mode depend upon the complexity of the subject matter.

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials (Cont)

US Army Signal School

Task	Average Time
Preliminary Planning	6
Develop Strategy	10
Prepare Lesson Outline	4
Equipment Set-up Procedure	6
Authoring Text (writing, typing, coding)	20
Training Aids	40
Photography	4
Debugging (purify lesson)	10
Trials (lesson review by second party)	2
Revisions	4
Evaluation (analyze data)	6
Coordination	12
Graphics (sketch generation)	8
Reference Literature (advance work sheets, etc.)	6
Other (specify)	9
Total	147

TABLE 10. Average Time/Task to Author One Hour of Tutorial CAI Materials (Cont)

US Army Aviation School (B24-2C35)

Task	Average Time
Preliminary Planning	200
Develop Strategy	100
Prepare Lesson Outline	80
Equipment Set-up Procedure	0.5
Authoring Text (writing, typing, coding)	10
Training Aids	1.5
Photography	N/A
Debugging (purify lesson)	20
Trials (lesson review by second party)	10
Revisions	10
Evaluation (analyze data)	25
Coordination	3
Graphics (sketch generation)	35
Reference Literature (advance work sheets, etc.)	10
Total	405

ANNEX L

TABLE 11. Personnel Expressing Desire for Orientation and Training In Computerized Training System (CTS)

Responding Organization/ Activity	Course A. Top Management							
	Present (FY-75)		Future (FY 76-78)		Estimated Attendance		Estimated Average Grade	
	Yes	No	Yes	No	Mil	Civ	Mil	Civ
Defense Information School		X	X		2	1	06	GS-14
Defense Language Institute		X	X			1		GS-15
US Army Command & General Staff College		X	X		1	1	06	GS-12
US Army Air Defense School	X		X		6	6	04	GS-11
US Army Armor School	X		X		2	1	05	GS-13
US Army Chaplain Center and School	X				1			
US Army Engineer School	X		X		3	1	06	GS-15
US Army Field Artillery School	X		X		18	3	05-06	GS-11
US Army Infantry School	X		X		9	1	05	GS-13
US Army Administration Center		X	X		2		06	
US Army Intelligence Center and School		X	X		1		06	
US Army Military Police	X			X	1		01	
US Army Missile and Munitions Center and School	X			X	6	4	05	GS-12
US Army Quartermaster School	X			X	2	2	04	GS-1
US Army Ordnance Center and School		X	X			1		GS-1

TABLE 11. Personnel Expressing Desire for Orientation and Training in Computerized Training System (CTS)

Responding Organization/ Activity	Course Present (FY-75) Yes	Course Present (FY-75) No	Course Future (FY76-78) Yes	Course Future (FY76-78) No	Top Management Estimated Attendance Mil	Top Management Estimated Attendance Civ	Estimated Average Grade Mil	Estimated Average Grade Civ
US Army Communications Electronics School	X		X		6	20	04-05	GS-13
US Army Signal School*	X		X					
US Army Transportation School		X		X				
US Women's Army Corps School	X				1	1	05	GS-13
US Army Aviation School		X		X				
US Army Institute for Military Assistance		X	X		1	1	06	GS-14
US Army SGM Academy		X	X		6	2	05	GS-9
Brooke Army Medical Center		X		X				
Letterman Army Medical Center		X	X		1	1	05	GS-11
US Army Logistics Management Center	X		X			2		GS-14
US Army Management Engineering Training Agency	X		X			2		GS-13
US Army Medical Department Veterinary School	X			X				
US Army Security Agency Training Center and School	X		X		10	10	04	GS-12

*All staff and faculty will be scheduled to attend whenever they are required to develop and implement CTS.

TABLE II. Personnel Expressing Desire for Orientation and Training in Computerized Training System (CTS) (Cont)

Responding Organization/ Activity	Course A. Top Management							
	Present (FY-75)		Future (FY 76-78)		Estimated Attendance		Estimated Average Grade	
	Yes	No	Yes	No	Mil	Civ	Mil	Civ
US Army War College	X		X		1		06	
Walter Reed Army Institute of Research		X	X		2	1	05	GS-14
US Army Military Academy	X			X	1		06	
US Army Academy of Health Sciences		X	X		1	1	03	GS-11

TABLE 11. Personnel Expressing Desire for Orientation and Training in Computerized Training System (CTS) (Cont)

Responding Organization/ Activity	Course B. Middle Management							
	Present (FY-75)		Future (FY 76-78)		Estimated Attendance		Estimated Average Grade	
	Yes	No	Yes	No	Mil	Civ	Mil	Civ
Defense Information School		X	X		1	1	04	GS-12
Defense Language Institute		X	X		1	9	03	GS-12
US Army Command & General Staff College		X		X	3		03-04	
US Army Air Defense School	X		X		6	6	04	GS-11
US Army Armor School	X		X		4	1	03-04	GS-9
US Army Chaplain Center and School	X				1			
US Army Engineer School		X	X		3	3	03	GS-12
US Army Field Artillery School	X		X		39	22	03-04	GS-7-11
US Army Infantry School	X		X		8	9	01-04	GS-11-12
US Army Administration Center		X	X		4	2	04	GS-13
US Army Intelligence Center and School		X	X		4	1	05	GS-13
US Army Military Police School	X			X	1		01	
US Army Missile and Munitions Center and School	X			X	6	12	04	GS-12
US Army Quartermaster School		X		X				
US Army Ordnance Center and School		X	X		1	1	05	GS-13
US Army Communications Electronics School		X	X		6	12	03-04	GS-12

TABLE 11. Personnel Expressing Desire for Orientation and Training in Computerized Training System (CTS) (Cont)

Responding Organization/ Activity	Course B. Middle Management							
	Present (FY-75)		Future (FY 76-78)		Estimated Attendance		Estimated Average Grade	
	Yes	No	Yes	No	Mil	Civ	Mil	Civ
US Army Signal School*	X		X					
US Army Transportation School	X		X		4		03	
US Women's Army Corps Center and School	X			X	2	2	04	GS-11
US Army Aviation School		X	X		1		05	GS-13
US Army Institute for Military Assistance	X		X		1	1	04	GS-12
US Army SGM Academy		X	X		6	1	03	GS-7
Brooke Army Medical Center		X		X				
Letterman Army Medical Center		X	X		4	2	03	GS-9
US Army Logistics Management Center	X		X		1	5	03	GS-13
US Army Management Engineering Training Agency	X		X			10		GS-13
US Army Medical Department Veterinary School		X		X				
US Army Security Agency School	X		X		8	8	03	GS-11
US Army War College	X		X		1	1	05	GS-14
Walter Reed Army Institute of Research		X	X		10	6	05	GS-14
US Army Military Academy	X			X	3		03	
US Army Academy of Health Sciences		X	X		1	1	E7	GS-7

*All staff and faculty will be scheduled to attend whenever they are required to develop and implement CTS.

TABLE 11. Personnel Expressing Desire for Orientation and Training in Computerized Training System (CTS) (Cont)

Responding Organization/ Activity	Course C, Instructional Programming							
	Present (FY-75)		Future (FY 76-78)		Estimated Attendance		Estimated Average Grade	
	Yes	No	Yes	No	Mil	Civ	Mil	Civ
Defense Information School		X		X				
Defense Language Institute		X	X			2		GS-11
US Army Command and General Staff College		X		X				
US Army Air Defense School	X		X		3		E5	
US Army Armor School		X	X			2		GS-11
US Army Chaplain Center and School		X		X				
US Army Engineer School		X	X		2		E5	
US Army Field Artillery School	X		X		14	9	03-04	GS-9-11
US Army Infantry School		X		X				
US Army Administration Center		X	X		7		E6	
US Army Intelligence Center and School		X	X		2		03	
US Army Military Police School		X		X				
US Army Missile and Munitions Center and School		X	X		1	3	E5	GS-11
US Army Quartermaster School		X		X				
US Army Ordnance Center and School		X	X					
US Army Communications Electronics School		X	X		2			GS-11
US Army Signal School*	X		X					

*All staff and faculty will be scheduled to attend whenever they are required to develop and implement CTS.

TABLE 11. Personnel Expressing Desire for Orientation and Training in Computerized Training System (CTS) (Cont)

Responding Organization/ Activity	Course C. Instructional Programming							
	Present (FY-74)		(FY 76-78)		Estimated Attendance		Estimated Average Grade	
	Yes	No	Yes	No	Mil	Civ	Mil	Civ
US Army Transportation School		X		X				
US Women's Army Corps Center and School		X	X		2	1	02	GS-7
US Army Aviation School		X		X				
US Army Institute for Military Assistance		X	X		3	1	E5	GS-5
US Army SGM Academy		X	X		1	1	03	GS-7
Brooke Army Medical Center		X		X				
Letterman Army Medical Center		X	X			1		GS-7
US Army Logistics Management Center	X		X		1	6	02	GS-12
US Army Management Engineers Training Agency	X		X			4		GS-13
US Army Medical Department Veterinary School		X		X				
US Army Security Agency Center and School		X	X		6	4	E8	GS-9
US Army War College		X	X		2		02	
Walter Reed Army Institute of Research		X	X		1	1	E6	GS-9
US Army Military Academy	X			X	3		E5	
US Army Academy of Health Sciences		X	X		1		E5	

Introduction to Annex M

a. Comments concerning Planned or Anticipated Future Computerized Training Activity and Comments Concerning the Survey which follow were taken from the respondents' entries in SECTION VII - FUTURE ACTIVITY in Questionnaire A.

b. These comments are condensed here for the sake of brevity, however, every effort was made in reducing the voluminous quantity of comments to convey the respondents' intent as completely and accurately as possible.

c. Some of the information stated in these comments was extracted and transposed to the applicable table in this technical report where the respondent chose to present responses in inclosure form.

ANNEX M

Comments Concerning Planned or Anticipated Future Computerized Training Activity

a. Defense Information School

(1) Other than planning use of the computer, DINFOS has not studied factors of cost, operation, or personnel.

(2) Future plans for CAI will determine feasibility of the use of the computer to assist in an 8-to-12-hour command post exercise which simulate on-going public affairs activities and problem solving. This exercise is conducted more than 20 times a year. Additionally, the feasibility of using the computer administratively is planned in the following areas:

(a) Monitoring and storing of academic records and transcript data of students such as attendance, graduates, and nongraduates.

(b) Compiling and analyzing data received for responses to post-graduate and supervisor questionnaires concerning the validity of DINFOS training.

b. Defense Language Institute

A subsystem is planned which would fit into the description of Computer Managed Instruction (CMI). This subsystem will use a computer to score tests and, from the results, prescribe remedial work for each student in terms of specific lessons and media. For periodic achievement tests, scores will also be posted to academic records. Further, these same scores will be compiled as test item statistics for continuing validation of item pools used in computer-generation of tests. Existing computer systems at DLI perform test scoring, student accounting, item analysis, and test generation. Another computer system that is used in a prototype course development project, keys test items to corresponding course material. In effect, the planned subsystem will build upon and integrate these existing systems. A schedule for this project will be set in a forthcoming survey of DLI's entire ADP course development plan.

c. US Army Command and General Staff College

The plans for FY-75 envision that each student will become familiar with the operation of computer terminals and the BASIC programming language. A data services center will be established which will provide the student officer with the equipment and a place within which to use the computer as a tool, not only in course work but also in any research effort.

d. US Army Air Defense School

USAADS has no basis for planned or anticipated future computerized training activity since it is just beginning to read into the area of computerized training.

e. US Army Chaplain Center and School

No computerized training activity is planned or anticipated for courses taught at the US Army Chaplain Center and School. The relatively small size of the Chaplain School and the limited student load (average is 146 persons) together with lack of available ADP facilities and trained personnel to operate them, preclude the meaningful use of Computer Applications in Training. In addition, the results of Systems Engineering of the courses at the Chaplain School indicate the almost negligible use of computers by Chaplains in the exercise of their professional responsibilities as clergymen in uniform. However, an ADP orientation is included in the curriculum of the Advanced Course.

f. US Army Engineer School

The Engineer School is developing plans to acquire an in-house, time-sharing system to replace the Service Bureau system now used. Target dates for completion is 30 Dec 74.

g. US Army Field Artillery School

Greater use of the existing computer resources within USAFAS is being explored, especially the possibility of adapting a simulation for use in tactical instruction. Numerous other potential uses for the computer as a training medium exist within USAFAS, such as gunnery and maintenance management instruction.

h. US Army Infantry School

The US Army Infantry School has been tasked with the DA approved Training Device Requirement (TDR) for a Combined Arms Tactical Training Simulator (CATTS) that will simulate a variety of combat situations for the training of future commanders and staff officers. The primary requirement of this simulator is to realistically approximate the placement of a commander and his staff in either of two simulated combat options: 1) a ground command post environment for conduct of tactical ground operations; or 2) a command and control helicopter environment for conduct of airmobile tactical operations. For program identification purposes, the ground environment simulation is referred to as Phase I and should be accorded first priority of development. The airmobile simulation is identified as Phase II

for later development efforts as the visual simulation state-of-the-art and funding availability permits its attainment. The training provided is to approximate decision-making experience which can now be obtained only through actual participation in combat operations. In a wide range of tactical situations, simulation must impose typical stress conditions and problems that commanders and staff officers must effectively resolve.

i. US Army Administration Center

The US Army Institute of Administration (USAIA) is currently studying all areas of instruction to determine the feasibility of applying Computer Assisted Instruction (CAI) in the near future.

j. US Army Intelligence Center and School

(1) The US Army Intelligence Center and School in conjunction with the Office of the Assistant Chief of Staff for Intelligence, DA, and Defense Intelligence Agency are endeavoring to determine the feasibility of utilizing computerized training in use of Department of Defense and DA Intelligence Data Handling Systems. However, as of 28 February 1974, data is unavailable concerning system scope, identification, description, course development and operation, and personnel and scheduling.

(2) The primary objective of the computerized training will be to prepare Army Intelligence personnel for assignment to positions requiring knowledge of the processing capabilities of Intelligence Data Handling Systems and to familiarize Army Intelligence personnel with the computerized intelligence applications, capabilities, and limitations.

k. US Army Military Police School

The Criminal Investigation Group at the US Army Military Police School is currently developing a new CAI program on an investigative type, working in conjunction with the Instructional Technology Division. It is still in the early planning stage and will be used in their CI classes. The Honeywell Center Computer System will be used with five Western Union Teleprinter sets.

l. US Army Missile and Munitions Center and School

Immediate plans include implementation of CAI programs on the TREDS Terminal/MICOM IBM 360/65 System. Long range plans include the acquisition of a tutorial oriented CAI system such as the currently planned prototype system at CTS.

m. US Army Ordnance Center and School

A full-scale operational test of the PLATO IV system is scheduled for FY-75. Future activity will depend upon the results of that evolution.

n. US Army Signal School

The US Army Southeastern Signal School has been selected as the site for the prototype Computerized Training System operational test. Participation by the USASESS in the CTS Project will consist of the development and administration of three courses on the CTS and the operation of the CTS hardware/software system provided by the Product Manager. Three courses; MOS 31E20, Field Radio Repair, MOS 35L20, Avionics Communications Equipment Repair, and MOS 31J20, Teletypewriter Equipment Repair will be totally implemented utilizing the CTS.

o. US Army Aviation School

(1) Synthetic Flight Training System (SFTS).

A Synthetic Flight Training System (SFTS) for helicopter flight training is to be implemented between 15 March 1974 to 29 December 1974. Seven production units consisting of modern hardware, such as digital computers will be implemented and will result in lower procurement and operating costs, greater systems reliability and greater flexibility than in present synthetic flight trainers.

(2) Training Device 15G16.

This device will be used for training in a functioning Air Traffic Control Activity to supply three additional simulated targets by interfacing with Radar Set AN/FPN-40. The device is expected to be implemented sometime during the summer of 1975.

p. US Army Institute for Military Assistance

(1) The only computer service which relates to instruction at USAIMA now is test grading, an administrative service. TREDS is to be established soon for DAWTS and academic record keeping, but that too will be an administrative service.

(2) Computer terminals and access to a number of data banks of economic, demographic, and sociological data together with scientific programs for processing the data might be valuable to the classes here. Such service might make possible the projection of results of military assistance programs far enough into the future to enable faculty members and students to evaluate them more effectively, effectively. Such results seem probable, but at present valid information is lacking.

q. US Army Sergeants Major Academy

Application of computers as a training medium is visualized at some future date in selected blocks of the Academy's instruction, although no such capabilities have been developed to date. It is anticipated that on-going systems engineering efforts will assist in this regard. Further, it is anticipated that installation of the TRADOC Educational Data System (TREDS) will satisfy the academic support requirements outlined as computer managed instruction and a computerized training system.

r. US Army Logistics Management Center

(1) Plans are to continually develop simulation to support the Center's training mission. This accelerated teaching tool places the student in a real-time, real-life situation and has proven itself to be highly beneficial.

(2) Planned additions to our simulation repertoire include:

(a) Commodity Command Standard System (CCSS) Stock Control

(b) The Goddard Space Flight Center Research and Development Management Exercise (GREMEX).

(c) A maintenance management simulation.

(d) CCSS Supply Management.

s. US Army Management Engineering Training Agency

(1) This Agency is planning a project in Computer-Aided Design and Engineering (CAD-E).

(2) The objective of the project is to provide both fast response and visual response (display) to a set of input data derived from course subject material. Input will be data involved in mechanical and electrical design problems.

(3) The computer will be used to:

(a) Store required source programs.

(b) Compile programs.

(c) Compute and manipulate data for both input and output usage.

(d) Maintain flicker-free image on display as data is manipulated.

(4) A disk pack for data and program storage will be needed, as well as display, write , and dedicated high-speed conditional communication lines. In addition, software will need to be purchased and modified to meet course needs.

(5) Schedule of development:

May - June 1974	Continued investigation and planning
July - December 1974	Training of personnel
January - June 1975	Implementation of systems and checkout
July - December 1975	Refine course material
February 1976	Implement CAD-E course for DoD

t. US Army Medical Department Veterinary School

No computer training is anticipated because of prohibitive cost factors and because of our developing capability to utilize TV tapes for primary and remedial training.

u. US Army Security Agency Training Center and School

A General Functional Systems Requirement (GFSR) - 2 Vols) was developed by USASATC&S and submitted to the Department of the Army (DA), proposing a total concept of computer interfaced with all instruction (much of which is classified) given at this service school. The aim of the proposal is to employ the tutorial and practical exercise methods of computer assisted instruction (CAI) where it is feasible. When final approval of the total system concept is received, the programming will be augmented and systems development will begin.

v. US Army Academy of Health Sciences.

IBM 1440 Computers are due to be removed. Exact replacement unknown at this time.

Comments Concerning Survey

a. US Army Command and General Staff College

(1) The US Army Command and General Staff College currently uses Computer Supported Instruction and Computer Based Instruction. Computer Supported Instruction is defined as that man-computer interface which provides information from the computer to the man to enable the student officer to make command/staff decisions. Computer Based Instruction is defined as instruction about the computer itself and use of it as an extension of that instruction.

(2) Computer applications are in teaching soft skills, such as management of logistical operations at the theater Army level.

(3) Plans are to teach computer programming in the language BASIC (a firm skill) but there are no plans to automate its instruction.

(4) The response to the survey reflects the best information within the confines of the questionnaire. Computer applications in training/education is such a vast area, it would have been more productive to let each school develop fact sheets stressing the areas of the most interest to your activity rather than being constrained by the questionnaire.

b. US Army Armor School

The Armor School does not use the computer in training as defined in the questionnaire glossary, however, the computer is integrated into several periods of instruction.

(1) Armor Officer Advanced Course (AOAC) students receive an exposure to computers during management information system training. This consists of 12 hours of instruction using computer time sharing. The host computer is a 2100B Hewlett Packard which the Armor School has access over voice grade dial-up lines using government owned teletypewriters. $10,000 a year is budgeted for this time-sharing system.

(2) AOAC students also use the commercial time-sharing computer as part of an ADP elective. This class meets three hours per-week for one semester. Students develop and debug programs that augment instruction in tactics, personnel, management, and logistics. Examples are: tactical march tables, personnel reports from a simulated officer master file, aircraft loading plans, POL usage, etc.

(3) Used presently, and due for expansion, the commercial time-sharing system is used to manage a brigade map maneuver exercise, a 26-hour block to be run four times a year. Various aspects of task organization, unit fire and movement fire support, (artillery and air) and combat service support are simulated. The system computes combat losses of personnel and equipment, ammunition expended, and POLusage for platoon and larger size units and provides information needed to enable controllers to respond rapidly to student-player decisions.

(4) The computer is also used in the academic records area, computer supported instruction (CSI) using the TRADOC Educational Data System (TREDS). This computer support, however, is not used as CMI as defined in the glossary.

(5) Computer Integrated Instruction (CII) and Computer Supported Instruction (CSI) will continue in the above areas in the Armor School with no major expansion other than defined in (3) above.

c. US Army Air Defense School

USAADS is just beginning to read into the area of computerized training activity. However, USAADS did express the desire for any information that would assist in launching a Computerized Training System.

d. US Army Engineer School

The Engineer School uses CAI mainly to teach students about the computer as an object of study. Very little tutorial is used. Applications developed are; scientific and engineering, with some management applications.

e. US Army Field Artillery School

USAFAS computerized training activity is minimal. Limited CAI experience exists.

f. US Army Administration Center

(1) The US Army Institute of Administration (USAIA) currently has a 360/30 with 128K memory and 8 disk drives. It is utilized for hands-on training in the computer operator course (MOS 74E). It is also used to assemble and compile programs written by students in the USAIA. The 360/30 supports the following courses:

(a) Computer Programmer Course (MOS 74F).

(b) The ADP Officer Course (MOS 2402).

(c) The Basic Systems Analysis Course.

(d) The Personnel Data Analyst Course (MOS 74C).

(e) AG and Finance Officer Basic and Advanced Courses.

(f) AG and Finance NCOES Advanced and Basic Courses.

(2) In addition, all students in USAIA receiving data processing instructions receive demonstrations of the equipment. In addition to the 360/30, the USAIA has an IBM 1401 with 16K memory and 6 tape drives. The 1401 is used to support the academic records of the USAIA and the Defense Information School in addition to local management reports and instructor scheduling.

g. US Army Intelligence Center and School

The US Army Intelligence Center and School in conjunction with the Human Behavioral Studies Group, Washington, DC, and the Electronics Command, Fort Monmouth, NJ, have developed a special paper-tape CAI program, template, and roll film to be utilized in conjunction with the AR-85A Computer in the AN/TSQ-43 Tactical Imagery Interpretation Facility for the purpose of utilizing the AR-85A in a CAI mode to support a self-paced identification course of instruction. Other courses of instruction could be applied if additional computer programs would be made available. This is a special purpose computer. Programming assists are not available at this Command.

h. US Army Missile and Munitions Center and School

(1) AR 18-1 and the entire 18-series AR's are directed at ADP per se and do not include provisions for CAI. It is felt that a proposal should be made that AR 18-1 be revised to include specific provisions for CAI, or that a separate directive be developed with guidance concerning CAI activities.

(2) TRADOC should provide the schools with guidance which would allow them to plan for CAI systems at their respective schools, based on the prototype system. If the prototype shows the need for changes, these plans could be amended accordingly, but because of the long-lead time involved, CAI system plans should be made as soon as possible.

i. US Army Quartermaster School

(1) GENERAL The UNI Series 70/15 Computer and terminals are used for computer assisted instruction in playing the following simulation and games:

COSINES (Computer Supported Instruction for Enlisted Supply)

SIMTASS (Stimulation, Theatre Army Supply System)

SIMPLEX (Simulation, Petroleum Laboratory Exercise)

COSTORE (Computer Support for Storage, Enlisted Supply)

SIMWIM (Simulation, Wholesale Inventory Management)

SIMSON (Simulation, Storage Operations Management)

CRASE (Cornell Restaurant Administration Simulation Exercise)

(a) Except for COSINES, each simulation plays once or twice a month for 12-16 hours. COSINES plays all day, every school day, and places the enlisted stock control and accounting specialist student (MOS 76P) at a Simulated Accountable Supply distribution activity and requires him to do the same as he would in real life. The remaining simulations and exercises do likewise in the subject area indicated.

(b) The following CAI applications are under development:

SIMSAX (Simulation, Spectrometric Analysis Exercise)

SIMFIN (Simulation, Financial Management)

SIMCOM (Simulation, Commissary Operations Management)

SIMPRA (Simulation, Pipeline Route Analysis)

(c) Six small NCR 500 Computers and Associated PCM are utilized in Direct Support Unit/General Support Unit (DSU/GSU) training. This equipment is identical to that found in the field and all systems design and programming for this field system is performed by the Computer Systems Command.

(2) PERSONNEL

(a) The Data Systems Branch is assigned to the Office of the Secretary and has the mission to support Computer Assisted Instruction with the following personnel:

Office of Chief	1 Mil and 1 Civ
Systems Analysts	4 Mil and 2 Civ
Programmers	5 Mil and 1 Civ
Computer Operators	0 Mil and 3 Civ

(b) Systems Analysts work with Instructors to design CAI applications and Instructors conduct the resulting simulation and games. Approximately 1

Civilian Instructors spend an average of 50 percent of their time and approximately 38 Military Instructors spend an average of 77 percent of their time conducting CAI applications.

(3) COSTS

(a) CAI (Rental & Maint)	FY-73	FY-74
UNI Series 70 Computer	$91,402	$62,240
Terminal Costs	45,594	48,926
(b) Computer Based Instruction (Rental & Maint)		
NCR 500's and PCM	77,472	70,332
(c) Supplies	[illegible],498	2,585
Totals	$216,966	$184,083

j. US Army Communications Electronics School

(1) The Fort Monmouth Computerized Training System Project is in the process of fielding a Prototype Multiprocessor-Minicomputer Training System. Testing and evaluation will be conducted at Fort Gordon, Georgia.

(2) Information is available concerning any aspect of computerized training to include:

Planning
Instructional Models
Course Development
Evaluation
Hardware
Software
Technical Reports
Historical documentation

(3) Films are available from the Product Manager's Office, Computerized Training System Project, Office Symbol ATSN-CTS, Fort Monmouth, NJ 07703.

k. US Army Transportation School

The Transportation School uses the computer as an educational tool primarily through the use of simulations. There are several simulations to teach

various ADP and transportation classes. The computer is also used as an instructional aid for teaching officer students simple BASIC programming. Additionally, the school uses a computer simulation at USALMC for instructing Officer Advanced Course students on supply management techniques.

1. US Army Aviation School

(1) The United States Army Aviation School (USAAVNS) recognized the need for more suitable training devices in the mid-sixties and began initial steps leading to the development of the Synthetic Flight Training System (SFTS). The Qualitative Material Requirement (QMR) for the SFTS was approved by DA in July 1967. A total of 8 devices were defined by the QMR for USAAVNS. Each device consists of 4 UH-1H mock cockpits, 4 motion platforms, 1 instructor/operator console, 3 digital computers, and related equipment.

(2) A contract was awarded by the Naval Training Device Center (NTDC) to Singer-General Precision, Link Division, the Singer Company, for a developmental model in April 1969. Research, Development, Test and Evaluation (RDTE) funds in the amount of $4,515,098 were used to procure the developmental model.

(3) Preliminary government acceptance testing began 28 September 1970 at the Singer Plant, Silver Springs, Maryland, with delivery of the developmental model to Fort Rucker in December 1970. Final government acceptance testing was completed on 26 February 1971. The Engineering Test (ET) was concluded prior to April 1971. The Expended Service Test (EST) started 5 April 1971 and was completed 5 March 1972. The ET and EST were conducted by USA Aviation Test Board for the US Army Test and Evaluation Command.

(4) An operational suitability test was developed and conducted by the Human Resources Research Organization's (HUMRRO) Aviation Division in support of the SFTS Expanded Service Test conducted by the US Army Test and Evaluation Command. Because the SFTS is unique, its suitability testing was difficult. It is not a replacement for existing equipment, and much of the training possible with it has not previously been possible for the Army, even when using operational aircraft. Thus, past approaches used for training device suitability testing were inappropriate for the SFTS. A test that failed to build upon the unique features of the device probably would have produced evidence that would appear to indicate that the device was unsuitable to fulfill the Army's requirements. A test that asked of the SFTS no more than is provided by existing Army flight training devices undoubtedly would have led to its rejection on a cost basis. On the other hand, tests that utilized the design-for-training features of the SFTS, with the goal of determining its cost/effectiveness in a training situation, led to quite different conclusions.

(5) The operational suitability test was conducted in three phases. During Phase I, primary emphasis was placed upon determining the workability of the various automatic and semiautomatic training features of the device. Phase I of the test (April, May, and June 1971) was not completed due to discrepancies in the software. Most software corrections have been completed and verified. During Phase II, a training program was developed that was intended to exploit the potential of the device in such a manner that the developmental hardware deficiencies would have minimum adverse effect upon test results. During Phase III, the training program developed in Phase II was tested for cost effectiveness of the device and a transfer of training study conducted for the Army rotary-wing aviator training program. Phase III revealed the device could be used in a cost-effective manner, cutting conventional training cost by 50 percent. It also revealed that SFTS training is highly transferrable to the aircraft. The test group consisted of 16 Initial Entry Rotary-wing students receiving a mean training time in the SFTS of 42+50 hours. The students then received a mean time of 4+12 hours aircraft familiarization prior to passing their 2+15 hour instrument checkride in the aircraft. This compares with a total time for conventionally trained students of 60+00 hours in the TH-13T helicopter plus 26+00 hours in the modified 1CA1 training device.

(6) The Turbine Trainer Test (TTT), consisted of two separate tests, each to be conducted in two phases. Phase II, Group II of the Turbine Trainer Tests utilized the SFTS, 2B24 as the primary instrument training vehicle. The results of that phase are summarized as follows:

(a) The test group consisted of 16 randomly-picked students (IERW-Class 72-39/40). The students participated in a proficiency progression program in the SFTS, 2B24 until they were determined by a flight examiner to have attained standard instrument proficiency. Upon completion of an SFTS standard instrument checkride, the students entered integrated instrument/contact training in the UH-1. After successfully completing the instrument checkride, they resumed UH-1 contact training and were scheduled for their advanced contact checkride as scon as they demonstrated proficient performance of the required contact maneuvers.

(b) The TTT, Phase II, Group II demonstrated that an equal or superior Army aviator can be produced utilizing the SFTS/UH-1 in a self-paced program in less flight and calendar time than with the conventional initial entry program of instruction. The mean time required for these students to achieve standard instrument proficiency in the SFTS, 2B24 was 36+24 hours. Mean Time required to pass an instrument checkride in the UH-1 aircraft was 13+00 hours. Mean time required to complete the UH-1 transition was 15+36 hours.

(c) The SFTS uses modern hardware, such as digital computers which result in lower procurement and operating costs and greater system reliability and flexibility than in present synthetic flight trainers. Two advance concepts distinguished in the SFTS are the adaptive training concept and the automated training concept. By programming the computer to perform many of the repetitive operations

traditionally assigned to the instructor, a single instructor may supervise the training of as many as four students, each flying a different simulated mission. Prerecorded briefings and instructions prepare the student for a lesson. If necessary, computer programs can activate the simulator and carry out the demonstration. The other advanced concept, a new innovation called the adaptive training mode, measures the skill level of the student and adjusts the difficulty and complexity of the task to that level. The program automatically increases the difficulty level as the student's skill increases.

(d) The device simulates all flight conditions within the capabilities of the platform, which provides five degrees of freedom of motion. All flight instruments, engine instruments, avionics, and communications are accurate duplications of those found in the aircraft. Vibrations and aural cues are also provided; however, weapon systems and visual contact flights are not simulated. Automated features of the system provide high quality, standardized instruction and enable students to execute malfunction reductions not demonstrable within safety limitations in operational aircraft.

(e) Initially, the SFTS was assembled in Building 6031 at Guthrie Field. On 6 March 1972, it was disassembled and moved to its permanent location in Building 4901 and reassembled. Reassembly tests were completed on 1 May 1972 at which time it became operational to support the US Army Aviation School mission. The SFTS operated on an eight-hour day until 1 October 1972 at which time the SFTS operation was increased to a twelve-hour training day.

(7) USAAVNS maintenance, operator, and programming personnel are undergoing an intensive OJT program under the tutelage of the contractor. The contractor has modified the developmental model to provide USAAVNS the capability to:

(a) Change existing programs.

(b) Develop new programs.

(c) Add to existing programs.

(8) On 29 December 1972, contract negotiations for the seven production units of the SFTS 2B24 for USAAVNS were completed between the contracting officer at the Navy Training Equipment Center, Orlando, Florida and the Simulation Products Division of the Singer Company.

(9) The production units will be delivered and ready for training on the following dates:

Unit #1	15 Mar 1974
Unit #2	15 May 1974
Unit #3	1 Jul 1974
Unit #4	15 Aug 1974
Unit #5	1 Oct 1974
Unit #6	15 Nov 1974
Unit #7	29 Dec 1974

(10) Unit #1 will be assembled in plant for govenment inspection, disassembled, shipped, and reassembled on site. Units #2 through #7 will be assembled and accepted on site at Fort Rucker. The Initial Entry Rotary Wing (IERW) Instrument Training Program cost savings per student with the use of the SFTS, 2B24 is as follows:

SFTS cost-per-cockpit hour - $19.05
UH-1 cost-per-flight hours - 94.39

Present program - SFTS - 7.5 hours - cost $ 142.88
UH-1 - 42.5 hours - " 4,011.58
TOTAL 50 hours - " $4,154.46

Target program - SFTS - 35 hours - cost $ 666.75
UH-1 - 10 hours - " 943.90
TOTAL 45 hours - " $1,610.65

Savings benefit/student - $2,543.81

(11) Initial investment for the eight SFTS, 2B24 devices will be accomplished as outlined below:

(a) The total cost of the eight SFTS, 2B24's is $20,312,426. Based on a 12-hour training day with 90 percent availability, each device will provide 216 hours of training per week. Fifty training weeks per year will yield 10,800 training hours per SFTS, 2B24 per year.

(b) The flight cost of the UH-1 aircraft is $94.39 and the SFTS, 2B24 is $19.05 per cockpit. The cost differential is $75.34.

(12) Based on the above data, the following computations denote the time required to amortize the SFTS, 2B24's at the USAAVNS:

10,800	hours per device per year
X 8	USAAVNS 2B24 devices
86,400	hours per year

86,400	hours per year
X 75.34	2B24/UH-1 operating cost difference
$6,509,376	USAAVNS savings per year

$\frac{\$20,312,426 \text{ initial investment cost for 8 devices}}{\$\ 6,509,376 \text{ USAAVNS savings per year}} = 3.12$ years to amortize initial investment cost

(13) The SFTS, 2B24 availability for training averaged 98 percent for the period of May 1972 through April 1973.

(14) It is estimated that the SFTS, 2B24 will reduce the various helicopter courses taught at the USAAVNS by 5 to 45 hours depending upon the length of their program of instruction. These changes will result in a substantial savings in flight training costs.

(15) Two UH-1 Cockpit Procedural Trainers (CPT) 2C35's were accepted by USAAVNS in October 1972. They are being used to support the IERW POI (4 hours/student) in conjunction with the SFTS, 2B24. Six additional 2C35 CPT's are programmed for delivery of the USAAVNS during FY-74.

(16) Support from the SFTS 2B24 since 1 May 1974:

(a) DEPARTMENT OF ADVANCED FLIGHT TRAINING
Upgrading flight-line-instructor pilots in the use of the SFTS.

(b) DEPARTMENT OF GRADUATE FLIGHT TRAINING
Upgrading flight-line-instructor pilots in the use of the SFTS.

(c) SFTS CONSOLE OPERATORS COURSE
Cross-training, synthetic flight-trainer operators in the use of the SFTS.

(d) USARMY AVIATION SCHOOL (HUMRRO)
Turbine Trainer Test II
Selected initial-entry rotary-wing students receiving instrument training in the SFTS for accumulation of data.

(e) DEPARTMENT OF STANDARDS AND INSTRUMENT TRAINING
Upgrading flight-line-instructor pilots in the use of the SFTS.

(f) US ARMY AVIATION SCHOOL (HUMRRO)
Combat Readiness Flying Program.

(g) US ARMY AVIATION SCHOOL
Standard Instrument Ticket Program.
Updating Tactical Tickets to Standard Tickets.

(h) DEPARTMENT OF ADVANCED FLIGHT TRAINING
Initial-entry rotary-wing course.
Providing 7.5 hours instruction in the SFTS on cockpit, instrument, and emergency procedures.

(i) US ARMY AVIATION SCHOOL (HUMRRO)
Army Scientific Advisory Panel Instrument Refresher Training, CRF Program.

(17) SFTS BRANCH:

TRAINING EQUIPMENT: 2B24

MANUFACTURED BY: Singer Simulation Products Division, The Singer Co., Silver Spring, Md.

PROTOTYPE COST: $4.5 million

PROD MODEL COST: $2.3 million

DELIVERED: December 1970

FUNCTIONS: Helicopter instrument simulation, and cockpit/emergency procedures.

CHARACTERISTICS:

1. Sound and motion simulation.
2. Flight control response through five degrees of motion.
3. 3 digital computers.
4. 98 radio and navigation stations.
5. Winds to 99 knots.
6. Turbulence levels from normal day through light, moderate, and severe.
7. Ground track generation for student and operator.
8. 1 TV camera per cockpit to include 1 hour video tape recording.
9. Five-minute play back of flight to include audio portion.
10. Freeze capability.
11. Cockpit seat positions for P-CP-1P.
12. A capability for 10 automated training periods to include the adaptive mode.

(18) Synthetic Flight Training System (SFTS) Training Device 2B31 and 2B33:

(a) 2B31 (CH-47)

1. The qualitative material requirement for the SFTS was approved by DA in 1967. Specifications for the 2B31 were completed in August 1972. The contract was signed on 22 June 1973, with delivery to follow in June 1975.

2. The specifications call for the 2B31 to have a visual capability consisting of a terrain board with cameras that pick up visual cues and present them to the cockpit. It will also be a three-seat trainer.

3. The contract was let to the Simulation Products Division, The Singer Company. Funding in the amount of 3.25 million dollars has been programmed for the purchase of the developmental model. Plans for a facility to house the 2B31 are in the process of being completed.

(b) 2B33 (AH-1)

1. The qualitative material requirement for this trainer was approved by DA in 1967. The 2B33 is a two-seat trainer with VFR/IFR and gunnery training capabilities for pilot and pilot/gunner.

2. Tentative planning calls for 10 units total, two at the training base and eight in field units.

3. Estimated cost of the developmental model is 3.5 million dollars. Tentative planning for prototype contract award is the Second Quarter of FY-74 with delivery to follow within 24 months.

(19) Radar Operator Training Device 15G16

The purpose of this equipment is to provide a simulation facility for the training of Army ATC personnel in surveillance and precision GCA approach air traffic control procedures at an Army Landing Control Central equipped with Radar Set AN/TPN-18, Interrogator Set AN/TPX-44, and multiple channel radio and telephone communication systems.

m. US Army Logistics Management Center

(1) The United States Army Logistics Management Center was organized in 1956 at Fort Lee, Virginia to develop management skills of both middle and top level supply managers and provide uniform training in United States Army-wide aspects of supply management. This training was required to fill a critical need for adequately trained management personnel in the wholesale supply system.

(2) The case method of instruction used so successfully by many graduate level business schools was selected as the principal method of instruction in the Army Logistics Management Center. The study and analysis of real or fictional cases provides the student with an insight and understanding that is normally acquired only through years of experience. The interchange of thoughts between members of the group, the give and take of lively discussion, and sound logical decision making provide the ingredients for excellent learning. Frequently, however, conclusions reached or decisions made cannot be tested against the situations; they can only be compared against history or left unresolved. In situations where many complex variables are involved this leads to some frustrations since the student cannot "live with his decisions." Obviously, this frustration can be minimized and learning increased if the student "lives a situation and sees the results of his actions."

(3) To emphasize "learning by doing" and augment the case method of instruction, the Army Logistics Management Center in 1960 adopted the use of computer simulations and business gaming.

(4) A computer simulation used for training may be considered to be an extension of the case method, primarily in two major areas:

(a) The first area concerns "student involvement." In a "case" a student analyzes a situation and attempts to project himself into the roles of the managers depicted in the case. In effect, he might say that had he been Colonel X he would have taken a different course of action or reacted in a different manner; but, had he really been Colonel X he may have reacted in much the same way as Colonel X did. In other words, in studying a case, the student looks at a situation in an objective rather than a subjective manner; whereas, in a simulation he is subjectively involved.

(b) The second area concerns "living with decisions." Going back to the previous illustration in which the student stated that had he been Colonel X he would have taken a certain course of action, another student might counter with the statement that had he taken that course of action, six months from now he would be in trouble due to the effects of certain probable events which might occur in the future. However, in a system as complex as our logistics system, with the many interacting variables involved, it is almost impossible to predict the effects of these variables on the student's decisions. However, with the use of a computer to simulate the passage of time, the effects of interacting variables on a particular decision can be readily measured. So the student really is forced to "live with his decisions."

(5) One of the primary objectives of our Center is to train our students in effective supply management. In support of this objective, the question was

asked, "What really makes one man a more effective supply manager than another?" It was found that in addition to having the necessary basic attributes of intelligence, flexibility, adeptness, etc., that what made one man a better manager than another was generally years of experience. The question we were faced with was how could we, in the few short weeks that our students were with us, give them years of experience. The answer we found, was to use computer simulations to compress time: thereby, giving our students what we call "accelerated experience."

(b) We use computer simulations in fifteen resident courses as well as several remote sites. They generally occur at the end of the course servings as a more or less "capstone" of the course. It is at this point that the students have an opportunity to put into practice what they have been taught at the center.

(7) We are continually updating our existing simulations to reflect current changes in policies and procedures and hope eventually to have a simulation applicable to all fifteen of our courses. We presently have a UNIVAC Series 70/45 computer with sixteen video data terminals which is primarily used to support these simulations. This computer is configured for multiprocessing and more than one simulation may be run at the same time.

(8) All of our simulations have a scenario programmed into the computer which simulates the passage of time and the effects of both student decitions as well as certain real-life events which occur in the particular model concerned. Our major simulation is CALOGSIM, which is a computer assisted logistics simulation of the Army's wholesale supply system.

n. US Army Security Agency Training Center and School

(1) Although few of our systems fall directly into the categories specified, the Automatic Data Processing Instructional Support Division (ADPISD) provides the command thirty additional jobs, categorized as computer managed systems. Such services as text correction, test construction, class master and hourly schedules, student roster and performance histories, and instructor performance records are provided. Specific information concerning any of the above computer systems will be provided upon request.

(2) The Morse Code Trainer (MCT-4) is an on-line, real-time Computer Aided Instructional (CAI) system. "On-line" denotes the fact that the operational equipment is directly connected to a dedicated computer while "real-time" indicates that all data being handled by the system - whether it be the presentation of simuli to the student, the acknowledgement of the student's response, the processing of student performance data, or the response to an instructor's input command - is processed so rapidly that the individual can sense no delay in the reaction of the system to his actions. The effect is that the individual feels that the system is operating entirely for him and, in fact, each student is treated as an individual

by this system and allowed to progress at his own rate with stimuli and prompting which are especially selected for his individual needs. In that sense the system represents an ideal training mechanism.

o. Walter Reed Army Institute of Research

(1) Walter Reed Army Institute of Research is not involved in any formal computer applications to training. Our military complement is generally recently graduated from Fort Bejamin Harrison computer training school. Therefore, training is necessary, mainly to orient the newly assigned military and civilians with the CDC 3500 hardware/software and remote-job-entry (terminal) operation. This type of training is accomplished by sending the individuals to the manufacturer's school. In a few cases we have had the manufacturer develop a course to meet the in-house requirement whereby all systems analysts and programmers have attended.

(2) We currently have an informal training program given by the systems analysts to their teams using a set of COBOL routines prepared and used extensively by the computer systems command. Our FORTRAN training programs have been designed to expose the student to those problems peculiar to this medical R&D center.

(3) We ordinarily allow the students to progress through the routines at their own pace and expect they will complete the training in four to six weeks.

(4) Our CDC 3500 computer uses the Master Operating System and a RESPOND Communication Subsystem which is expected to incorporate an interactive capability system some time in the first quarter of 1975.

p. US Military Academy

USMA CAI takes as its guiding priciple the use of the computer as a tool to be used by the teacher as a powerful and versatile instructional media. Examples of this are:

(1) Learning Resource Laboratories. Seven laboratories are available where an instructor can bring his class, put each student at a computer terminal, and proceed to have each student construct and/or run programs that demonstrate the lesson concepts as they are discussed.

(2) Portable Computer Terminal-TV Display. Portable computer terminals are available where an instructor can set up the portable terminal in his classroom, call in to the computer over a telephone line, and have his interactive communication and computer output displayed over the closed circuit TV set in the classroom.

(3) Computer Graphics. USMA's field of particular expertise is the use of computer graphics in CAI, the subject of a workshop session to be presented by Instruction Support Division at the 10th Annual Council Meeting and Conference of EDUCOM. Examples of computer graphics applications are:

(a) Engineer Design Problem. The Department of Engineering assigns cadets a problem of designing a steel frame capable of supporting a predefined load. An interactive computer graphics program is made available to them to help them design the frame. The graphics program computes a pictorial diagram of the frame and the student input loads, a shear diagram corresponding to the loads, and a moment diagram corresponding to the loads. Other graphical options are available.

(b) Physics Ballistic Trajectory Program. The Department of Physics uses an interactive computer graphics program to illustrate the laws of motion and gravity for an in-class workshop period. Two positions, A and B, are identified on the screen with a "mountain" between them. The workshop exercise is to calculate the elevation and muzzle velocity required to fire a projectile for a position A and score a direct hit on position B, or vice versa. The graphics program accepts data, calculates the trajectory, and draws the trajectory on the screen of the graphics terminal. In this manner, the student immediately sees derived physics formulas applied. The same program is available as a game. Two students, "manning" positions A and B, take turns firing projectiles over the mountain at each other. The first to score a direct hit wins. In making this program available as a game we share the same philosophy as Dartmouth that "exposing a student to the computer even for nonacademic work -- is a beneficial learning experience."

(c) Mathematics Department Program on "Developing the Definite Integral." The Department of Mathematics needed to explain to the students the concept of a Riemann sum approximation to the definite integral. The point to be made is that the area under a curve can be approximated by a series of rectangles. This is demonstrated by a sequence of graphic displays from a computer graphics program. These graphic displays can be broadcast to the television sets in the classrooms and allow individual instructors to provide the narration. A second option, the one the Mathematics Department chose to use, is to make a video tape (TV program) of the instructor's narration, with the computer graphical displays inserted at appropriate times. Direct graphic input to the television studio allowed the graphical image to be recorded on video tape as it was being built on the screen of the computer terminal.

q. US Army Academy of Health Sciences

Our 1440/CW-I is apparently the last one in operation in the world today. We are somewhat isolated and interest is hard to generate because of this. Most medically related CAI is under COURSEWRITER III and we do not have convenient access to these materials at this time.