ARI Research Note 87-41

DEVELOPMENT OF COMPUTER-BASED INSTRUCTION FOR MOS 76C

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U. S. Army

Research Institute for the Behavioral and Social Sciences

September 1987

U. S. ARMY RESEARCH INSTITUTE

FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency under the Jurisdiction of the

Deputy Chief of Staff for Personnel

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Research a-complished under contract
for the Department of the Army

Scientific Systems, Inc.

Technical review by

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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: ARI Research Note 87-41
2. GOVT ACCESSION NO.:
3. RECIPIENT'S CATALOG NUMBER: AD-A188 364

4. TITLE (and Subtitle): DEVELOPMENT OF COMPUTER-BASED INSTRUCTION FOR MOS 76C

5. TYPE OF REPORT & PERIOD COVERED: Sept. 85 - Feb. 87

6. PERFORMING ORG. REPORT NUMBER:

7. AUTHOR(s): Frederic J. Skalny and Ruth Ann Marco

8. CONTRACT OR GRANT NUMBER(s): MDA903-85-C-0405

9. PERFORMING ORGANIZATION NAME AND ADDRESS:
Scientific Systems, Inc.
One Alewife Place, 35 Cambridge Park Drive
Cambridge, MA 02140

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS:
2Q263743A794
3.3.1 R1

11. CONTROLLING OFFICE NAME AND ADDRESS:
U.S. Army Research Institute for the Behavioral and Social Sciences, 5001 Eisenhower Avenue
Alexandria, VA 22333-5600

12. REPORT DATE: September 1987

13. NUMBER OF PAGES: 67

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office): - -

15. SECURITY CLASS. (of this report): Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE:

16. DISTRIBUTION STATEMENT (of this Report):
Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report): - -

18. SUPPLEMENTARY NOTES:
Bruce W. Knerr, contracting officer's representative
Bruce W. Knerr and Robert J. Seidel, technical monitors
Funding provided by U.S. Army Training and Doctrine Command/Training Technology Agency.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number):
Job Analysis, Computer Based Instruction,
Instructional Design, Computer Based Training,
Supply Skills Training, Technical Training.
Interactive Videodisc,

20. ABSTRACT (Continue on reverse side if necessary and identify by block number):
This research note describes the work performed in analyzing, designing, producing, and validating the interactive courseware for the Equipment Records and Parts Specialist training course (MOS 76C). Keywords:

DEVELOPMENT OF COMPUTER-BASED INSTRUCTION FOR MOS 76C

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EXECUTIVE SUMMARY

Requirement:

To analyze, design, produce, and validate Computer-Based Instruction (CBI) to improve the on-the-job performance of the Equipment Records and Parts Specialist (MOS 76C).

76C Advanced Individual Training (AIT) provides training in four duty positions, one of which is Prescribed Load List (PLL) Clerk. Current problems associated with PLL Clerk training and performance are: (1) classroom training does not realistically portray the job as it is performed in the field, and thus limits the transfer of schoolhouse training to on-the-job performance; (2) PLL Clerks are often required to perform their job with little technical support from their supervisors; (3) the job functions are changing from manual to automated with the implementation of the Unit Level Logistics System (ULLS); and (4) a large amount of time is consumed by instructors updating and presenting classroom instruction, and performing administrative functions.

Procedure:

An analysis of the 76C work environment was conducted to define job situations to which PLL clerks and their supervisors should be exposed during training. Design specifications were developed, and submitted to technical review, as were subsequent scripts and storyboards. Two courseware components were developed for delivery on the Micro-TICCIT CBI system. One component uses interactive videodisc technology to simulate the PLL Clerk's work environment. The second component emulates the ULLS screens and interactive routines to train ULLS user skills. All courseware was subjected to a preliminary evaluation at the Quartermaster School (QMS).

Findings:

The technical reviews and evaluation data indicated that the ULLS emulations were technically accurate reproductions of the ULLS system and effective as self-study instructional materials. The interactive video courseware also accurately portrays the PLL Clerk's work environment.

However, its potential as effective self-study instructional material for transferring procedural and forms completion skills from the classroom to the job has not been adequately tested.

Utilization of Findings:

All courseware is now on-line at the QMS. It will undergo additional evaluations to thoroughly assess its effect on student performance, both in the schoolhouse and on the job and to insure that it can be implemented as a functional instructional and administrative component within the 76C AIT sequence.

INTRODUCTION

This report presents a discussion of the research and development activities performed by Scientific Systems, Inc. (Cambridge, MA) under Contract Number MDA903-85-C-0405. This contract was completed for the U.S. Army Research Institute (Alexandria, VA), U.S. Army Quartermaster School (Fort Lee, VA), and the U.S. Army Training and Doctrine Command (TRADOC) Training Technology Agency (TTA). Specific emphasis is given to the methodology, findings and product outcomes of the key tasks performed under this contract. The report is formatted into the following six parts:

1-PROJECT OVERVIEW
2-REVIEW OF RELATED LITERATURE
3-MOS 76C TRANSITION MODULE COURSEWARE
4-MOS 76C SUPERVISOR TRAINING MATERIAL
5-UNIT LEVEL LOGISTICS SYSTEM JOB ANALYSIS
6-UNIT LEVEL LOGISTICS SYSTEM COURSEWARE.

Each of these six parts are further subdivided into sections which present discussion of significant content related to project areas.

PART 1: PROJECT OVERVIEW

SUMMARY OF MOS 76C PROBLEM

The mission of the Training Technology Field Activities (TTFA) is to facilitate use of new technologies to improve Army training. This mission is being accomplished in part through the TTFA at the U.S. Army Quartermaster School (QMS). This TTFA, a cooperative effort of the U.S. Army Training and Doctrine Command (TRADOC), Training Technology Agency (TTA), the U.S. Army Research Institute (ARI) and QMS, identified a need to provide MOS 76C classroom training which addresses the requirements of the job as it is typically performed in the field.

MOS 76C is the Equipment Records and Parts Specialist which includes four duty positions: (1) Prescribed Load List (PLL) Clerk; (2) Shop Stock Clerk; (3) Shop Clerk; and (4) The Army Maintenance Management System (TAMMS) Clerk. When awarded an MOS 76C, the solider will be normally assigned to only one of these duty positions. This compounds the QMS' findings that there is a worldwide shortage of qualified PLL clerks, and that training of these clerks currently lacks depth because of the breadth of training required for MOS 76C, and the limitations on training time.

The technical advisor for the 76C is the Unit Supply Sergeant (MOS 76Y), but there is also a lack of trained 76Y30 personnel to provide technical supervision to 76C E1 through E5 soldiers at skill levels 1

and 2. Unit commanders often do not fully understand the prescribed load list, and therefore do not understand how to supervise and assist the PLL clerk. As a result, there have been consistent complaints from commanders that PLL and TAMMS clerks are not adequately trained, but little help is available at the job site for improving their job skills and knowledge.

In addition, a number of specific problems with current MOS 76C training have been identified. First, although the training covers correct completion of the approximately 35 forms that the 76C must master, it does not adequately treat the relationship of forms to each other, nor the conditions that require the use of each form. The training does not integrate job functions. Frequent revisions to supply and maintenance procedures require continuing revisions and updates to the training. This problem is further exacerbated as the functions of the 76C are converted from manual to automated systems that will vary from one duty position to another.

Second, because of high throughput of students for MOS 76C (40 to 60 students begin nine weeks of training every week), administrative duties consume an excessive amount of instructor time. The high throughput also burdens instructors with a high teaching workload and demands that a great deal of time be devoted to creating and maintaining training materials.

The third, and perhaps most important, problem with MOS 76C training is that the classroom does not realistically represent the job as it is performed in the field. Instruction tends to focus on the completion of specific forms, but it does not provide the trainee with the initiating cues that result in the selection of forms or reproduce the pressures of the job environment. For example, the trainee may learn how to complete DA Form 3318 (Record of Demands - Title Insert), and may even receive verbal instruction on its relationship to the PLL. Yet the trainee is not likely to encounter a task in which:

> The PLL clerk is issued a repair part which is the cue to also post it to the demand file using DA form 3318. When doing this, the clerk notices that the posting is the third within 180 days and thus, the clerk must request an addition to the PLL. However, prior to request, the clerk must compute the authorized stockage level using DA Form 2765-1 and 2064. Coupled with this is a visit by a supervisor who does not understand the 76C job and questions the clerk why it takes so long to complete the paperwork associated with "a simple repair part request."

The incident described above indicates that without training experiences that represent realistic job demands, the 76C will not be able to

acquire the knowledge and skills in those tasks required to perform the job, nor the confidence to apply the knowledge and skills. Computer-based instruction (CBI) using interactive video, however, may be an approach that more realistically presents training experiences representative of 76C performance in the work environment. Further, CBI may provide an instructional management tool which could reduce administrative overhead for the 76C course.

COMPUTER-BASED INSTRUCTION AND INTERACTIVE VIDEO

CBI has been shown to be effective instruction that can be economically delivered. With properly implemented CBI, the following potential training advantages could be anticipated:

1. CBI permits the presentation of stimulus conditions in the classroom to closely approximate those which will prevail in the actual job setting. Such a capability allows for maximum transfer between the training situation and the job situation (Gagne, 1954)

2. CBI permits the behavior to be learned in the classroom to be functionally equivalent to that required on the job. In some cases the behavior to be learned will be topographically equivalent, e.g. training to use an automated logisitics system.

3. CBI permits the delivery of feedback (reinforcement) immediately upon performance of the desired behavior. The importance of immediate feedback for the strengthening of desired behavior has been repeatedly demonstrated in research by Skinner (1938), Ferster and Skinner (1957), and Honig (1966).

4. CBI permits each student to proceed through the lesson material at a rate appropriate to his/her learning ability. Students may continue to proceed through training as a group; however, individual acquisition rates can be accommodated within segments of instruction through CBI.

The continued development and refinement of interactive videodisc technology may offer an effective means of augmenting 76C training. In certain cases, teaching topography of behavior under conditions similar to those which will occur on the job is insufficient to insure adequate job performance. The problem that arises is not that the individual does not "know" what to do, but that the probability of doing it is very low under the precise conditions which demand it. A common reason for the failure of the appropriate behavior to appear is the presence of demands on the job which were not represented in training. Such demands may be related simply to the newness of the situation or to peripheral job factors that could not be trained easily in the classroom. Interactive videodisc may be well suited to overcome this situation.

The utility of interactive videodisc training, as it applies to training 76C, is its potential for raising the probability of occurrence of the proper job behaviors in the real job environment.

A feature of CBI is the capability to provide a management information system which offers on-line data on students' profiles, course performance, course progress, need for remedial training, analysis of overall class performance, analysis of relationships among profiles and class performance, maintenance of clss rosters, calculation of grades, and the production of reports as requdired. Thus, properly designed computer-managed instruction allows those people responsible for the management of training to accomplish their jobs more efficiently.

TECHNICAL OBJECTIVES

Scientific Systems, Inc. (SSI) was under contract to the U.S. Army Research Institute (ARI) to conduct research and development activities related to the application of interactive videodisc computer-based instructional technology as a possible solution to the problems confronting MOS 76C. This research effort sought to provide ARI with reliable and valid data as to the effectiveness and efficiency of interactive CBI as a technology for: (1) increasing the transfer of training from the schoolhouse to the job by providing training which accurately characterizes the requirements of the job as it is typically performed in the field; (2) increasing 76C proficiency in performing automated PLL tasks; and (3) determining whether this training would be appropriate for training supervisors of 76C. Specifically, in accordance with the requirements of ARI and the Quartermaster School, SSI has developed computer-based instruction in keeping with the following technical objectives:

1. To develop an interactive (videodisc) instructional simulation of the job environment that requires students to perform tasks in a realistic job setting. This segment of instruction is referred to as the "Transition Module".

2. To identify the training and information requirements for supervisors of the 76C, and to develop the suplementary instructional segments to the Transition Module.

3. To provide interactive training materials on the automated system that impacts the job of the 76C - the Unit Level Logistics System (ULLS).

These instructional materials were developed at SSI for presentation using the MicroTICCIT computer-based training system produced by Hazeltine, Inc. These systems are resident at QMS and ARI.

SUMMARY OF THE SCOPE OF WORK

In keeping with the technical objectives, the primary work tasks performed by SSI included:

1. Work Environment Analysis - defined the characteristics of the 76C job environment that students should be exposed to during training.

2. Transition Module Design - created the instructional plan and specifications for developing an interactive computer-based training module for delivery in the Quartermaster School.

3. Transition Module Development - produced the lesson segments of the training module.

4. Transition Module Validation - studied and assessed the effectiveness of the training module on a sample of 76C trainees.

5. Supervisor Training Requirements Analysis - determined whether the Transition Module would also serve as a mechanism for familiarizing supervisors with the nature of 76C duties and responsibilities, and thus, enable them to more effectively supervise job incumbents.

6. Supervisor Training Material Development - produced lesson segments appropriate to supervisors of 76C.

7. Unit Level Logistics System (ULLS) 76C Job Analysis - determined training requirements of 76C to understand and use the ULLS system.

8. ULLS Instructional Courseware Design - created the instructional plan for developing emulations and lesson segments for training 76C in ULLS operations.

9. ULLS Instructional Courseware Development - produced ULLS emulations and lesson segments.

10. ULLS Instructional Courseware Validation Study - studied and assessed the effectiveness of the courseware on a sample of 76C trainees.

PART 2: REVIEW OF RELATED LITERATURE

MOS 76C

According to a recent report on the Career Management Field 76 (U.S. Army Quartermaster School, 1984), 76C is the Military Occupation Speciality (MOS) with the largest problem history in CMF 76. A consistent complaint has been that Prescribed Load List (PLL) clerks and The Army Maintenance Management System (TAMMS) clerks are not adequately trained to the standard necessary for successful job performance in the field (p.1-10). It was further cited that there is a lack of trained 76Y30 personnel to provide technical supervision to 76C E1 through E5 soldiers at skill levels 1 and 2 (p.1-9); that unit commanders do not understand the prescribed load list and thus, do not understand how to supervise or assist the PLL clerk (p.1-9); and, that Major Command unique supply systems have an adverse effect on school-trained MOS 76C (p.2-21).

Within this context, the Army Research Institute and the Quartermaster School acknowledged that a principal determinant of optimal job performance of 76C soldiers in functional units is their reaction to critical events which drive the 76C job.

For example, the critical events to which the PLL clerk must respond include: requests for repair parts, posting and transmitting requests, turning in defective or wrong parts, maintaining inventory to authorization levels, and updating the PLL and Document Register. These critical events, and those constituting the other duty positions within 76C remain relatively constant despite differences in local operating procedures.

Although critical events on the job remain constant, the 76C work environment is usually less than ideal due to the pressures, difficulties, constraints and variations within the environment. For example, it is common for a PLL clerk to have four or five mechanics trying to get their requests filled immediately, and the clerk gets frazzled and incorrectly fills out different forms. Another typical situation finds the PLL clerk in a hurry to pick up a new shipment of parts waiting at the Supply Support Activity (SSA), but also rushing to finish the forms to turn-in several parts to the SSA at the same time. This usually results in careless mistakes that cause further delays in performing his job. These situations suggest another probable determinant to optimal job performance of PLL clerks, namely, the "competencies" which underlie their job performance. For example, it seems plausible that the PLL clerk in both situations may not need training on completing the appropriate forms for each request, but instead, may need to learn how to use a more general skill (competency) such as "prioritizing". In the first example, if the clerk establishes which demand must be responded to first, he could than inform the others to wait accordingly. This would create a more organized group of

mechanics, and provide a work environment in which the clerk could concentrate on commpleting the paperwork for the first demand correctly. The second example is similar. Again, if the clerk realizes that his first priority is to pick-up the new parts, he would avoid rushing to complete turn-in forms with a good possibility that mistakes would be made entering the required information.

Of particular interest to how PLL clerks perform their jobs in the field is the idea that job performance may be more a function of underlying behavioral strategies of the performer than the mechanics of the job such as selecting the right form and completing it correctly.

A JOB COMPETENCY MODEL

The notion of underlying behaviors or competencies is not new. In 1959, Psychologist Robert White labeled "competence" as "a basic drive for effectiveness" (White, 1959). Building on the work of psychologist David McClelland (McClelland, et al., 1958), behavioral scientists at the consulting firm of McBer and Company established a definition of "competence" as follows:

> "..a competency, or component of overall competency, is a characteristic of an individual that underlies effective work performance. A competency can be any human quality: It can be knowledge, a category of usable information organized around a specific content area (for example, knowledge of mathematics); it can be a skill, the ability to demonstrate a set of behaviors or processes related to a performance goal (for example, logical thinking); it can be a trait, a consistent way of responding to an equivalent set of stimuli (for example, initiative); it can be a self-schema, a person's image of self and his or her evaluation of that image (for example, self-image as a professional); or it can be a motive, a recurrent concern for a goal state or condition which drives, selects, and directs behavior of the individual (for example, the need for efficacy)" (Klemp and Sokol, Unpublished Manuscript, 1985, p.127).

According to studies by the McBer staff, competencies have been identified for a variety of job performers including managers (Boyatzis, 1980) insurance underwriters (Cullen, 1981), junior officers in the Army (Cullen, et al., 1983) and commissioned Organizational Effectiveness Staff Officers in the Army (Klemp and Sokol, 1985).

Based on the study of job competence (Boyatzis, 1980), job behavior may be primarily a function of an individual's competence, the job demands, and the organizational environment. These components are the basis for a competency model of job performance, and have specific significance to the PLL clerk job performance. For example, application of this model suggests that a PLL clerk has certain characteristics which can be called competencies. As the clerk performs a specific job

task, the clerk demonstrates actions or behaviors. If the clerk's competencies lead to the types of behavior which would satisfy or respond to the requirements and responsibilities of the job demands, and these behaviors are consistent with the policies, procedures, and conditions of the Army's organizational environment, the clerk's behavior will be effective. In this competency model, it is emphasized that effective job performance of the individual occurs when all three critical components are consistent or "fit".

This competency model suggests that an analysis of the 76C work environment should attempt to understand the PLL clerk's reactions in terms of underlying competencies, and to recognize the interdependence between individual competencies, job demands, and organizational environment. Within this framework, the information gathered may also suggest that 76C training solutions might be designed around the competencies of the job performers rather than around discrete job task behaviors. For example, if PLL clerks have difficulty solving problems resulting from their job demands, focus for training might well be targeted on the principles or rules underlying problem solving. This is justified in that the most exhaustive analysis would not identify all the possible situations in which deficiencies in problem solving might occur, and all the subtle variations of these deficiencies due to individual differences.

An initial analysis of the problem as defined by QMS subject matter experts indicated that a focus on competence might be an appropriate model for designing the 76C Transition Module. However, more detailed information was needed to define the 76C work environment, and the conditions within that environment to which trainees should be exposed during training.

PART 3: MOS 76C TRANSITION MODULE COURSEWARE

MOS 76C WORK ENVIRONMENT ANALYSIS

A vital aspect of the instructional design and development process is the accurate identification of the skills and knowledge required by the student to perform his job. This is certainly the case with the content of the Transition Module. The goal of this training program is to provide a mechanism for allowing 76C graduates to practice classroom learned skills in a simulated job environment. To accomplish this goal, instructional designers were required to learn details about the environment in which 76C personnel work. The purpose of the MOS 76C Work Environment Analysis was to generate detailed information about the tasks which are performed on the job, and about the environment in which these tasks are performed. This information was also utilized in developing the job scenarios required for creating the videodisc script material.

Collection of 76C work environment data and the generation of final scenario material is described in the following steps. Initial work environment data were collected through interviews and discussions with Ft. Lee QMS personnel during a site visit in October, 1985, and from review of select Army documents. These documents included: CMF 76 Study, ACN70629 (1984); Keesee (1980); and Hughes (1979).

Step 1. Initial Data Collection - Ft. Lee QMS. An information gathering visit was conducted at Ft. Lee QMS in October, 1985. Details of this visit are contained in the interim report entitled, Ft. Lee Site Visit Summary Report (Skalny, 1985). As a result of this visit, information was gathered specific to technical resource assistance, critical job tasks, work flow and work environment conditions. Findings for each of these are reported in the following section.

Technical Resource Assistance. Seventeen Ft. Lee personnel provided the initial source of 76C data. These individuals represented both the Enlisted Supply Directorate (ESD) and the Department of Training and Doctrine (DOTD).

Critical Job Tasks. Information was gathered and verified by two ESD and two DOTD staff members which indicated that 76C are currently trained in 23 critical job tasks. These tasks are shown in Appendix A. More detailed discussion with the two ESD staff members revealed that eleven of the 23 tasks were most critical to job performance. These tasks are marked with an asterisk.

Typical Day Work Flow. A sample of the PLL clerk's work flow was obtained through discussions with six incumbent 76C instructors. Additional work flow descriptions were obtained from two ESD staff and audio taped for further review.

Preliminary analysis of these samples demonstrated that the performance of a PLL clerk suggested possible application of the job competency model. In order to determine if discrete competencies (e.g., also referred to by SSI as behavioral domains) could be identified, the first day work flow description was reexamined by three SSI senior instructional designers. Each designer was asked to review the first day description, and locate specific segments within this description that suggested a competency domain. Inputs from each designer were discussed in order to arrive at a consensus as to where a domain occurred and what competency was suggested. This quantitive review indicated that the work flow actions of the clerk seem to demonstrate competency domains such as planning, organizing, and problem-solving.

Work Environment Conditions. During the process of collecting PLL critical job tasks and the work flow information, two ESD staff and six incumbent 76C instructors were asked to describe a work condition which caused problems in PLL clerk performance. Four samples were captured and rewritten by a member of the DOTD staff. This substantiated that this type of content information could be translated into instructional scenarios for video script development.

Step 2. Review of Initial Data. According to the the Ft. Lee Site Visit Report (Skalny, 1985), three specific work site analysis items were identified for further discussion at a November meeting with ARI and QMS. These items included:

1. Creation of an operational definition of "environmental condition" which is acceptable to ARI and QMS.

2. Identification of priority environmental conditions for which scenario content will be collected by SSI.

3. Clarification of the concept and content focus of the Transition Module.

Results of the meeting suggested that an operational definition of "environmental condition" and a prioritized order depended on further input and refinement by QMS subject matter experts.

Step 3. Refinement of Environmental Conditions. Building on initial data about environmental conditions collected during the Ft. Lee Site Visit and from the Army documents, a list was prepared by SSI of 41 characteristics. These characteristics represented typical conditions encountered in the 76C work environment. These characteristics were reformatted into a questionnaire for QMS refinement. Specifically the questionnaire was used to determine how frequently each characteristic is encountered by a new PLL clerk, and the degree to which each one interferes with optimal job performance. A three-point scale was used for rating frequency as follows: Never or Rarely, Sometimes,

Frequently. The three-point scale used for rating interference was: Very Little or Not At All, Moderately, Very Much.

Step 4. Determining Critical Characteristics. The questionnaire was administered to seven military staff at Ft. Lee. A review of the completed questionnaires revealed that six of the staff were in MOS 76Y, and one was in MOS 76C. All of the staff had experience with MOS 76C, ranging from one and a half to six years. All six of the staff had four and a half or more years of direct PLL clerk experience. Further, this group had participated in PLL training, including the current QMS group paced instruction, Advanced Individualized Training (AIT), and on-the-job training. Based on the background of the staff, it was concluded that they represented sufficient knowledge of the PLL clerk job to make accurate judgments on the questionnaire.

A panel of four senior instructional designers on staff at SSI conducted a qualitative review of the ratings for each of the 41 characteristics. The findings indicated that 31 of the characteristics were rated sufficiently high in frequency and interference, and thus, could be considered critical. Responses to the remaining ten characteristics were unevenly dispersed over the three rating categories but indicated that these characteristics had an overall rating of moderately important. Based on these findings, the panel recommended that all 41 characteristics seemed "sufficiently important" to "critical", and should be retained for scenario development. It was postulated that any insignificant or irrelevant characteristic would become obvious when developing the draft scenarios and thus, would be disregarded.

Step 5. Generating Draft Scenarios. A 76C subject matter expert on contract with SSI was used to develop the initial scenarios from the 41 environmental conditions. The SME retired from active military service in November, 1985, as a 76Y20 with eight years of experience in supply and logistics.

The plan for developing scenarios required adherence to four special requirements. First, each scenario had to reflect at least one of the 41 characteristics as a clearly stated problem or difficulty encountered by a PLL clerk. Second, each scenario had to relate to one or more of the 23 critical job tasks performed by the clerk. Third, each job situation had to reflect the real world including the setting in which the characteristic occurs, the personnel involved, and the specific forms and technical documents being used. Fourth, each scenario had to suggest a training focus for learning a skill underlying one of the following three competencey domains: Planning, Organizing and Problem Solving. This last requirement was considered essential for promoting transfer of learning from one scenario situation to another within the same competency domain and ultimately, to insure transfer of learning from the training simulation to the job.

Following these requirements and using a question-asking routine with the subject matter expert, a total of 31 draft scenarios were created. These scenarios are contained in an interim report entitled, Draft Scenarios For MOS 76C (Skalny and Mandra, 1986). These scenarios represent coverage of 39 of the 41 original environmental conditions (EC) used in creating the questionnaire. The two items omitted were EC 8 - Failing to review and update the PLL and MPL records, and EC 26 - Needing a high priority request item which is not in stock and can not be ordered in time. The 31 scenarios also represent coverage of 22 of the 23 critical job tasks performed by the PLL Clerk. The one task omitted was 101-539-1110, Prepare and Process a Request for a Repair Part Designated as Quick Supply Store (Automated). Omission of some environmental conditions and job task were anticipated as a result of the subject matter expert's review in that these specific omissions were considered by the expert as unimportant.

Each scenario was formatted as follows:

SCENARIO #:	The scenario identification number.
JOB SITUATION:	The environmental condition (EC) as listed in the questionnaire which represents a potential problem or difficulty for the clerk.
DOMAIN:	The behavioral category which best represents a skill underlying a clerk's problem or difficulty.
JOB TASKS:	The critical job tasks being performed by a clerk when the problem or difficulty is likely to occur.
SETTING:	A specific location where the problem or difficulty might occur.
PERSONNEL:	The specific individuals who might be directly involved in the problem or difficulty.
CONTENT:	The events surrounding and/or leading up to the problem or difficulty.
PROBLEM:	A statement which summarizes a probable generic skill or knowledge deficiency resulting in less than optimal job performance by a clerk.

These scenarios were written to present only the most essential aspects of the events surrounding and/or leading up to the problem encountered by the PLL clerk. The scenarios were submitted to ARI and Ft. Lee QMS personnel for review as to real world accuracy and completeness of coverage.

Step 6. Revising and Validating Scenarios. The draft scenarios were reviewed by two 76C subject matter experts from ESD. Based on their recommendations for revision, a work session was held at Ft. Lee to obtain the additional inputs. The following revisions were made to the initial scenarios: 1) the scenarios were sequenced to reflect a PLL clerk's first day through first three weeks on the job; and 2) additional scenario situational content was integrated with the initial scenarios.

Step 7. On-going Development of Scenarios. Because the scenarios had changed very little since the original November 1985 presentation, it was agreed that SSI would use the latest reviewed set as the foundation for the development of the Transition Module Design Specification Lesson Prototype. In order to refine the Lesson Prototype and Design Specification, SSI continued to collect scenario validation data and incorporate any changes into the revised lesson specifications as shown in the interim technical report - MOS 76C Revised Scenario Material Document (Skalny, Mandra, Marco and Nichols, April and May, 1986).

TRANSITION MODULE DESIGN CONCEPT

This section describes the instructional design specifications for the Transition Module. In keeping with the need to provide MOS 76C classroom training, the design specifications address:

1) the requirements of the job as they are typically performed in the field, and

2) the need to increase the transfer of training from the schoolhouse to the job.

A first step in developing the courseware design for the Transition Module was to analyze the 76C work environment data. As reported in the Work Site Analysis Report (Skalny and Mandra, 1986), the initial data collected consisted of the PLL clerk's typical work flow, the critical job tasks, and the environmental conditions which impact the performance of the PLL clerk.

Based upon the findings of the work environment analysis, and the initial work effort in developing the PLL clerk scenarios, joint reviews and work sessions were held between SSI, ARI and QMS project staff. As a result of these activities, it was agreed that the final outcome of the Transition Module was to produce PLL clerks who perform at subjourneymen's level upon assignment to their duty positions in the field. Within this context, the specific concept of the Transition Module was created as presented in the interim technical report - **Concept Paper - MOS 76C Transition Module (Skalny and Marco, 1986).**

In the analysis of the problems encountered by a new PLL clerk on the job, it became apparent that there were three sets of skills required of apprentice clerks. First, they must complete their job duties quickly, efficiently, and accurately. To successfully complete the 76C AIT course taught at the Quartermaster School (QMS), students must meet a minimum requirement of 85% accuracy. However, as stated by ARI and QMS, this level of accuracy is unacceptable for actual on-job performance which should approximate 100% accuracy. Accuracy is further exacerbated on the job by the frequent requirement of the 76C clerk to do multi-tasking, a situation that the QMS is not able to address or test at this time. Thus, one requirement of the Transition Module is to provide a mechanism for "overlearning" to increase speed and accuracy of on job performance.

Second, 76C PLL clerks must accommodate and react appropriately with the correct response to situational variables. Because of the variety of factors, including local standard operating procedures (SOPS) that can influence how a particular form is processed or a procedure is completed, the QMS teaches the general rule and stresses the importance of learning the situational variables in the job. Thus, the Transition Module was designed to assist the student in accommodating situational variables while maintaining speed and accuracy in job performance.

Third, for most jobs in the military as well as in the civilian sector, there is typically a time period for the apprentice to learn more about the job through direct contact with the supervisor, and, through on-the-job training. Because of the nature of the their jobs, PLL clerks have little contact with their supervisors, and on-the-job training consists of "learning by doing." Although the QMS produces well-trained graduates, it cannot anticipate and train for every possible exigency. Thus, the Transition Module was designed to alleviate some of the problems associated with little supervisory contact by providing the PLL clerk with training in general behavior performance domain skills.

Thus, the final goal of the Transition Module was to master these three sets of skills. They translate to two instructional requirements. First, reinforce mastery of procedural and forms completion skills as acquired in the classroom through applied practice in simulated job situations; and second, develop skills in dealing with job problems by applying rules underlying effective execution of job performance.

INSTRUCTIONAL BUILDING BLOCKS

To achieve the requirements as discussed in the previous section, the Transition Module was structured into three units: Unit 1 - The Job, Unit 2 - Domains On The Job, and Unit 3 - Applied Job Practices. These units were designed to function as "building blocks" through the

courseware as described in the following interim reports: 1) Concept Paper - MOS 76C Transition Module (Skalny and Marco, 1986); 2) Draft Transition Module Design Specification (Skalny, Mandra and Israelite, 1986); 3) MOS 76C Transition Module Course Syllabus (Skalny, Mandra, Mandra and Marco, 1986); 4) MOS 76C Transition Module Lesson Specifications Document (Skalny, Mandra and Nichols, 1986).

Unit 1 - The Job was to reinforce and build on the procedural and forms completion skills acquired in the classroom. The design of this Unit required four subsections. The first section was an introduction to familiarize incumbent PLL Clerks with their work environment in the field. Students interacted with text and representative work environment scenes presented through videodisc. The second section provided practice in completing work forms. Students were required to review representative PLL clerk work forms which were displayed on the terminal screen, and then key-in data in response to specific job-related prompt questions. The third section required students to identify situational cues that trigger execution of specific job task procedures and the completion of associated work forms. The situational cues, as they occur in the work environment, were presented through videodisc. The fourth section required students to learn causes and solutions to representative problems which occur when performing tasks on the job. These problem situations were also presented through videodisc.

Unit 2 - Domains On The Job, teaches students how their performance of procedural and form completion activities can be increased through applying rules related to the following two performance competencies: planning and organizing skills, and problem solving skills. The design of this Unit required students to learn the rules for each domain and then to analyze representative work environment situations to determine which rules were applied and which should have been applied.

Unit 3 - Applied Job Practice then became the focal point of the Transition Module. The basis for the design of this unit was to integrate application of procedural, forms completion, cue identification and competency skills within the context of their work environment. In this unit, the design required students to practice these applications in simulated job situations which increased in complexity. Specifically, the students were given text and graphic, or videodisc scenes which depicted job problems. Then, they were required to demonstrate the ability to deal with the problems by applying correct procedures, completing forms accurately, and applying the correct competency skills.

In keeping with these unit descriptions, specific performance objectives were created for the module. These objectives are stated in the following section.

TRANSITION MODULE COURSE OBJECTIVES

The terminal objective of this module was to provide practice for the 76C trainee in transferring his or her school-acquired procedural knowledge to an application environment that varies from the ideal. In keeping with this expectation, the primary performance objectives were as follows:

1. Given a video simulation of a PLL clerk's job environment containing cues for performing critical job tasks, the trainee will select the correct tasks indicated by each cue.

2. Given a video simulation of problems encountered in the PLL clerk's job environment when performing a critical task, the trainee will apply the solution which corrects each problem.

3. Given text descriptions of problem encountered in the PLL clerk"s job environment when performing a critical task, the trainee will select the competency domain most appropriate for solving each problem.

4. Given a video simulation of problems encountered in the PLL clerk's job environment, the trainee will apply the correct job actions to resolve the problems. The trainee must attain at least 90% accuracy on each problem situation.

Prior to the actual development of the Transition Module instructional content, specific enabling objectives were created for each of the three performance objectives as shown in the interim technical report - Draft Transitional Module Design Specification (Skalny, Mandra and Israelite, 1986).

TRANSITION MODULE COURSE STRUCTURE

The final Transition Module courseware was designed according to the MicroTICCIT hierarchical structure of Course, Unit, Lesson, and Segment. Within this structure, the course design consisted of three units, seven lessons and 26 segments as follows:

Course: Transition Module

Unit 1: The Job

Lesson 1: Getting Started and Forms Completion (2 Segments)
Lesson 2: Job Cues (3 Segments)
Lesson 3: Doing Your Job - Week One Problems (5 Segments)
Lesson 4: Doing Your Job - Week Two Problems (7 Segments)
Lesson 5: Doing Your Job - Week Three Problems (4 Segments)

Unit 2: Domains On The Job

Lesson 1: Planning and Organizing, and Problem-Solving (2 Segments)

Unit 3: Applied Job Practices

Lesson 1: Basic, Intermediate, and Advanced Practices (3 Segments)

A Pretest and Posttest were also included as part of the course structure.

INTERACTIVE VIDEO SCRIPTS AND VIDEO PRODUCTION

Once the initial scenarios were created as discussed previously in the section on the work environment analysis, it was possible to revise these scenarios as an on-going process with technical staff from ARI and Ft. Lee QMS. The revision effort was documented by SSI in the interim technical report - MOS 76C Revised Scenario Material Document (Skalny, Mandra, Marco and Nichols, 1986). This revised material provided SSI with detailed and valid data about the 76C PLL clerk when performing in his or her job environment. Thus, this material was considered as the base information from which both the nonvideo instructional content and the video scripts were developed for the Transition Module. Further, this material was supplemented with access to information in the MOS 76C technical manuals and instructional sources such as the Soldier's Manual FM10-76C, the MOS 76C Transition Performance Aid (flow charts), and MOS 76C AIT classroom instructional materials. An additional source of information was input from MOS 76C subject matter experts including SSI military consultants and Ft. Lee QMS technical staff.

This source document provided the essential content required for creating the video scripts. A total of 39 scripts were written for inclusion in production of the interactive videodisc. All scripts were reviewed for technical accuracy and completeness by staff from ARI and QMS. The final paper copy of the 39 scripts were delivered to ARI as an interim technical report - MOS 76C Video Scripts (Skalny, Mandra and Sawyer, 1986).

The on-site video shot for the 76C Transition Module was performed at the 85th Evacuation Hospital Motor Pool at Ft. Lee from 23 June to 2 July 1986. This activity was coordinated by an SSI staff member who was experienced in interactive video production. Also, members of QMS and ARI staff were present and assisted during the shot. The daily shooting schedule was from 7:30 am to approximately 5:00 pm. Video Software Associates of Washington, D.C., under subcontract with SSI, provided all on site crew and equipment. Five professional actors were used for those roles with major speaking parts and those roles with minor speaking parts were assigned to Ft. Lee staff members.

Although the scripts for all video scenarios were carefully reviewed and revised prior to the shot, various changes were recognized during the shot which required minor rewrites. The video shot was completed on schedule along with the rough edits. Rough cuts of the entire video scenario tape were reviewed by SSI, ARI and QMS staff and minor changes were made. Final editing was performed by Video Software Associates, and the final premaster was forwarded to the 3M Company for production of the final Transition Module videodisc.

Concurrent with creation and production of the videodisc scenarios, instructional designers and courseware developers at SSI continued to write the instructional segments against the Transition Module design specifications, program and debug each segment online, and complete internal reviews and revisions. When the videodisc was available, the 39 scenarios on the disc were logged and integrated into predetermined lesson segments. Once a lesson segment was debugged and revised, the segment was delivered to both Ft. Lee QMS and ARI for client reviews. The client review comments were documented and provided the basis for final revisions to each lesson segment.

Following Transition Module lesson segment revisions, all components of the courseware (e.g. menus, pre and posttests, remediation branches) were integrated together to produce a totally operational interactive video computer-based instructional course. This courseware was delivered to Ft. Lee QMS and loaded on their MicroTICCIT system for a field validation tryout with 76C and 76Y trainees.

TRANSITION MODULE FIELD VALIDATION

A comprehensive assessment of the effectiveness and efficiency of the Transition Module requires considerable field testing. Within the constraints of this contract, it was possible to only conduct a "pilot test" of the course on a small sample of subjects. The plans are to continue to run the course at the QMS and collect sizeable data upon which valid revision decisions can be made. Thus, the findings reported below are based only on the initial validation study of the Transition Module conducted at the Quartermaster School from 2-13 Feb 1987.

Subjects. A total of six subjects were used in this study. Four of the subjects were trainees currently taking the 76C Advanced Individual Training (AIT) sequence. these subjects had completed all but the final section of their AIT. Thus, they had taken and passed the Prescribed Load List (PLL) section approximately five weeks prior to the study. The two other subjects were NCOs from the 76Y MOS currently teaching the 76 AIT. The Transition Module course was presented on MicroTICCIT workstations.

Method. The subjects were informed of the general purpose of the study, namely to: locate programming "bugs"; provide feedback on the accuracy of the PLL related information contained in the course; and, evaluate the adequacy of the video and text displays. The subjects signed on to the course and then proceeded through all of the sections in sequential order. The subjects first took the pretest, answered the items in the three instructional units, and then took the posttest.

When subjects had questions, comments or difficulties about the TM, the classroom proctors provided assistance either by reexplaining the procedures or by writing down a description of the problems encountered and advancing the subject to the next frame or lesson segment. The proctors did not provide answers to test items in the course. Comments were written on paper and registered in MicroTICCIT through the NOTE command.

Findings. The nature of the problems encountered and the comments provided were roughly comparable for both the student and instructor groups. In the view of the instructors, a couple of the video sequences contained some small inaccuracies or improbable actions on the part of the PLL clerk. The students were unable to evaluate this aspect. Many problems were encountered in the computer scoring procedures. These scoring difficulties were caused by a variety of circumstances, such as incorrect recognition of answers, and wrong item totals. As far as can be determined, all of these should be correctable by debugging or rewording.

A more serious problem was encountered in the Applied Job Practice Unit. The items were put in constructed response format; however, the scoring procedures precluded even the most minor deviations from the defined correct answer. For example, omissions of articles, capitalization, transposition, and synonyms all produced wrong answers according to the answer analysis program. All subjects reported great difficulty and exasperation with this section.

Unit 1 (The Job) and Unit 2 (Domains) were more favorably viewed by the subjects who felt that they provided a good integration of all the major activities of the PLL clerk. Unit 2, Domains on the Job, was particularly effective in terms of learning several skill competencies which are related to overall job performance. In addition, the subjects felt that the video quality and video/text integration was satisfactory.

Although the initial validation study findings were based on responses of six students, the preliminary data suggested need for specific revisions to the Transition Module courseware prior to further field testing. Revisions were made by a courseware developer from SSI as follows: 1) Student response scoring routines and report generation functions of the MicroTICCIT system were debugged, and 2) question items identified as ambiguous or inaccurate were rewritten. Preliminary work was started on simplifying the constructed response requirements to reduce confusion encountered in Unit 3 - Applied Job Practices. However, to preserve the constructed response format used in this Unit, the exact type of revisions needed should be considered only after inputs are collected from a larger sample of subjects than used in this initial study.

PART 4: MOS 76C SUPERVISOR TRAINING

PURPOSE

In addition to the MOS 76C Transition Module, a requirement of this contract was to analyze the relationship between 76C personnel and their supervisors to determine whether additional training for the supervisor was indicated. The output of this task was determine whether such instruction was warranted, whether add-ons or modifications to the Transition Module were required, or whether supplemental instructional materials were needed.

REVIEW OF THE PROBLEM

The MOS 76C duty position for the PLL clerk is often performed in an environment with little immediate technical backup. This includes the immediate supervisors of 76C who are supply sergeants, motor sergeants, and motor officers. Since these personnel are not trained as 76C, but are experienced with operational procedures, there may be communication difficulties which contribute to 76C performance problems. It is generally acknowledged that if there is a difference of opinion, rank will prevail.

Attention to deficiencies and voids in 76C supervisor training first surfaced in the 1970's when significant changes occurred in Career Management Field 76 (CMF 76 study, 1984). However, it was not until 10 September 1982 when an official Combat Development Study Directive was issued for Supply and Services Career Management Field (CMF) 76 study. Contained in this directive (CMF 76 study, 1984, p. V-1) is reference to the general problem of lack of technical competence in the supply and service MOS Army-wide. Specifically, this study was prompted by the perception that there exists a lack of trained 76Y30 personnel to provide technical supervision to 76C E1-E5 soldiers at skill levels 1 and 2; that the maintenance NCOs (motor sergeants) in CMF 63 were trained to manage rather than perform PLL and TAMMS supply functions; and that unit commanders did not understand how to supervise or assist the PLL/TAMMS clerk.

Concerted efforts by the Ft. Lee Quartermaster School showed that numerous training options for 76C supervisors were available or planned. The focus of this training was to ensure a better trained 76Y who can offer technical assistance to both the maintenance sergeant and the unit commander concerning the duties of the 76C. An example of this is the Basic Technical Course for MOS 76Y30. As of October, 1983, this course included PLL/TAMMS functions in order to increase the technical expertise of the 76Y supervisor in these functions (CMF 76 study, 1984, p.2-25).

Although 76C supervisor training existed, the concern was raised by SSI as to whether this training focused too much on basic Army Supervisory practices and overall technical content which is common to all MOSs. If so, little or no attention would be directed to understanding the actual 76C job environments, adjusting to local requirements, and dealing with pressures as related to communication difficulties contributing to 76C performance problems.

A potential vehicle for cross training 76C supervisors to become aware of and deal with critical situations encountered on the 76C job may be the MOS 76C Transition Module. To determine this, an analysis was conducted to identify whether: (1) instruction for 76C supervisors is warranted; (2) instruction should be an add-on or modification to the Transition Module; or (3) other supplemental instruction is required.

METHODOLOGY

The methods used to collect 76C supervisor data included a critical review of Army documents and informal interviews with military personnel considered to be subject matter experts (SME) with the issues concerning 76C and 76C supervision.

Three primary Army documents were initially reviewed to acquire background information on issues related to 76C supervision. These documents included: CMF 76 STUDY, ACN70629 (1984); Keesee (1980); and Hughes (1979).

From the review of these documents, and informal interviews with personnel in the Department of Training and Doctrine, and Enlisted Supply Department at Ft. Lee in October, 1985, a list was compiled of 41 job related characteristics which seem to affect 76C job performance. These characteristics were used as the basis for further interviews to define job concerns and potential training needs of 76C supervisors. Informal interviews were first conducted between SSI and a military consultant with 76C experience under contract with SSI. A second set of interviews was conducted between the SSI military consultant and five retired military personnel in the Ft. Lee, Virginia area. Four of the five individuals were recent retirees, that is, three retired in 1984 and one in 1985. The fifth retired in 1979. The backgrounds of these personnel represented 76C, 76Y and 76Z careers with a combined total of fourteen years of direct experience in PLL/TAMMS and over twenty years of 76C experience. In addition, this group had experience in 76C course material development, instruction, DS-4, TACCS and logistics.

FINDINGS

The findings of this study were reported for five areas impacting 76C supervisors: supervisory personnel, technical job specialization, career promotions, supply system automation, and training. Although 76C supervisor information was reported for these five areas, analysis of documents and SME inputs clearly indicated that a major concern

impacting 76C supervisor was related to the nature and scope of available and anticipated supervisor training. A need existed not only for supervisors to understand the technical, day-to-day operations of 76C, but also how to effectively administer and manage supply personnel and operations under specific 76C work environment conditions.

The following sections present a discussion of the major findings of this analysis.

SUPERVISORY PERSONNEL. According to inputs from the SMEs, it was acknowledged that supervision of 76C was a shared responsibility. However, considerable discussion had prevailed as to which MOS should have supervisory authority over 76C, such as 76Y versus 63B (CMF 76 Study, 1984). According to AR 611-201, technical supervision of 76C10/20 was the responsibility of 76Y30. By nature of their duty position, 76Y30 performed duties of the Equipment Records and Parts Specialists (76C20), took necessary action to assure professional development of soldiers in lower skill levels including 76C10/20, and provided technical assistance to 76C20 in reference to the Prescribed Load List (PLL).

However, SME input suggested that, in actuality, 76C had infrequent contact with the designated MOS 76Y supervisor. Reasons offered for this were that 76Y also performs very specialized job tasks that required extensive utilization of their time; that 76Y may have been physically isolated from the PLL environment making it difficult to monitor day-to-day activity of the 76C; and, most importantly, they may not have been sufficiently prepared to deal with specific technical issues surfacing from daily PLL operations such as PLL change listings and reconciliations. It was unofficially reported that because of these factors an attitude existed among some of the 76Y that since the motor sergeant supervised the PLL clerks, he or she should help the clerk.

Supervision was further compounded by the possibility that in functional units, personnel besides the motor sergeant or supply sergeant were involved frequently. These included the maintenance motor officer, the maintenance technician/warrant officer and unit commanders who were usually captains of any branch. SME input supported the notion that often the PLL clerk was confronted with various opinions, interpretations and requests contributing to confusion or misunderstanding of procedural operations.

TECHNICAL SPECIALIZATION OF MOS 76C. MOS 76C personnel required extensive technical knowledge and skills in order to perform their required job tasks. Review of the 1985 Program of Instruction for MOS 76 (1985), and the Soldier's Manual for MOS 76C, Skill Levels 1 and 2 (1984) revealed that this MOS had to be proficient in approximately 38

job tasks. Each task required execution of discrete job procedures and forms to specified standards. Also, mastery was required in use of reference documents such as the AMDF and IL, at least twelve technical manuals and an assortment of specialized vehicle manuals.

Compounding the demands of the 76C job was the frequency of policy changes to these manuals. SME inputs indicated that although changes to Army-wide and local policy/procedure were infrequent, occurring about twice a year, implementing these changes required considerable expertise with the activities of the supply system in order to overcome customer confusion and system errors.

PROMOTIONS. A 76C became a 76Y on promotion to grade E6. The SMEs reported that this promotion has a subtle impact on the relationship between 76C and 76Y. Specifically, when promoted, the new 76Y was physically relocated from the motor pool environment and, especially, from the day-to-day PLL activities. The subtle effect was that, often, contact between the new 76Y and the 76C was reduced significantly. Over time, this effect became even more pronounced.

In addition, the SMEs reported that very little consideration was given to the new 76Y in acquiring new, and very specialized job demands. For example, the 76C was responsible only for Class IX supplies, whereas 76Y was responsible for all types of supplies other than Class IX. The 76Y had to acquire proficiency not only in working with the PLL but also the Property Book. To acquire these job proficiencies demanded the time and effort of the 76Y. This subtlety was reflected in the absence of the 76Y from the PLL environment.

A further issue not often considered relates to the decay in 76C skill and knowledge as one moves away from the daily operation of the PLL. It was already stressed that 76C performs a very complex job, and failure to remain close to this work environment may result, over time, in unfamiliarity is specific procedures and their implementation. This was particularly evidenced in changes or enhancements to automated systems which affect the PLL. Changes in the supply system affecting the PLL were simultaneously being implemented in the Property Book. The new 76Y supervisor had to devote effort to understand these changes to the Property Book and thus, let the new PLL procedures go unnoticed.

SUPPLY SYSTEM AUTOMATION. The Army Documents which were reviewed specifically indicated concern related to the Army's gradual conversion from manual to automated supply system procedures (Hughes Aircraft, 1979, Hel Technical Memorandum, 1982 and CMF 76 Study, 1984). The major concern related to the human engineering aspects resulting from implementing new automated systems, such as Direct Support Unit Standard Supply System (DS-4) for Division Logistics System (DLOGS). The consensus was that these systems or their prototype versions were cumbersome to use and often manifested software/hardware problems contributing to supply system difficulties. However, as automation evolved, many of the system and user problems were addressed through

assessment of field transition training for DS-4 and residential DS-4 courses.

An added concern of this analysis was to determine whether 76C supervisors need instruction in supply system automation. This focus of analysis was prompted by the PLL clerk requirement to learn the operations of the Unit Level Logistics System (ULLS). As a general consideration, the SMEs stated that no automated system should be introduced at the direct user level without also providing the appropriate tools for those who must ultimately supervise these users.

Data reported in the SSI interim technical report, Unit Level Logistics System (ULLS) Job Analysis (Skalny and Peaslee, 1986), indicated that 76C supervisors needed to be familiar with ULLS hardware components, keyboard functions, and menu options and the activities which take place within each option. In addition, it was noted that 76C supervisors had to learn access procedures to reach and monitor critical PLL job displays such as the Due-In Status Report, Document Control Register and PLL. Further, it was found that supervisors had to be able to obtain financial reports, PLL management reports and transaction files.

SUPERVISOR TRAINING. The issue of cross training for 76C supervisors had received considerable attention and documentation (Hughes, 1979; Keesee, 1980; and CMF 76 Study, 1984). However, it was important to focus this issue primarily on the type and scope of training currently available to 76C supervisors.

As background information, SMEs reported that 76C supervisors vary in 76C technical proficiency. This depended on their rank and grade. For example, SMEs stated that 76Y30 was proficient in thirteen PLL job tasks, and six TAMMS job tasks because of shared training in these areas. This proficiency was also due to 76Y's responsibility to perform supply job tasks in such core skills as PLL for small arms, Due-Ins, Document Register and Reconciliations. The overlap was the basis for the decision to retain 76Y as the supervisor of 76C (CMF 76 Study, 1984).

The SMEs also pointed out that a major skill deficiency seemed to be related to preparing and maintaining the PLL and Modified Prescribed List (MPL); both as manual and automated tasks. The reason was that the 76Y who came up to grade E6, rather than the current career progression from 76C to 76Y, was only minimally exposed to PLL and TAMMS tasks. Although 76Y and 76C have shared job tasks, the PLL job and accounting records of 76C differ from supply accounting records of the 76Y.

SME information suggested that major inroads had been made to provide supervisors with 76C training. For example, approximately fifteen Army Correspondence Course Programs (ACCP) and 30-35 Training Extension Courses (TEC) were validated and available to any supervisor and 76C personnel. In addition, more specialized training was offered

through 39 lessons in the Non Commissioned Officer Educational System (NCOES).

A central issue in this study of training requirements of 76C supervisors was whether existing training was sufficient to familiarize 76C supervisors with the environmental conditions, requirements and difficulties encountered on the 76C job. Information bearing on this issue was obtained through discussions with two Ft. Lee SMEs during an October, 1985 visit. Additional inputs were provided by the SSI military consultant during a work session at SSI in December, 1985. Analysis of current training for 76C supervisors is provided below.

ARMY CORRESPONDENCE COURSE PROGRAM (ACCP). These course are exportable, individualized self-study programs available to any individual soldier. The courses were targeted around MOS/Branch job tasks. Fifteen courses were identified which addressed specific 76C PLL/TAMMS tasks. The aim of each course was to provide a basic level of training in the technical procedures and completion of forms relevant to a 76C job task. To ensure trainees that the technical requirements in each course correspond to the job task, these courses were subjected to annual reviews.

TRAINING AND EXTENSION COURSES (TEC). These courses were also exportable and similar in design and content to the ACCP courses. The focus was on stand up group instruction stressing basic technical 76C job procedures, form completion and use of technical reference material. Building on these two instructional course systems was the NCOES program which progressed through five levels and accommodates supervisors based on rank and position.

PRIMARY LEADERSHIP DEVELOPMENT COURSE (PLDC). This was a four to five week residential training program which provides supervisors at grade E4/5 with basic instruction in both leadership and technical knowledge common to all MOSs. Three to four weeks were devoted to leadership content such as policies, principles and procedures, and attitudinal and motivational issues which impact soldiers. Opportunity, although minimal, was provided to apply this leadership content in field exercises. Time is also devoted to a technical overview of policies and procedures which related to all common MOS job performances. The PLDC course specifically addresses technical content such as basic operating procedures related to PLL and TAMMS for all attendees regardless of their MOS.

BASIC LEADERSHIP COURSE (BLC). This is a ten week residential course which provided supervisors at grade E5 and E6 with eight weeks of leadership and primary MOS technical task training, and two weeks of technical concentration in job tasks common to all MOSs. This course also progressed on the foundation of PLDC by providing more detailed exposure in dealing with attitudinal and motivational issues of soldiers. Technical content was addressed which covers the MOS common core and, for the 76Y, focuses on a more detailed understanding of how

supply, PLL and TAMMS clerks work in functional units. For example, material covered includes the PLL, DA Form 3318, computing the PLL, using MPL, and conducting Due-In Reconciliations for the PLL.

ADVANCED NCO COURSE (ANOCC). This was an eight-ten week course for supervisors at grade levels E6 and E7 and is offered at QMS for 76Y, as well as sixteen other service schools for other MOSs. The course was designed to enhance technical skills and leadership principles common to all MOSs. The 76Y ANCOC course teaches supply accounting, requests for issue, turn-ins, automated supply procedures, and PLL and TAMMS tasks, including preparation of forms and interpretation of automated printouts. This training was in addition to the common core leadership module. The scope of this module was reflected in Training Annex A, Common Core (January 1985) which provides supervisory skills and knowledge needed to perform the duties of a platoon sergeant for military subjects required to train and lead other soldiers at the platoon and comparable level. Using this common core module as a representative of 76C supervisor preparation training, it was noted that approximately eight of 49 training objectives might have had some direct relationship to dealing with specific 76C work environment issues such as the pressures, constraints, problems and variations 76C encountered on the job. Also, these eight objectives constituted eighteen of approximately 168 hours of instruction in this leadership module. Three specific examples which reflect these eight objectives were:

1. Be able to effectively apply the principles of human motivation and behavior in daily interaction between yourself and your subordinates so as to enhances desirable soldierly behavior.

2. Understand and employ the appropriate leader/follower style for the situation concerned.

3. Know how the process of perception and communications relate to and impact on your ability to lead and manage a platoon/section effectively.

FIRST SERGEANT COURSE. This course was for supervisors at grade level E8 and ran for six months at Ft. Bliss, Texas. This course was designed to prepare E8s for assignment to positions as Unit First Sergeants. The course content covered leadership goals and principles related to issues such as Equal Employment Opportunity, and technical aspects of supply maintenance, PLL, TAMMS, and other common MOS job tasks.

SERGEANTS MAJORS ACADEMY (SMA). This course was for supervisors at grade level E8 and E9. The course was offered at Ft. Bliss, Texas and runs for six months. The course content was designed to refine leadership and technical job skills previously learned through the NCOES system, and through job experience as preparation for assignment as Command Sergeants Major.

RESULTS AND DISCUSSION

Based on these findings, it was apparent that substantial enhancements have been made to the NCOES training program in order to prepare more qualified 76C supervisors. These enhancements have been prompted by the issues and problems identified in the CMF 76 Study (1984), Keesee (1980) and Hughes (1979). The changes impacting 76C supervisors were directly related to a more comprehensive understanding of common core technical job tasks and leadership skills.

More specifically, evidence existed which revealed that 76Y receives extended PLL and TAMMS technical skill training. This concentration was due to duty responsibilities of 76Y requiring technical expertise similar to the 76C PLL clerk. The noticeable difference, however, was that 76Y applied these technical skills to supply classes other than Class IX which is the domain of 76C.

Further, the leadership modules in the NCOES system provided training in understanding the principles of human behavior and the application of these to Army situations such as motivating soldiers to work, discipline, and conflicts caused by attitudes of subordinates.

In general, it was suggested that training should produce a better trained 76Y to assist and provide technical support to 76C. However, the findings suggested that specific conditions still existed which may be deterrents to effective 76C supervision.

First, in functional units, 76C worked directly for the motor sergeant. Because of this, a prevalent attitude among 76Y seemed to be that since the PLL clerk works for the motor sergeant, the motor sergeant should help him or her out. Yet, it was tne 76Y and not the MOS 63B motor sergeant who was officially authorized to supervise 76C, and who was trained in common PLL job tasks.

Second, the technical specialization of the 76C job and the need to be current with procedural changes suggested that effective 76C supervision required direct day to day contact. The 76Y, however, was not only confronted with keeping current with 76C specialization and procedural changes, but also had to work on maintaining proficiency in 76Y technical job tasks and procedural changes. It was pointed out that as procedural changes occurred in the supply system, they impacted 76C and 76Y operations. To stay current with the specialization of both the 76C and 76Y jobs was a demanding requirement for 76Y. The fact that 76Y is physically removed from the PLL area seems to compound the issue of providing immediate technical support backup to 76C.

Third, the on-going conversion in the Army from manual to automated supply systems indicated that pre-existing problems with DLOGS/DS-4 had been addressed. With the implementation of the Unit Level Logistics System (ULLS), and the requirements for using this system by 76C and 76Y, it was inevitable that additional problems in supervisory support

would surface. However, valid training based on 76C and 76Y job requirements for using ULLS should minimize difficulties which typically occur during the implementation phase. These requirements were defined in the Unit Level Logistics System (ULLS) Job Analysis Report (Skalny and Peaslee, 1986).

Fourth, based on the Army documents, a need was established to provide a better trained 76Y. This had been addressed in part, by promotions of 76C to 76Y positions. In the past, shortages of personnel in 76Y resulted in promoting soldiers with little or no PLL experience to this supervisory position. As the pool of experienced 76C PLL specialists increases, more qualified personnel were available for promotion to 76Y and the supervision of 76C personnel. This situation should continue to result in more qualified 76C supervisors.

The major results of this study suggested that training factors which contributed to low levels of competency of supply system personnel were in the process of being corrected, and that various training options were currently in place which could benefit 76C supervisors in providing technical backup support to 76C. However, existing 76C supervisor training did not seem to focus directly on the documented problem situations which were encountered by these 76C clerks on the job. Specifically, leadership training as presented in the ANCOC course, which was considered to be representative of all NCOES system leadership training, dealt with generic Army personnel issues. It seemed that no current training existed which was explicitly designed for training 76C supervisors to become more aware of and understand how to deal with the critical situations encountered on the 76C job. It was posited that since 76Y was becoming more technically competent and better versed in leadership practices, natural progression would be to enhance these skills through exposure to select instructional content within the MOS 76C Transition Module. The content of the Transition Module captured video simulations of actual 76C work environment situations, and included instructional strategies for learning to deal with these typical situations. The result of exposure to this module should be a more focused awareness of when and how more immediate technical back up support can be provided to the PLL clerk.

It is also recommended that 76Y should be exposed to the ULLS system through the ULLS computer-based instructional program designed and developed by SSI. Using a predefined learning path through the ULLS CBI, 76Y should acquire an additional awareness of the ULLS work system and how to perform some of their job duties on ULLS. These skills and knowledge should further prepare 76Y to better provide immediate backup support to the PLL clerk.

A final recommendation from this study was to consider exposing other 76C supervisors to the instructional content of the Transition Module and ULLS. This was based on the finding that supervision was still a shared activity between 76Y/30 and the motor sergeant. As long as motor sergeants were involved with the PLL specialist on a daily basis, they should also be prepared to assist the PLL clerk.

The findings of this study supported the recommendation that unique 76C work environment training was warranted for 76C supervisors, and that this training could be designed as a modification to the MOS 76C Transition Module.

SUPERVISOR TRAINING MATERIAL

Based on the results of the analysis of MOS 76C supervisor training, consensus was reached by staff members from SSI, ARI and Ft. Lee QMS that supervisors would benefit by completing specific lesson segments within the Transition Module. Specifically, the terminal objective for the supervisor track in the Transition Module was to familiarize supervisors with the 76C duties and responsibilities, and to expose them to the typical problems 76C encounters on the job.

In keeping with this objective which focuses on "familiarization training" for supervisors, the following specific lesson segments were identified for inclusion within the supervisor track:

Unit 1: The Job

Lesson 1:	Getting Started (1 Segment)
Lesson 2:	Job Cues (3 Segments)
Lesson 3-5:	Doing Your Job (5 Segments representing typical 76C job problems)

Also, the supervisor track included a supervisor-specific introduction to this lesson material, and a pretest and posttest referenced to these specific lesson segments.

PART 5: UNIT LEVEL LOGISTICS SYSTEM (ULLS) JOB ANALYSIS

STATEMENT OF THE PROBLEM

Over the next several years, each of these 76C duty positions will be converted from a manual to an automated system. A prototype system has been developed for the unit level supply functions. This system, the Unit Level Logistics System (ULLS) automates supply, maintenance and transportation functions.

Currently, 76C personnel attend a nine week training program at the Quartermaster School at Ft. Lee, VA. This training covers the manual pocedures for completing job requirements in each of the four duty positions. Approximately 35 to 45 Critical Tasks are taught during MOS 76C training. The number of Critical Tasks changes periodically to reflect modifications in the job requirements for the duty positions. The major emphasis of training for 76C coers the PLL Clerk duties.

The conversion of MOS 76C unit level duties to an automated system changes and/or modifies the procedures for performing the Critical Tasks taught during the nine week course. These changes necessitate development of a training program that will enable 76C personnel who are trained in manual procedures to transfer this knowledge to automated procedures. One task to be performed under this contract is to develop the computer-based training (CBT) to train 76C personnel on the operation of ULLS. This requirement includes the development of training for the 76C supervisors to facilitate their use of ULLS and to provide ULLS support to MOS 76C personnel. The first step to completing this task was a job analysis of the ULLS task requirements.

METHODOLOGY. The ULLS Job Analysis was conducted to collect and analyze data related to (1) the ULLS-I prototype system; (2) ULLS-I users; and (3) the emulation capabilities of the instructional computer system. These findings will form the basis for determining ULLS-I job requirements for 76C personnel and supervisors. This section of the report will describe the methods used and present the major results critical to the design of the ULLS computer-based courseware specifications.

The methods used to collect ULLS data included a critical review of Army documents, informal interviews and discussions with subject-matter experts (SME) and direct observation of the ULLS-I on-line prototype system.

A visit to QMS in October, 1985 provided preliminary information through informal discussions with ULLS SMEs and by observing a ULLS, Version I demonstration.

The need for more explicit information relating to the functions of ULLS and user requirements for 76C and 76C supervisors, required a second visit to Ft. Lee QMS in December, 1985. A prepared list of 31 questions was used as the basis of discussions with a QMS selected ULLS SME and for clarifying screen formats, content and interactions as shown through demonstrations of ULLS-I. These questions are contained in Appendix A of this report. In addition, 160 35mm color slides were taken of screen displays for each job function for more detailed analysis following the visit.

Interviews were also conducted with the ULLS SME to determine the characteristics of ULLS users and type of problems encountered in using ULLS.

In addition, data were collected through critical review of ULLS documents including:

- ULLS-I Functional Users Manual (Change 6, September, 1985).

- The ULLS Job and Task Analysis Plan (FY85). This document, developed by Army personnel from a November, 1984 site visit to Ft. Stewart, GA, provides a list of critical tasks performed on ULLS-I.

- 76C Critical Task List. The 76C Critical Tasks are included in the 76C course at the QMS.

Finally, an analysis was conducted of the attributes of the instructional delivery system, MicroTICCIT, for comparison with the attributes of the Unit Level Computer (ULC) on which ULLS is being developed. This analysis was performed to determine the emulation capabilities of the instructional courseware. Information was obtained from the listings and explanation of ULC given in the ULLS-I User Manual.

FINDINGS

The findings of the ULLS Job Analysis are reported for the following areas: (1) ULLS-I System Information; (2) ULLS-I User Information; and (3) ULLS Emulation Capabilities.

ULLS-I System Information

Information obtained during the first visit to Fort Lee indicated that ULLS is currently in revision and that the revised ULLS-II will not be available for use during the contract period. It was, however reported by the ULLS SME that subsequent revisions should be enhancements to Version I rather than major changes. In addition, it was noted that the Radio Shack TRS-80 hardware system used for the ULLS-I prototype is in review, with the likelihood of conversion to a different system. A final hardware decision is not expected until the spring of 1986.

Review of the ULLS-I Users Manual revealed comprehensive listings and descriptions of the software, especially relating to menu options. However, it was noted that specific information needed for emulation purposes was missing. For example, the Users Manual does not consistently cite the data input prompts that guide the user through computer functions. A typical Users Manual citation states: "The operator will enter the data as prompted by the messages displayed." Information on cursor movement, fixed field data and software error messages are not available in the Users Manual.

Further, the Users Manual refers to the Help option with detailed explanation of how it is accessed, but gives no example of the content of the Help screens.

It was also unclear from the Users Manual which 76C Critical Tasks were performed on ULLS. In some cases, it was evident from the menu option such as REQUEST FOR ISSUE, and CANCELLATION. In other cases, it was not clear how, if at all, some Critical Tasks are performed on or through ULLS, such as RECEIVE REPAIR PARTS and PERFORM RECONCILATION OF DUE-INS.

From this review of the Manual, it was apparent that additional information about the ULLS-I system was needed. Specifically, the information required included:

- Verification of the 76C Critical Tasks performed on ULLS-I.

- Verification of information 76C supervisors need about ULLS-I.

- Complete screen data for each Critical Task showing cursor movement, data input prompts, Help screens and software error messages.

ULLS-I User Information

A 76C Critical Task list was obtained from QMS during the October visit to Fort Lee. These tasks are taught to 76C trainees during the nine week MOS 76C training program and are documented in the MOS 76C Program of Instruction for 551-76C10, May, 1985. This list of tasks was compared to the job task requirements of ULLS-I. Data contained in the ULLS Job and Task Analysis Plan (FY85) also provided a list of 76C job functions performed specifically on ULLS. The information in the report was omitted from the comparison process since it was based on the earlier version of ULLS-I, Change 1.

Data collected during the second visit to Fort Lee confirmed that the current QMS 76C Critical Task list was valid and paralleled the job tasks required on ULLS-I. These ULLS-I Critical Tasks are presented in Appendix B.

In the process of reviewing ULLS-I and identifying 76C job functions performed on ULLS, information pertinent to 76C supervisors was identified and recorded. This information primarily concerns the reports generated by ULLS, such as the PLL Zero Balance Report. These reports provide the supervisor with on-line oversight capabilities. A complete list of the job requirements performed by 76C supervisors on ULLS-I is presented in Appendix C.

Background on target audience characteristics was offered by an ULLS SME who has had extensive experience delivering stand-up lecture-based ULLS-I training. It was indicated that the 76C trainees were highly motivated to learn ULLS. This was based on the observation of the SME that students with prior manual supply system background discovered that ULLS is a more efficient and convenient system to use. Also, it was reported that approximately 60-70% of these students had some prior experience with computers. As a final observation, the SME indicated that the user does not need typing skills or detailed knowledge of a keyboard, since most ULLS entries are single character.

The SME's experience with ULLS training suggested three problem areas: (1) difficulty in responding to the range of options in the REQUEST FOR ISSUE menu option; (2) difficulty in responding to error messages concerning system or disk problems; and (3) the tendency over over-confident students to jump ahead of instruction and make mistakes, like printing the Document Control Register, which can take up to an hour.

ULLS-I Emulation Capabilities

The 10 color slides taken of ULLS screens during the second visit to Fort Lee were grouped by 76C Critical Tasks and by supervisors tasks. The slides were then analyzed, in coordination with the Users Manual, to determine the completeness of information needed to accurately emulate each task. The analysis showed that approximately 90% of the necessary information is available from these sources. During the second site visit, resource assistance from the ULLS SME was confirmed for future questions concerning the accuracy of the ULLS emulations.

Review of the slides showed that there are major textual inconsistencies in the ULLS-I prototype software. Standard formats are not always followed in respect to Help screens, data input prompts, data input locations and screen formats.

The current version of ADAPT, the authoring system for MicroTICCIT, is only capable of showing 71 columns of characters. The TRS-80 monitor has an 80 column screen. This discrepancy may cause difficulties in emulating ULLS text displays that run over 71 characters in length. Review of the slides and Users Manual shows that two screens to be emulated overrun this limit.

As a final analysis, the hardware components of the instructional delivery system were compared with the ULLS-I hardware in order to determine how much of the ULLS system could be feasibly emulated.

The Unit Level Computer (ULC) system for the ULLS-I prototype is a transportable microcomputer system manufactured by Radio Shack. It consists of a monitor, CPU, floppy disk drive, hard disk drive, keyboard and printer. Floppy disks are used for recording supply transactions, receiving updated information from the SSA and for recording a backup of daily activities. As of the date of this report, a final hardware system for ULLS/ULC has not been chosen.

The instructional delivery system for ULLS will be the MicroTICCIT system developed by Hazeltine Corporation. A MicroTICCIT workstation will most likely consist of a monitor, keyboard, lightpen and videodisc player. MicroTICCIT workstations do not have disk drives or printers. The absence of these components limits the emulation and instruction of computer skills necessar for operations of these computers.

DISCUSSION OF FINDINGS

ULLS-1 System Information

Detailed software information has been gathered relating to the specific ULLS job functions that will be emulated. This task information is available from four sources:

- the Users Manual, which furnishes all menus, most forms, and a general description of each menu option.
- 160 35 mm color slides taken by the contractor of the comprehensive demonstration of 76C and 76C supervisors' tasks on ULLS.
- Printouts of forms obtained during the ULLS demonstrations. These include the Status File printed from the Mail option and TAMMS forms.
- Notes about screen activity and computer functions obtained during the comprehensive demonstrations of ULLS.

Descriptions of each job function identified in ULLS has been developed to capture the step by step procedure for that job function. These descriptions were used to develop accurate emulations for each job function and were a compilation of the four sources cited above. Any remaining gaps in emulation information was isolated at this point and rectified by contacting the ULLS SME.

It was intended to obtain complete information about the Help option available throughout ULLS. It was found that Help is a large data file and is specific to the content. Upon suggestion of the SME, it was decided to photograph primarily the Help screens which explain each menu option. These Help screens can then be embedded in instruction as a means of illustrating the Help option and providing information on the menus.

ULLS-I User Information

The second visit to Ft. Lee offered the chance to verify and see exactly which job functions were performed on ULLS-I. The SME validated the 76C Critical Task list to show which of these were performed on ULLS and also demonstrated several typical functions that were not Critical Tasks but important for the daily operation of ULLS.

This validation process also identified four tasks on the 76C Critical Task list which were not done on ULLS-I. These are:

- Task 1102 Maintain a Record of Demands-Title Insert

- Task 1109 Prepare and Process a Request for a Repair Part Designated as Direct Exchange

- Task 1115 Conduct Review and Inventory of Demand-Supported Record of Demands-Title Insert File

- Task 1164 Update Signature Cards

Other tasks, such as PREPARE AND MAINTAIN A DOCUMENT REGISTER and MAINTAIN A PRESCRIBED LOAD LIST, are modified because ULLS-I automatically does many of the steps involved in these tasks.

While the 76C Critical Tasks as taught during the nine week MOS 76C course still drive 76C duties, it was clear from this Job Analysis that the introduction of an automated system influences how these job tasks were done. One element of ULLS CBT was to address the differences and similarities of performing 76C Critical Tasks in an automated enviroment as opposed to a manual enviroment.

Major 76C supervisor job requirements on ULLS were identified in this analysis process. Information about ULLS was identified which will aid a supervisor in monitoring 76C activities on ULLS. The training of supervisors on ULLS will be shorter and less detailed than 76C instruction, including an overview of the menu-driven ULLS system, and how to access the information and reports relating to 76C supply activities performed on ULLS.

Information on the 76C target audience indicates that extensive introductory and motivational material on the ULLS-I system may not be necessary. The ease and efficiency of performing 76C Critical Tasks on ULLS appears to be highly motivating in itself. Considering that performing these tasks takes a limited number of keystrokes and that the system is user-friendly, a brief introduction to ULLS-I operations would probably suffice to bring most novice users up to a minimal level of competence for performing ULLS job functions.

ULLS-I Emulation Capabilities

The results of the ULC/MicroTICCIT analysis provided the frameword for deciding which job functions to emulate for CBT. For system emulation, the primary difference between these two computer systems was that the ULC has a floppy disk drive as an essential component of its operation and MicroTICCIT did not. The absence of a disk drive at a MicroTICCIT workstation limited the range of system emulation possibilities of the courseware. Many error messages and most Utilities options in ULLS focused on disk problems or functions, such as booting and formatting disks. While system information and troubleshooting

skills can be addressed conceptually in instruction, simulating these functions would be difficult. The strength of MicroTICCIT is its ability and flexibility in emulating software functions and processes.

The inconsistencies found in ULLS-I text and format could hinder the development of efficient programming of the courseware template for emulating ULLS. The contractor had to balance the need for accurate emulation with the need for an efficient courseware coding method. Some screens, such as the Help screens, were put in a standard format without affecting the content or function of the ULLS emulation.

The 71 character column display capability of MicroTICCIT was adequate for accurate emulation of ULLS screen displays. Review of ULLS forms indicated that most screen displays use less than 70 characters per line. Where screen displays exceed 71 characters, an effort was made to adjust the spacing to fit the information into screen facsimiles.

SUMMARY

Given both the possibilities and limitations of MicroTICCIT, the Job Analysis indicated that the instructional focus of ULLS-I CBT should be on the 76C Critical Tasks. To perform these tasks successfully, instruction should cover the software operating aspects of ULLS such as the function and purpose of each menu option, and several utilities options.

Generic computer functions and concepts needed to be addressed in the CBT courseware as well as specific ULLS computer skills. This is to enhance the transfer of learning to the updated ULLS/ULC system as it becomes finalized.

The next step in developing ULLS courseware for 76C and 76C supervisors was to translate the identified and verified results from this Job Analysis and prepare the learning objectives which drive the development of the ULLS courseware design specifications.

PART 6: UNIT LEVEL LOGISTICS SYSTEM COURSEWARE

ULLS-I Design Concept

The Unit Level Logistics System - Phase 1 (ULLS-1) provides automated procedures for performing and managing the Prescribed Load List. This section describes the instructional design specifications in keeping with the need to provide MOS 76C training which provides a bridge between the manual procedures performed by PLL clerks and the automated ULLS-I procedures. The primary focus of the instructional design was to teach the PLL clerk the basic skills necessary to operate the ULLS-I system. Through the ULLS Job Analysis (Skalny and Peaslee, 1986), it was determined that performing MOS 76C tasks on the ULLS-I system requires the following skills: 1) entering data, 2) locating ULLS-I forms and, 3) using the options on ULLS-I forms. The MOS 76Y who supervise the MOS 76C should also learn the basic skills necessary to operate the ULLS-I system. It was also determined that learners should be provided with an opportunity to practice these skills.

INSTRUCTIONAL BUILDING BLOCKS

To achieve the requirements as discussed in the previous section, the course was structured into four instructional lessons and one practice lesson. Details of the ULLS-1 design were presented in the interim report - Draft ULLS Training Design Specification (Mandra and Israelite, 1986). Each of the four instructional lessons contained the following four components: 1) Introduction, 2) Instruction, 3) Practice, and 4) Review. Emulations of actual ULLS-I screens were provided in the practice lesson and the learner had to complete specific ULLS-I tasks as if the ULLS-I system were actually being used. As the learner progressed through the practice lesson the tasks which the learner was to perform became increasingly complex. The MOS 76C trainee was required to complete each of the four lessons and the first three practices in the practice lesson. The MOS 76C trainee was not required to complete the fourth practice in the practice lesson which consists of only supervisor tasks. The MOS 76Y had to complete the fourth practice. The remainder of the course was optional for the MOS 76Y. A Pretest and Posttest were included in the course. The lessons are described in the following sections.

Lesson 1 - Introduction to ULLS-I. This lesson shows the overall structure of the ULLS-I system. The course objectives and course outline is presented to the learner.

Lesson 2 - Keyboard Skills. It was necessary for the trainee to utilize keyboard skills in all aspects of the ULLS-I system. In this lesson, the trainee was taught how to enter information designated by prompts on the ULLS-I system.

Lesson 3 - Using ULLS-I Forms. In this lesson the trainee was shown how to use the options on the ULLS-I forms. Variations in the ULLS-I operating procedure were also presented.

Lesson 4 - Locating ULLS-I Forms. This lesson presented the method of using the ULLS-I menus to navigate through the system.

Lesson 5 - Practice. This lesson presented four practices in which the trainee uses an emulation of the ULLS-I system to perform ULLS-I tasks.

Acknowledging that the ULLS-I design was a working, and thus evolving, document, it was possible to create specific performance objectives for the course. These objectives are stated in the following section.

ULLS-I COURSE OBJECTIVES

The terminal objective of this course was as follows:

Given a job task which requires the execution of procedural steps, the trainee executed the steps using the ULLS-I system in sequence.

In keeping with this expectation, the primary performance objectives were as follows:

1. Using the ULLS-I automated system, the 76C will locate all on-line ULLS-I forms necessary to complete the selected job tasks.

2. When provided with any on-line form used in the ULLS-I system, the 76C will make all appropriate data entries.

3. When provided with a completed ULLS-I on-line form, the 76C will verify the data on the form with 100% accuracy.

4. Using the ULLS-I automated system, the 76C will perform all functions required to format a Transaction diskette.

5. Using the ULLS-I automated system, the 76C supervisor will locate all forms necessary to complete the selected job tasks.

6. When provided with an automated form used in the ULLS-I system, the 76C supervisor will verify the data required to complete the selected job tasks.

7. When provided with an automated form used on the ULLS-I system, the 76C supervisor will perform the steps required to print the form.

ULLS-I COURSE STRUCTURE

The final ULLS-I courseware was designed according to the MiccroTICCIT architecture of Course, Unit, Lesson, and Segment. Within this structure, the course design consisted of one unit, five lessons, and 20 segments as follows:

Course: ULLS-I

Unit 1: ULLS-I

Lesson 1: Introduction to ULLS-I (4 Segments)

Lesson 2: Keyboard Skills (4 Segments)

Lesson 3: Using ULLS-I Forms (4 Segments)

Lesson 4: Locating ULLS-I Forms (4 Segments)

Lesson 5: Practice (4 Segments)

ULLS-1 COURSEWARE DEVELOPMENT AND REVIEW

Concurrent with programming and debugging the ULLS-1 emulations, instructional designers at SSI created the instructional content against the previously stated objectives and within the lesson segment course structure. Each lesson segment was then programmed and debugged on-line, and reviewed internally for revisions. Once a segment was revised, a tape copy was made and delivered to QMS and ARI for review. The client review comments were documented and provided the basis for final revisions to each lesson segment including the emulated ULLS-1 screens. Following final revisions, all components of the courseware (e.g. menus, pre and posttests, remediation branches) were integrated to produce a totally operational, interactive computer-based instructional course. This courseware was delivered to QMS and loaded on their MicroTICCIT system for field validation tryout with 76C and 76Y trainees.

ULLS-1 FIELD VALIDATION

SUBJECTS. Fifteen trainees at the U.S. Army Quartermaster School at Ft. Lee, Virginia were initial participants in this study. However, difficulties were incurred in collecting sufficient and/or reliable data on seven of the trainees. Thus, the findings reported in this section were based on only eight 76C trainees.

EQUIPMENT AND MATERIAL. The ULLS-1 course was presented as computer-based instruction to the trainees. The ULLS-1 course for MOS 76C trainees is approximately 6-8 hours of training and consists of a pretest, an introduction, three instructional lessons, three job

simulation practices and a posttest. The course for MOS 76Y trainees is about 4-6 hours of training consisting of a pretest, three instructional lessons, one job simulation practice and a posttest. Five Hazeltine MicroTICCIT terminals resident at QMS were used to deliver the courseware.

A Background Information Form was used to gather specific information about each participant. A Student Opinion Questionnaire was used to gather trainee judgments for each of the instructional lessons and job simulation practices. A Course Evaluation Form was used to gather trainee judgments about the overall course.

PROCEDURE. Prior to starting the ULLS-1 course, each trainee was registered in the course, assigned to a MicroTICCIT terminal, and given a brief overview of the ULLS-1 project, the purpose of their participation in this study, and directions for completing the Background Information Form.

The 76C trainees were told to proceed through the course segments in the following order: 1) Pretest; 2) Introduction to ULLS-1; 3) Keyboard Skills; 4) Using ULLS-1 Forms; 5) Locating ULLS-1 Forms; 6) Job Simulation Practice 1; 7) Job Simulation Practice 2; 8) Job Simulation Practice 3; and 9) Posttest.

The trainees were also told that a classroom supervisor would be present and should be informed whenever they were having difficulty proceeding through any course segment. The supervisor would note the specific location and type of difficulty, and insure that the trainee could continue on in that course segment.

To obtain trainee judgments of each course lesson and job simulation practice, the trainees were told to stop when they reached a message screen informing them to see their classroom supervisor. At these points in the course, each trainee completed the Student Opinion Questionnaire. Trainee judgments were collected after the following course segments: 1) Introduction to ULLS-1; 2) Keyboard Skills; 3) Using ULLS-1 Forms; 4) Locating ULLS-1 Forms; 5) Job Simulation Practice 1; 6) Job Simulation Practice 2; and 7) Job Simulation Practice 3.

Trainees were informed to read the course displays carefully, and follow the directions on each display. All trainees were asked to work through the course independently and at their own pace.

After the course Posttest, each trainee was asked to complete the Course Evaluation form.

RESULTS

The results presented in this section were based on only eight 76C trainees. Due to the small sample size used in this initial validation study, it is acknowledged that the trends reported may vary as a result of subsequent field testing conducted under more formal research conditions.

STUDENT DESCRIPTIONS. Table 1 shows a basic profile of the eight participating trainees. This information was reported on the Background Information Forms the trainees completed at the start of the validation study. Six trainees were in the Regular Army, two were in the National Guard and one was in the Reserve Component. Months in the Army ranged from four to 60 months and showed that four trainees were in the Army for only four months, and five trainees were in the Army for more than one year. The rank of trainees ranged from E-1 to E-5. Four of the subjects were previously awarded an MOS.

Table 2 shows which trainees reported experience with supply, typing, computers and computer-based instruction (CBI). This information was reported on the Background Information Forms.

Prior military supply experience was reported by three trainees as follows: Trainee S-4 RS served as a PLL clerk for seven months, trainee S-6 JH served as a Maintenance Management clerk in the Marines for four years and as a PLL clerk for one year, and trainee S-7 TL served as a PLL and TAMMS clerk for four years.

Typing experience was reported by six trainees, computer experience was reported by five trainees and CBI experience was reported by three trainees.

TABLE 1. Description of Students

Student	Military Component	Months in Army	Rank	Awarded MOS
S-1 GA	Regular Army	4	E-1	None
S-2 TA	National Guard	21	E-3	None
S-3 MB	Regular Army	4	E-1	None
S-4 RS	Army Reserve	60	E-4	76P 10 76V 10
S-5 CC	Regular Army	4	E-1	None
S-6 JH	National Guard	16	E-4	76C
S-7 TL	Regular Army	42	E-5.	63 B 10 76 C 10
S-8 RR	Regular Army	4	E-2	None

TABLE 2. Student Reporting Supply, Typing and Computer Experience

	Experience with			
Student	Supply	Typing	Computers	CBI
S-1 GA				
S-2 TA		•	•	•
S-3 MB		•	•	
S-4 RS	•	•		
S-5 CC		•	•	•
S-6 JH	•		•	•
S-7 TL	•	•	•	
S-8 BR		•		

ULLS-1 PRETEST AND POSTTEST PERFORMANCE. Performance on the Pretest and Posttest is summarized in Table 3. Scores are reported for the Overall test and for the following subsections: Keyboard Skills, Using ULLS-1 Forms, Locating ULLS-1 Forms and Job Simulation Practice. All scores are expressed as a percentage of a maximum score of 100%. The criterion of 90% was established as a Pass/Fail reference point.

More specifically, as shown in Table 4 and Figure 1, these trainees did substantially and consistently better on the Posttest than the Pretest. The mean Overall scores were 57% on the Pretest and 86% on the Posttest, which is a 29% gain after completing the ULLS-1 instruction (Table 4).

Analysis of the four subsection scores showed that these trainees achieved higher scores on each of the four subsections on the Posttest than the Pretest (Table 4). Scores on the Pretest and Posttest for Keyboard Skills were 76% vs. 95%, a 19% Posttest gain; for Using ULLS-1 Forms, 58% vs. 94%, a 36% Posttest gain; for Locating ULLS-1 Forms, 51% vs. 79%, a 27% Posttest gain; and for the Job Simulation Practice, 52% vs. 83%, a 31% Posttest gain.

Test completion time is reported in minutes and represents the actual time taken from start to completion on the Pretest and on the Posttest (Table 3). No time measures were obtained for the four subsections of either the Pretest or Posttest. Based on the information in Table 3, the eight 76C trainees required less time to complete the ULLS-1 Posttest than the Pretest. This group of trainees used an average of 52 minutes (range 24-75 minutes) to complete the Pretest and 20 minutes (range 15-29 minutes) to complete the Posttest. The difference between the means was 32 minutes less time required to complete the Posttest.

Further, inspection of Table 3 also showed that on the Pretest, no trainee achieved the 90% Pass/Fail criterion. However, on the Posttest, three of the eight trainees achieved this criterion, and seven of the eight trainees achieved 80% or better. One trainee was below 80% on the Posttest with a score of 72%.

ULLS-1 COURSE PERFORMANCE. The ULLS-1 course consisted of the following lessons and practices: Lesson 1 - Introduction to ULLS-1; Lesson 2 - Keyboard Skills; Lesson 3 - Using ULLS-1 Forms; Lesson 4 - Locating ULLS-1 Forms; Job Simulation Practice 1; Job Simulation Practice 2; Job Simulation Practice 3.

Performance on each lesson and practice is reported in Table 5. In this table, "Attempt" refers to the number of times a trainee tried the segment, and "Score" is the score achieved on the last attempt. The score in Lesson 1 is reported as completed (C) since this segment was not tested, and the score on Practice 1, 2 and 3 represents either passed at 90% (90) or failed (F).

TABLE 3. ACHIEVEMENT SCORES AND THE OVERALL TIME-TO-COMPLETE THE ULLS-1 PRETEST AND POSTTEST.

	PRETEST						POSTTEST					
SUBJECTS	Overall Score	Keyboard Subscore	Using Subscore	Locating Subscore	Practice Subscore	Overall Time (min)	Overall Score	Keyboard Subscore	Using Subscore	Locating Subscore	Practice Subscore	Overall Time (min)
S-1 GA	53	73	64	30	48	35	94	100	100	84	94	17
S-2 TA	51	73	57	43	46	71	72	93	92	76	68	29
S-3 MB	60	80	64	69	48	70	82	100	100	69	76	15
S-4 RC	54	73	50	61	45	42	81	100	100	61	78	17
S-5 CC	63	73	64	46	64	24	86	73	71	76	94	20
S-6 JH	53	80	58	38	48	75	86	100	100	84	76	28
S-7 TL	64	73	64	53	64	37	91	93	92	84	92	20
S-8 RR	60	80	42	69	56	60	92	100	100	100	86	16
MEAN	57	76	58	51	52	52	86	95	94	79	83	20
9 JD (76Y)	49	60	28	80	50	-	73	100	75	76	66	-

TABLE 4. Achievement Score Gains on the Posttest for 76C Students

PRE/POSTTEST SECTIONS	PRETEST Mean Score (%)	POSTTEST Mean Score (%)	Gain (%)
Overall	57	86	29
Keyboard Skills	76	95	19
Using ULLS-1 Forms	58	94	36
Locating ULLS-1 Forms	51	79	27
Job Simulation Practice	52	83	31

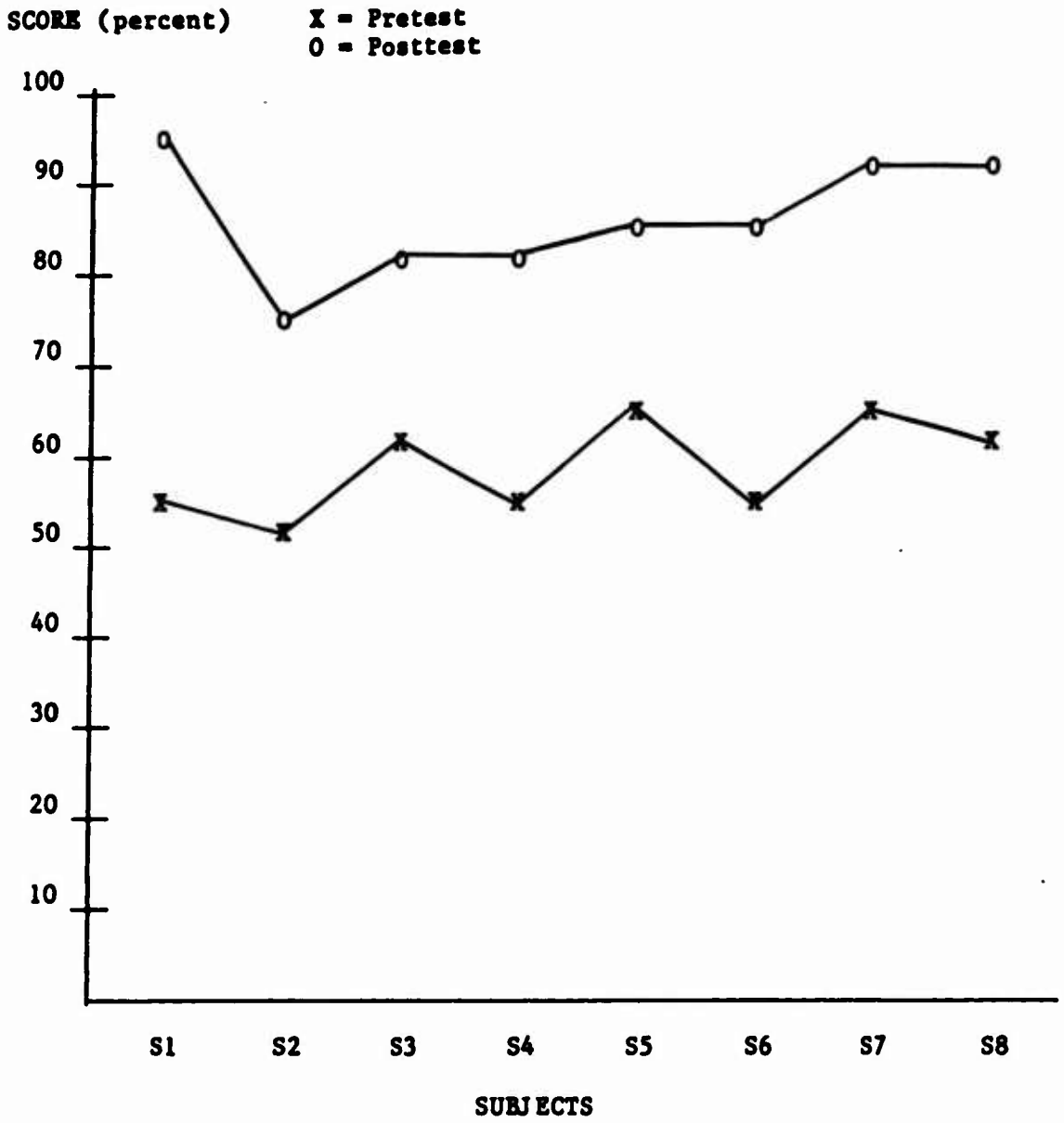

FIGURE 1. Overall Scores on ULLS-1 Pretest and Posttest for 76C Students.

As shown in Table 5, all eight 76C trainees and the one 76Y trainee passed all three instruction lessons (Keyboard, Using and Locating) at the 90% criterion on the first attempt.

Lesson 1 - Introduction. Based on performance of the eight 76C trainees on the Introduction, all trainees completed the Introduction on the first attempt. The mean time to complete the Introduction was 11 minutes (range 5-18 minutes).

Lesson 2 - Keyboard Skills. All eight trainees passed this lesson at the 90% criterion level in one attempt. The mean score was 98% (range 93%-100%). Five of the eight trainees achieved a score of 100%. The mean time to complete the lesson was 30 minutes (range 19-43 minutes).

Lesson 3 - Using ULLS-1 Forms. All eight trainees passed this lesson at the 90% criterion level on one attempt. The mean score was 96% (range 90%-100%). Two of the eight trainees achieved a score of 100%. The mean time to complete this lesson was 28 minutes (range 13-42 minutes).

Lesson 4 - Locating ULLS-1 Forms. All eight trainees passed this lesson at the 90% criterion level in one attempt. The mean score was 96% (range 93%-100%). Three of the eight trainees achieved a score of 100%. The mean time to complete this lesson was 30 minutes (range 14-55 minutes).

Practice 1. All eight trainees passed Practice 1 at the 90% criterion level. Two trainees achieved criterion on the first attempt, 4 trainees on the second attempt and two trainees on the third attempt. The mean time to complete Practice 1 on the first attempt was 30 minutes, on the second attempt was 23 minutes, and on the third attempt was 28 minutes.

Practice 2. Seven of the eight trainees passed Practice 2 at the 90% criterion level. Four trainees achieved criterion on the first attempt and three on the second attempt. The one trainee (S-3 MB) who did not achieve criterion tried the Practice four times and then was asked to stop and go on to Practice 3. The mean time to complete Practice 2 on the first attempt was 18 minutes and on the third and fourth attempts (one subject) 15 minutes each.

Practice 3. Seven of the eight trainees completed Practice 3. Of these seven trainees, five achieved the 90% criterion level. However, three trainees achieved criterion on the first attempt and two on the second attempt. The two trainees who did not achieve criterion attempted the Practice one time (S-3 MB) and two times (S-4 RC) before they were told to stop. The mean time to complete Practice 3 on the first attempt was 28 minutes, and 20 minutes on the second attempt.

TABLE 5. Attempts, Time-to-Complete and Scores on Each Lesson and Practice for 76C and 76Y Students.

SUBJECTS	LESSON 1 Introduction			LESSON 2 Keyboard			LESSON 3 Using			LESSON 4 Locating			PRACTICE 1			PRACTICE 2			PRACTICE 3		
	Attempt	Time (min)	Score	Attempt	Time (min)	Score	Attempt	Time (min)	Score	Attempt	Time (min)	Score	Attempt	Time (min)	Score	Attempt	Time (min)	Score	Attempt	Time (min)	Score
S-1 GA	1	10	C	1	22	100	1	20	96	1	22	96	2	28/14	90	1	19	90	2	30/15	90
S-2 TA	1	13	C	1	35	100	1	39	90	1	55	100	3	31/14/25	90	2	26/17	90	-	-	-
S-3 MB	1	5	C	1	30	96	1	31	93	1	38	96	3	31/31/20	90	4	20/18 15/15	89	1	28	F
S-4 RC	1	5	C	1	22	100	1	33	96	1	32	96	1	40	90	1	18	90	2	29/25	F
S-5 CC	1	18	C	1	25	93	1	13	100	1	14	100	2	11/11	90	1	13	90	1	14	90
S-6 JR	1	18	C	1	40	100	1	42	93	1	34	90	2	42/23	90	2	30/20	90	1	35	90
S-7 TL	1	5	C	1	19	100	1	19	100	1	20	100	2	20/27	90	1	16	90	1	20	90
S-8 RR	1	12	C	1	43	96	1	26	96	1	27	93	1	40	90	2	38/18	90	2	37/20	90
MEAN	1	11	-	1	30	98	1	28	96	1	30	96	2	30/18/23	-	1.7	23/18 15/15	-	1.4	28/20	-
S9 JD 76Y	1	10	C	1	38	96	1	26	100	1	41	94	1	14	90	2	12/11	90	-	-	-

- Attempt is the number of tries.
- C in Lesson 1 score column means completed (not tested).
- Practice 1, 2 and 3 scores of 90% mean passed at 90% criterion or F meaning failed at this criterion. All scores are for the last attempt.
- Dash (-) means data unavailable.

Table 6 provides individual and mean time measures required to complete the entire ULLS-1 course and the following course subsections: Pretest, Lessons 1-4, Practices 1-3, and Posttest. These time measures are for first attempts only.

On the average, it took about four hours to complete the entire course (range 2.9 to 5.7 hours). More time (20 minutes) was used on the four lessons than on the three practices (98 vs. 78 minutes).

The greatest amount of time (98 minutes) was required to complete the four lessons, followed by the three practices (78 minutes), the Pretest (52 minutes) and, finally, the Posttest (20 minutes).

TABLE 6. Time to Complete the ULLS-1 Course and Course Subsections on the First Attempt for 76C Students.

Subjects	Time to Complete (Minutes) Pretest	Lesson 1-4	Practice 1-3	Posttest	Total Min. (Hrs)
S-1 GA	35	74	77	17	203 (3.4)
S-2 TA	71	142	-	29	-
S-3 MB	70	104	79	15	268 (4.5)
S-4 RC	42	92	87	17	238 (4.0)
S-5 CC	24	70	38	20	152 (2.5)
S-6 JH	75	134	107	28	344 (5.7)
S-7 TL	37	63	56	20	176 (2.9)
S-8 RR	60	108	105	16	289 (4.8)
Mean	52	98	78	20	239 (4.0)

STUDENT OVERALL COURSE EVALUATION. The eight 76C trainees responded to the eight questions on the Overall Course Evaluation Forms after completing the Posttest. Their responses to each question are summarized in this section.

Question 1. When in the program did you become comfortable using the computer?

S-1 GA No problem
S-2 TA Beginning
S-3 MB Keyboard lesson
S-4 RC (Gradually)
S-5 CC Keyboard section
S-6 JH Practice #3
S-7 TL During the Practices
S-8 RR After each block of instruction (gradually)

Question 2. How was the length of the program?

S-1 GA Exercise could be a little longer
S-2 TA Too short
S-3 MB For 4-5 hours I was okay
S-4 RC (not applicable)
S-5 CC Perfect
S-6 JH Very long
S-7 TL A good amount of time
S-8 RR Length was good

Question 3. Was this program difficult?

S-1 GA No, it was an average type of exercise
S-2 TA Some of it - Locating section
S-3 MB It wasn't difficult
S-4 RC Not at all
S-5 CC No, actually easier than what I experienced in the past
S-6 JH Yes, at the start
S-7 TL No
S-8 RR No

Question 4. Did you have any problems with any features or aspects of this program?

S-1 GA No problems with this program
S-2 TA Yes, Locating
S-3 MB On occassion I was confused by the documents
S-4 RC Locating lesson
S-5 CC No
S-6 JH No
S-7 TL (No)
S-8 RR The "Help" didn't have anything to do with the exercises. All it did was give general instructions.

Question 5. What features or aspects of the program did you like the most?

S-1 GA The advice part - helps you save time by storing the situation at your fingertips
S-2 TA (not applicable)
S-3 MB Using the computer
S-4 RC Keyboard, Using ULLS-1, Job Simulation
S-5 CC I liked the flowchart to explain the ULLS-1 system and the graphics
S-6 JH (not applicable)
S-7 TL An Introduction to every block and the practice to prepare you for the Posttest
S-8 RR Realizing how easy the ULLS-1 is

Question 6. What features or aspects of the program did you like the least?

S-1 GA Not applicable
S-2 TA Not enough like regular procedures
S-3 MB There was nothing that I really disliked
S-4 RC Locating
S-5 CC Not applicable
S-6 JH None
S-7 TL Jumping from one situation to another
S-8 RR Didn't like seeing the question "What do you do next? over and over

Question 7. How would you change the instruction if you could?

S-1 GA I wouldn't change it
S-2 TA Make locating easier to understand
S-3 MB Give us more frequent breaks
S-4 RC (No response)
S-5 CC No overall change
S-6 JH (Not applicable)
S-7 TL Locating
S-8 RR No response

Question 8. This is your space for any additional comments you would like to make about this program.

S-1 GA I this this program is a great addition to our technology and could probably take over when the instructor can't quite get the information over.
S-2 TA (No response)
S-3 MB (Not applicable)
S-4 RC It's an excellent course of instruction.
S-5 CC (More wrong answer feedback)
S-6 JH The program was very educational.
S-7 TL The ULLS system is very good - it will help 76C do their job more effectively and more expedient than using the manual system.
S-8 RR (No response)

STUDENT OPINIONS ON LESSON AND PRACTICE SEGMENTS. The responses of the eight 76C students to the items on the Student Opinion Questionnaire for each Lesson and Practice are summarized in this section.

The questionnaire consisted of 14 statements related to the instructional mechanics of the ULLS-1 course as follows:

1. The lesson was well organized.
2. The content of this lesson was difficult to understand.
3. The screen icons such as "HELP", "BACK", "EXIT", "ADVICE" and "GO" were easy to use in this lesson.
4. The technical terms were difficult to understand in this lesson.
5. The lesson was interesting.
6. The print size was difficult to read in this lesson.
7. The ULLS-1 forms were easy to use in this lesson.
8. The directions in the lesson were confusing.
9. The graphics were helpful in this lesson.
10. The length of this lesson was too long.
11. The ULLS-1 work forms were difficult to understand in this lesson.
12. The keyboard was difficult to use in this lesson.
13. It was easy to understand that the upper portion of each screen displayed the ULLS-1 work form, and the lower portion contained data and instruction.
14. How frequently did you use each of the following icons in this lesson?

Review of trainee responses to these fourteen statements showed that across all four lessons and three job simulation practices, the majority of trainees agreed with the statements; that is, the majority of students strongly agreed and/or agreed with statements written as positive (e.g., statement 1), and disagreed or strongly disagreed with the negative one (e.g., statement 2).

SUMMARY OF MAJOR FINDINGS

The following section presents the major results of the ULLS-1 validation study. It is important to note that during the validation activity, a considerable amount of information about each lesson segment within the course was obtained from the trainees. This information was critical in identifying specific problems related to presentation of instructional content, screen formatting, progression through each segment, directions, "help" and feedback information. Also, this information permitted identification of significant "author" and MicroTICCIT "system" errors. For example, one particular error occurred which inabled the trainees to move to the next screen. Also, branching routines at several points in the course directed trainees to an inappropriate screen. Finally, problems were identified with the code used to control several lesson menus, and calculation errors were noticed in the MicroTICCIT automated scoring and reporting function in

one lesson. As a result of this type of user information, it was possible to compile a list of items in need of definite revision.

Based on the findings reported in the previous sections above, the major results of the ULLS-1 validation study were:

1. The ULLS-1 course appeared to have a learning effect on these trainees as reflected in significantly better Posttest scores, and in the high number of lessons and practices in which these trainees achieved the 90% pass criterion on the first attempt.

2. The course appeared to be well organized, interesting and presented clearly, and the ULLS content seemed to address the core areas of the ULLS automated work system. This result was based on debriefings with the trainees following completion of the course.

   However, the lesson on locating ULLS-1 forms seemed to be the most difficult for trainees in that, as a group, the trainees reported some confusion as to what form they should use next. This may have been attributed to their unfamiliarity with the ULLS system in terms of both the newly automated PLL forms and the new procedural step required to locate menus and forms in ULLS.

3. There did not seem to be any relationship between trainees who could not type and level of success in this course. This is probably attributed to the fact that this course did not require any exceptional typing skills, since the entire course can be completed using a one finger, "hunt and peck" method of typing.

4. Based on information from trainee debriefings, it was indicated that the trainees reacted favorably to CBI. Particular features of CBI which emerged were self-paced, self-study, immediate performance feedback, and consistent presentation of instruction when repeating any lesson segment. Also, it was indicated that as a group, these trainees did not seem to experience "computer anxiety" when using the courseware.

5. Overall, the ULLS-1 course required approximately four hours to be completed. The time to complete data, when further validated, may be useful for course scheduing activities.

As a result of this initial validation study, significant revisions have been made to the ULLS-1 course. Further refinements to this course are anticipated as this course continues to be field tested on 76C trainees at Quartermaster School.

APPENDIX A

CRITICAL TASKS FOR 76C PLL CLERK

TASK NUMBER	CRITICAL TASKS LIST (Annex B)	RATINGS* D	F	C
101-521-1157	Maintain Due-In Status File for Request Items	V	7	A
101-521-1163	Prepare and Maintain a Document Register	D	7	A
101-521-1164	Update Signature Cards (Notice of Delegation of Authority - Receipt for Supplies).	E	1	B
101-521-1101	Maintain a Prescribed Load List (PLL) (Manual)	E	5	A
101-539-1102	Maintain a Record of Demands-Title Insert (Manual)	E	7	A
101-539-1105	Prepare and Process a Request for a Repair Part (Manual)	E	3	A
101-539-1109	Prepare and Process a Request for a Repair Part Designated as Direct Exchange (DX) (Manual)	E	3	B
101-539-1115	Conduct Review and Inventory of Demand-Supported Record of Demands-Title Inserts (Manual)	D	1	A
101-539-1124	Maintain Mandatory Parts List (MPL) Record of Demand-Title Inserts (Manual)	D	1	A
101-539-1119	Initiate Follow-Up or Document Modification Action (Manual)	E	1	B
101-539-1120	Initiate Cancellation Action (Manual)	E	1	B
101-539-1111	Receive Repair Parts (Manual)	E	3	A
101-539-1113	Turn In Repair Parts (Manual)	E	1	B
101-539-1104	Prepare and Process a Request for a Repair Part (Automated)	E	7	D
101-539-1125	Prepare and Process a Request for a Repair Part Designated as Direct Exchange (DX) (Automated)	E	3	D
101-539-1110	Prepare and Process a Request for a Repair Part Designated as Quick Supply Store (QSS) (Automated)	E	2	B
101-539-1126	Maintain a Prescribed Load List (PLL) (Automated)	E	7	A
101-539-1116	Process Prescribed Load List Change Listings (Automated)	E	2	A
101-539-1121	Perform Reconciliation of Due-Ins	E	1	A
101-539-1122	Initiate Follow-Up or Document Modification Action (Automated)	E	1	B
101-539-1123	Initiate Cancellation Action (Automated)	E	1	B
101-539-1112	Receive Repair Parts (Automated)	E	3	B
101-539-1114	Turn In Repair Parts (Automated)	E	1	B

*KEY

C = Critical
A = Must do
B = May do

F = Frequency
7 = Performed 7 Days a week
1 = Performed 1 day

D = Difficult
V = Very difficult to perform
D = Difficult to perform
E = Easy to perform

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