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ORNL/TM-10243

Computer Aided Instruction for the Naval Aviation Logistics Data Analysis System

Interim Report

L. D. Duncan
B. H. Handler
S. G. Sparks

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Energy Division

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Naval Aviation Logistics Data Analysis System**

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L. D. Duncan
B. H. Handler
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NOTICE This document contains information of a preliminary nature.
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LIST OF ACRONYMS

AIMD	Aircraft Intermediate Maintenance Department
AIS	Automated Information System
CAI	Computer Aided Instruction
COMNAVAIRRESOR	Commander, NAVAL Air Reserves Force
COMNAVAIRPAC	Commander, NAVAL Air Pacific
CRT	cathode-ray tube
DECwriters	Digital Equipment Corporation hardcopy terminals
FOJ	Fleet Originated Job
GSE	Ground Support Equipment
MAG	Marine Air Group
MAW	Marine Air Wing
MDS	Maintenance Data System
MENS	Mission Elements Needs Statement
NAEC	Naval Engineering Center
NALC	Naval Aviation Logistics Center
NALDA	Naval Aviation Logistics Data Analysis
NAMP	Naval Aviation Maintenance Program
NARF	Naval Aviation Rework Facility
NAVWESA	Naval Weapons Engineering Support Activity
NAVAIRSYSCOM	Naval Air Systems Command
NESO	Naval Engineering Support Office
ORNL	Oak Ridge National Laboratory
PC/AT	IBM Personal Computer/Advanced Technology
PM	Program Manager
POA&M	Plan of Action and Milestones
S2K	System 2000
SESD	Supply Engineering Standardizing Department
SHMD	Shore Manning Documentation
SRC	Scheduled Removal Component
TDSA	Technical Directive Status Accounting
TTY	Teletype Terminal
VIDS/MAF	Visual Information Display/Maintenance Action Form
WSMO	Weapon Systems Management Office

ABSTRACT

Oak Ridge National Laboratory personnel are researching the applicability of computer aided instruction for the Naval Aviation Logistics Data Analysis (NALDA) System. The objective of this project is to correct the deficiencies outlined in the NALDA Mission Elements Needs Statement (MENS), dated January 22, 1986.

The project is divided into two phases. This report follows the completion of the first two tasks in phase one. The purpose of these tasks was to (1) determine the scope of the investigation and to identify representative sites and target audiences, and (2) investigate current operations, including existing software and hardware, current training curricula, user operator procedures, and specific deficiencies that may be improved.

Site visits and user interviews have been completed and the resulting data have been entered into a database which was used as an analysis tool in building a generic profile of user needs. This interim report discusses the data gathered from current NALDA users in connection with their experiences in learning and using the system. A prioritized list of needs and requirements of the NALDA user community is included.

1. PROJECT DESCRIPTION

1.1 PURPOSE

The purpose of this project is to design and develop a Computer Aided Instruction (CAI) system for the Naval Aviation Logistics Data Analysis (NALDA) Automated Information System (AIS) to correct the deficiencies outlined in the NALDA Mission Elements Needs Statement (MENS) dated January 22, 1985. The project is divided into two phases. Phase I is currently being performed by the Oak Ridge National Laboratory (ORNL).

1.2 REQUIREMENTS

Phase I: ORNL shall (1) analyze requirements, target audience, and determine course content and delivery options, and (2) document findings in a comprehensive report to the NALDA Program Manager (PM). The desired CAI system shall be interactive, user friendly, easy to learn, and easy to use. It shall provide for the creation, maintenance, usage, and monitoring of on-line training for NALDA AIS users, and shall be accessible through the NALDA CRT terminals, personal computers, and minicomputers which communicate with the central mainframe.

Phase II: Based on the results of Phase I and on approval of the NALDA PM, ORNL shall complete a structured design and specification document for a CAI system. This design shall in turn provide the basis for development and implementation of the desired CAI system.

1.3 ACTIVITIES

A listing of activities, organized in chronological sequence by task number under each phase, is presented as follows:

Phase I

- Task 1: Develop a plan of action (i.e., determine scope of investigation, identify representative sites, and target audience).
- Task 2: Investigate current operations (i.e., existing software, hardware installation schedule, current training curricula, user operating procedures, and known deficiencies that could be corrected).
- Task 2A: Document findings of Task 2 in an Interim Report to NALC.
- Task 3: Investigate alternatives (i.e., buy vs. build, current market options, prioritize needs and requirements, analyze costs, and determine scheduling constraints).
- Task 4: Make recommendations and report to NALC.

Optional continuation of ORNL support with personnel requirements, schedules, and cost estimates to be determined after completion of Task 4.

Phase II

- Task 5 : Design "friendly" user interface.
- Task 6: Design computer aided instruction.
- Task 7: Develop user interface.
- Task 8: Develop CAI.
- Task 9: Implement interface and CAI.

1.4 CURRENT STATUS

Tasks 1 and 2 within Phase I have been completed. Site visits and user interviews are complete. The data collected from these meetings have been entered into a database. The database has been used as an analysis tool in building a generic profile of user needs. Task 3 is currently underway. Additional analyses of user requirements are continuing. Identification and review of commercial authoring systems have begun.

2. DATA COLLECTION

2.1 METHODOLOGY

The primary thrust of Phase I, Task 2, has been to collect data from the current users of the NALDA system based on their experiences in learning and using the system as it exists today. An attempt was made to identify the most representative user organizations and those which are the most unique. Once target sites were selected, a primary contact at each was provided by NALC. ORNL staff made phone calls to the primary contacts to discuss the topics to be covered in the interviews and to secure assistance in scheduling interviews with other NALDA users at the same site (Fig. 2.1).

At each site, or user organization, interviews were conducted both individually and in small groups. The interviewers collected background demographic data about each person including education and related experience. The interviewers asked a series of open-ended questions to the NALDA users related to their past, present, and planned interactions with the system (Figs. 2.2 and 2.3). This approach allowed the users to focus on the key issues from their own perspective, and did not introduce the interviewer's bias to the discussion. In addition, a multiple choice survey was completed by each user regarding specific issues (Fig. 2.4).

Once the interviews had been conducted, follow-up letters were sent to the primary contacts to thank them for their cooperation (Fig. 2.5). Similar letters were sent to other people who were of significant help in the site visiting process.

2.2 POPULATION DESCRIPTION—GENERAL

A total of 91 users were interviewed by one or more of the ORNL team. These users represent 14 sites and/or major organizations including COMNAVAIRRESOR, COMNAVAIRPAC, NAVWESA, NAVAIRSYSCOM, NAEC, and all six NESOs. A list of site visit dates and organizations is included in this report as Fig. 2.1. This listing is considered to be an adequate sample from which to interpolate the general needs of the current NALDA user community and the needs of future users who will be gaining access to the system with fleet expansion.

2.3 POPULATION DESCRIPTION—ANALYTICAL

When reading the following sections and viewing the tables and figures, consider that some of the percentages do not add to 100. Due to rounding errors, some of the sums of the individual percent calculations fell between 99 and 101 percent.

Date	Site	Organizations visited
April:		
22 (Tues.)	Norfolk, VA	NAMP
23 (Wed.)		AIMSO (from Pax River)
29 (Tues.)		Maintenance Dept.
30 (Wed.)		NESO
May:		
1 (Thur.)	Norfolk, VA	Manpower Engineering Center SHMD
13 (Tues.)	Oak Ridge, TN	Martin Marietta Energy Systems
June:		
3 (Wed.)	Cherry Point, NC	NESO, 2nd MAW (Supply) Weapons Systems, WSMO
5 (Fri.)	Oceana, VA	AIMD (Supply)
11 (Wed.)	New Orleans, LA	COMNAVAIRRESFOR
12 (Thurs.)		NESO
23 (Mon.)	Pensacola, FL	NESO
24 (Tues.)		
23 (Mon.)	Miramar/	AIMD, VC-16, ManTech
24 (Tues.)	North Island	COMNAVAIRPAC (Supply)
25 (Wed.)	San Diego, CA	NARF, NESO, MAW
26 (Thurs.)	Jacksonville, FL	NESO
26 (Thurs.)	El Toro/Tustin	3rd MAW, MDS
27 (Fri.)	Santa Ana, CA	MAG 11, WING
July:		
14 (Mon.)	Washington, DC	CACI
15 (Tues.)		NAWWESA
16 (Wed.)		NAVAIRSYSCOM
17 (Thurs.)		
18 (Fri.)		
22 (Tues.)	Lakehurst, NJ	NAEC, SESD
24 (Thurs.)	Lexington Park, MD	NALC (GSE, SRC, TDSA)
25 (Fri.)		
August:		
6 (Wed.)	Cherry Point, NC	MAG 14
7 (Thurs.)		2nd MAW (Supply)

Fig. 2.1. Schedule of site visits.

The following are examples of questions you will be asked to answer/discuss during your interview.

How long have you been a NALDA user?

What percentage of your total work load is devoted to using NALDA?

Have you had experience with other databases?

Have you had formal NALDA training?

What hardware are you presently using?

Are you anticipating a change in the hardware that will be available to you?

How do you use NALDA in your job (e.g., reliability studies, inventory)?

Do you anticipate using NALDA for any future applications?

Which databases do you access?

What problems, if any, did you encounter while learning to use NALDA?

What suggestions do you have for improving existing NALDA training?

Do you think NALDA is "user friendly"?

Do you find the information obtained from NALDA easy to interpret?

In your opinion, does NALDA meet all your information needs?

Do you feel the level and intensity of NALDA training has been satisfactory for effective use?

To what extent do you feel free to "play" or experiment with NALDA?

Fig. 2.2. NALDA CAI interview questionnaire.

DATE: ____/____/____ SITE: _____ INTERVIEWER: B G L D

TITLE: _____

NAME: _____
 FIRST MIDDLE LAST

ORGANIZATION/ACTIVITY: _____

ORG LEVEL: 0 I D

ORG TYPE (e.g., squadron, wings): _____

GRADE/RANK: _____ CODE: _____

JOB TITLE: _____ HOW LONG: _____

OFFICE PHONE: _____ / _____
 AUTOVON COMMERCIAL

DAYS/HOURS YOU CAN BE REACHED BY PHONE (e.g., M-F 8-10) _____

CIRCLE ONE: CIVILIAN MILITARY (HOW LONG:))

LENGTH OF NALDA USE IN YEARS (e.g., 10.5): _____

DOES ANYONE ELSE USE YOUR ACCOUNT: _____

FREQUENCY OF USE (PERCENTAGE OF TOTAL WORK LOAD): _____

NALDA USE: SELF-DIRECTED DIRECTED BY OTHERS

PRIMARY USE: FORMULATE QUERIES ANALYSIS REPORTS

 OTHER _____

MOST JOBS SUBMITTED VIA: BATCH INTERACTIVE

PREVIOUS DATABASE EXPERIENCE: YES NO

FORMAL NALDA TRAINING: NO YES (WHEN:))

EDUCATION: HS NAVY SOME COLLEGE COLLEGE DEGREE _____

COMPUTER COURSE: HIGH SCHOOL COLLEGE NONE OTHER _____

EXISTING HARDWARE: _____

PROJECTED HARDWARE: _____

Fig. 2.3. NALDA CAI user questionnaire.

APPLICATION: _____

PROJECTED APPLICATIONS/NEEDS: _____

DATABASE(S) ACCESSED: _____

Give interviewee rating form here

TRAINING PROBLEMS: _____

TRAINING SUGGESTIONS: _____

GENERAL SUGGESTIONS: _____

OBSERVER COMMENTS: _____

Fig. 2.3 (continued)

NAME _____

OPINION/RANKING: 1 Strongly Agree
2 Agree
3 Disagree
4 Strongly Disagree
5 Don't Know

1. THE SYSTEM IS USER FRIENDLY

1 2 3 4 5

2. INFORMATION FROM NALDA IS EASILY INTERPRETED

1 2 3 4 5

3. THE USE OF NALDA REQUIRES KNOWLEDGE OF DEPARTMENTS/DIVISIONS WITHIN YOUR ORGANIZATION WITH WHICH YOU ARE NOT FAMILIAR

1 2 3 4 5

4. FROM YOUR PERSPECTIVE, THE SYSTEM MEETS/EXCEEDS ALL OF ITS INTENDED PURPOSES

1 2 3 4 5

5. THE MAJORITY OPINION WITHIN YOUR ORGANIZATION IS THAT NALDA MEETS/EXCEEDS ALL ITS INTENDED PURPOSES

1 2 3 4 5

6. IN YOUR OPINION, SYSTEM TRAINING HAS BEEN ADEQUATE

1 2 3 4 5

7. THE HARDWARE USED TO ACCESS NALDA IS ADEQUATE TO MEET INTENDED SYSTEM PURPOSES

1 2 3 4 5

Fig. 2.4. NALDA CAI multiple choice questionnaire.

8. IN YOUR OPINION, YOU ARE ADEQUATELY INFORMED OF NALDA'S CAPABILITIES

1 2 3 4 5

9. YOU PRESENTLY HAVE ADEQUATE MATERIALS/RESOURCES WITH WHICH TO CONTINUE YOUR NALDA TRAINING

1 2 3 4 5

10. WHICH OF THE FOLLOWING RESOURCES HAVE BEEN MOST RESPONSIBLE FOR ANY INEFFECTIVE SYSTEM TRAINING. LACK OF:

_____ TRAINING AIDS (system documentation, brochures, training software)

_____ SKILLED INSTRUCTORS

_____ ADEQUATE TIME FROM DAILY DUTIES TO LEARN THE SYSTEM

_____ INFORMATION ABOUT AVAILABLE TRAINING AIDS

_____ THERE HAS NOT BEEN A LACK OF ANY OF THE ABOVE

11. THE LEVEL AND INTENSITY OF SYSTEM TRAINING HAVE BEEN SATISFACTORY FOR EFFECTIVE SYSTEM USE

1 2 3 4 5

12. IN YOUR OPINION, YOU FEEL FREE TO 'PLAY' OR EXPERIMENT WITH NALDA

1 2 3 4 5

13. MANY TIMES A PIECE OF SYSTEM HARDWARE IS INTENDED FOR USE BY SEVERAL DIFFERENT PEOPLE—THIS IS A NALDA ACCESS PROBLEM FOR YOU.

1 2 3 4 5

Fig. 2.4 (continued)

July 10, 1986

Contact
Installation
Site

Dear Primary Contact:

This letter is written to let you know how much the hospitality and cooperation of you and your staff were appreciated on our recent visit to your activity. We especially want to thank-you for the candor with which you spoke about your involvement in the NALDA system and its training program. You made our job very pleasant and easy to accomplish.

As we mentioned in our visit, we would like the opportunity to contact you if the need arises for further clarification or additional information. You were a delightful host and provided us with pertinent data that will be utilized in our final analysis.

We are convinced that NALDA has the capabilities to meet the needs of the users. Steps are being taken to ensure that this goal will be accomplished. Being a part of a government agency, we realize the magnitude of this goal and respect the effort being made by NALC to attain it.

We will submit a final report to NALC, documenting our findings and providing recommendations. If you would like a copy of this report or if there is anything further we can do to help you in any way, please do not hesitate to call.

Sincerely,

Interviewer(s)

Fig. 2.5. Follow-up letter.

2.3.1 Database Experience and Formal NALDA Training

Fifty-five percent of those interviewed (50 people) had no previous experience with a database, therefore System 2000 (S2K) was their first introduction to any type of database management system (DBMS). The 45% (41) who had previous experience working with a DBMS had worked with a one other than S2K (Fig. 2.6). Of these 45% (41), about one-third (13) had not received formal NALDA training, although they had been using the NALDA system for an average of 2.1 years within a range from 0.5 to 5 years of use.

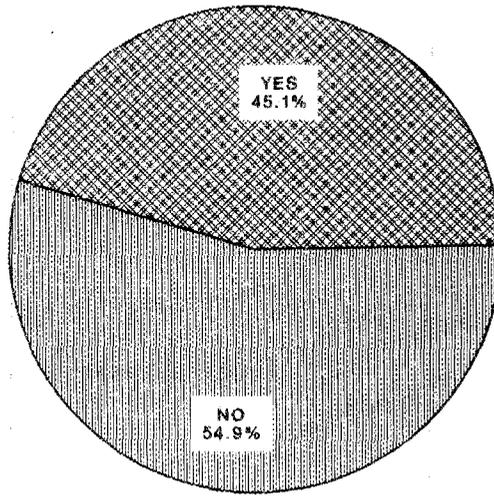


Fig. 2.6. User population with previous data base experience.

Within the entire sample, there were 30% (27) of the users who had not received formal training (Fig. 2.7). The remaining 15% (14) were using NALDA with no formal NALDA training or prior experience in the use of any DBMS (Fig. 2.8). Comments made by this group of users included references to the difficulty of structuring queries within a hierarchical structure and alluded to the fact that all users need some type of training on a friendly system.

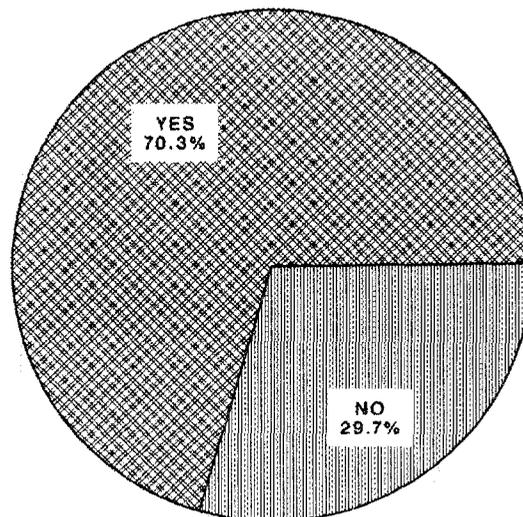


Fig. 2.7. User population with formal NALDA training.

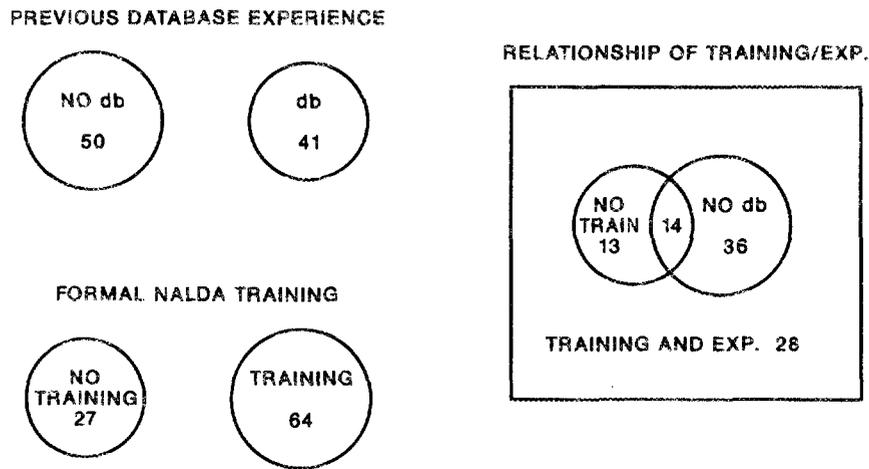


Fig. 2.8. User population with previous data base experience and formal NALDA training.

2.3.2 Education Level

The educational background (Fig. 2.9) of the interviewed users varied through high school (2%), military training (21%), some college (48%), and college graduates (29%). Slightly over half of the interviewees (52% or 48 users) had received some type of computer course (Fig. 2.10) either in college (36% or 33 users), the military (12% or 11), or assorted other ways (4% or 4). These types of individual differences in student backgrounds affect the students' readiness to learn to use NALDA and should have a

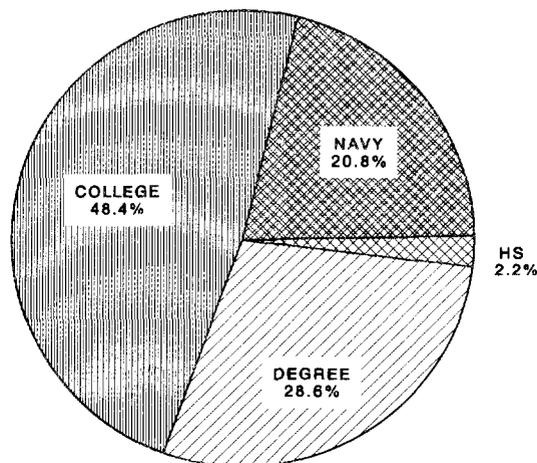


Fig. 2.9. Educational level of user population.

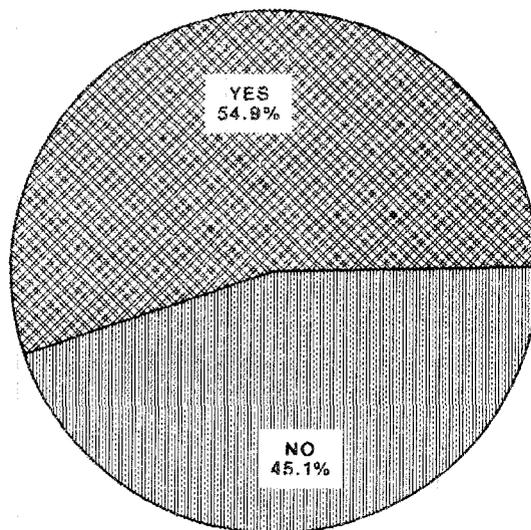


Fig. 2.10. Previous computer courses of user population.

sharp influence on the structuring of any instruction. This diversity is an area in which a CAI type of presentation could make a significantly positive contribution.

2.3.3 Frequency of NALDA Use

The majority of NALDA users questioned have been using the system for less than two years (63% or 57 people). The user who has been using NALDA the longest reported 11.5 years of use and was included in the 11% (10) of those interviewed who have been accessing the system for more than 5 years (Fig. 2.11). It is understandable that the frequency of use, or the actual percentage of working hours spent using NALDA, would vary. The results show that 63% (57) use the system less than 25% of their working hours. Thirteen users (14%) stated their frequency of use as being between 25 to 49% of their work load and 21 (22%) fell into the interval of 50 to 90% (Fig. 2.12). One user (1%) stated an involvement of over 90% of total work time as being spent with NALDA.

It is interesting to note that 70% of the users with formal NALDA training worked with NALDA a maximum of 25% of their time, and 70% of the users without training worked with NALDA a maximum of 25% of their time (Fig. 2.13). No difference was detected between the two groups in the amount of time spent accessing the system; however, there was a difference in the comments made about the system use. As would be expected, the group with no the formal training found the system more difficult to use. Some of the specific comments made included, "If I were more knowledgeable, I would do more with the system," and "I see more NALDA possibilities but my training has been inadequate." On the other hand, those who had previous training made comments that pertained to the data rather than the actual use of the system: "Database has errors, there

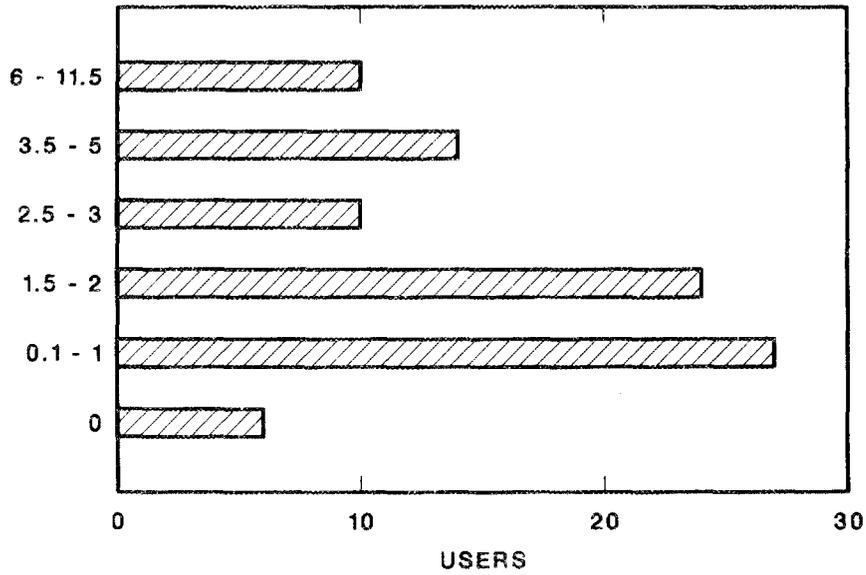


Fig. 2.11. User population: length of use.

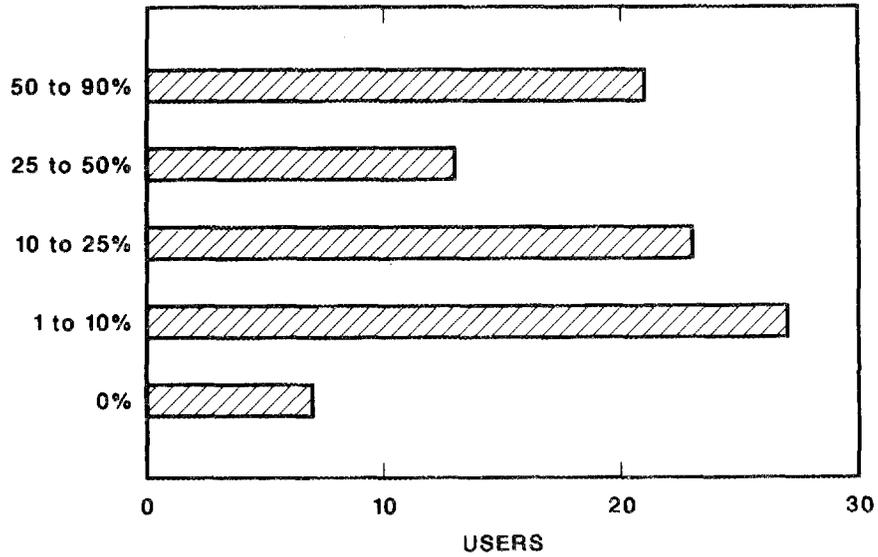


Fig. 2.12. User population: frequency of use.

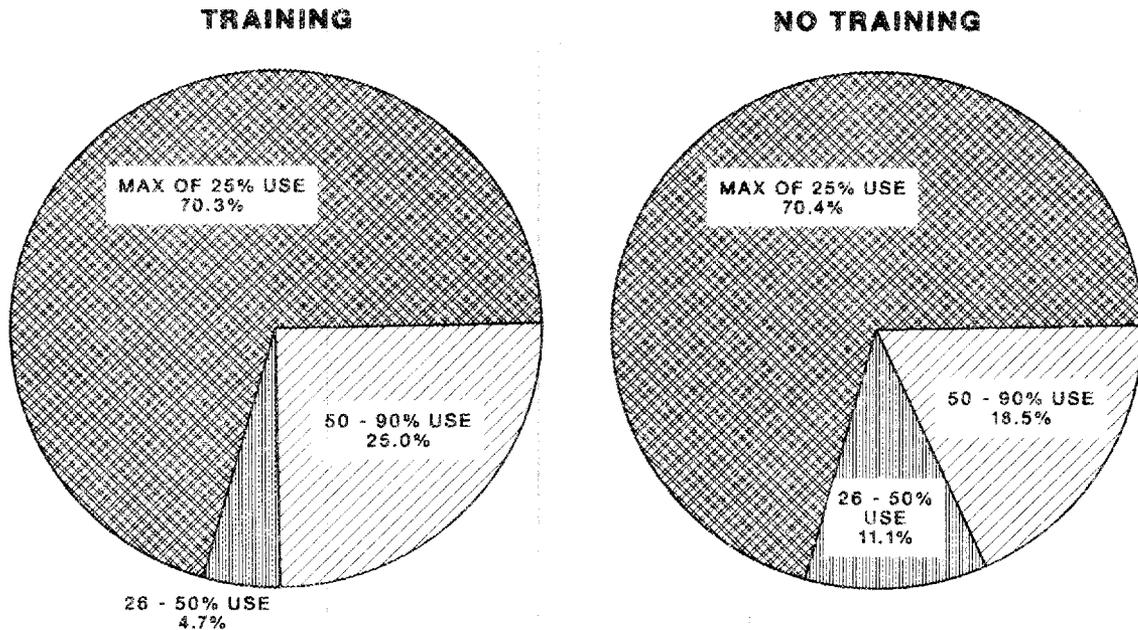


Fig. 2.13. User population: relationship of training and frequency of NALDA use.

doesn't seem to be any interest in being sure data are accurate," "More current data needed," and "Need updates from NALDA/NALC."

2.3.4 Military/Account Status/Direction

During the interviews, users were asked whether they were military or civilian employees, whether they had a private NALDA account or shared an account with others, and whether their use of NALDA was self-directed or directed by others. Of the interview sample ($n = 91$), 59% (54) were civilian, and the other 41% (37) were members of the military (Fig. 2.14). This sample represents a fairly even split between military and civilian users, although civilians do make up the majority.

Sixty-six percent (60 people) of the sample population reported that they shared an account with at least one other person. The largest number of users sharing an account was reported to be eight; however, some users stated they shared with "everyone in the branch" rather than giving an actual count. Individual accounts were maintained by 30% (27), and data were not obtained from four users (4%) (Fig. 2.15). Many users said they had applied for an account, or for more accounts to share, but had not yet received them. Although sharing accounts was a minor inconvenience for some users since only one person could be logged on under that account at a time, the limited availability of equipment seemed to control the number of people attempting to access NALDA simultaneously. The split between military and civilian users was roughly the same for shared and individual accounts (Fig. 2.16).

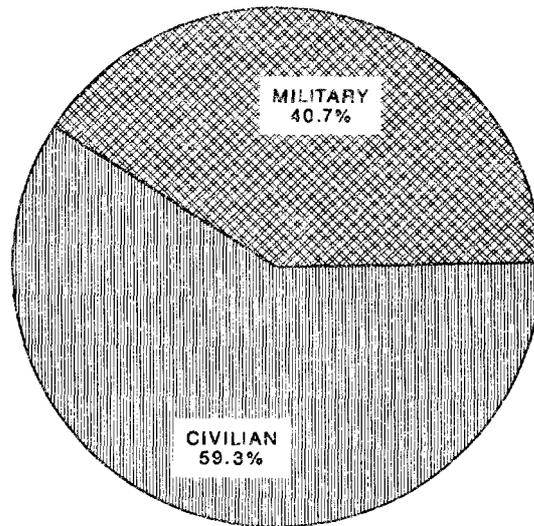


Fig. 2.14. User population: military/civilian.

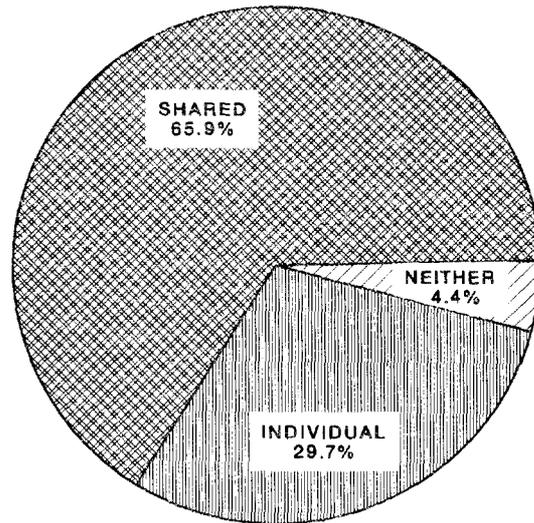


Fig. 2.15. User population: NALDA account.

The largest category of users interviewed carried out their work by the direction of others (48% or 44 users), and 22% (20) considered their work to be self-directed. One fourth (25% or 23 users) of the sample indicated that they did both types of work (self-directed and directed by others). There were four users (4%) who were not working with NALDA at the time of their interview (Fig. 2.17). The large proportion of people using

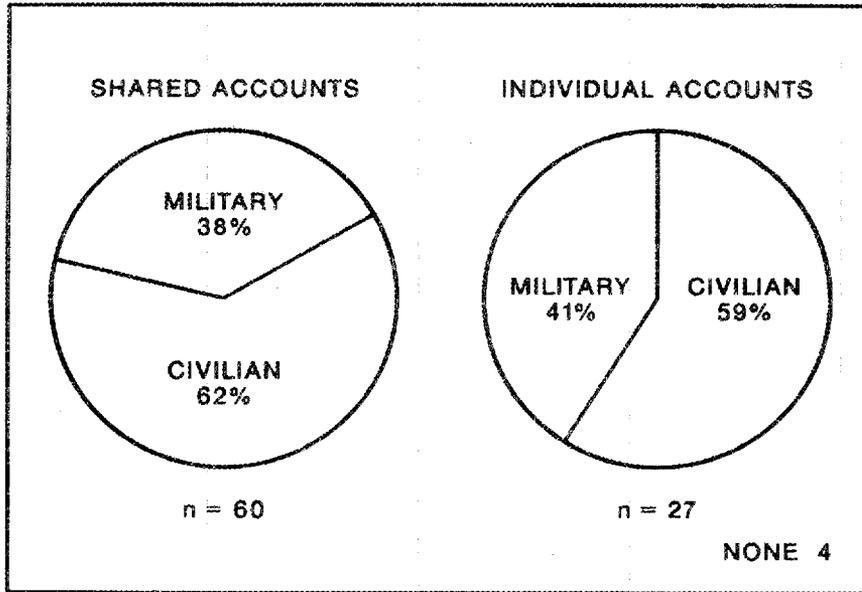


Fig. 2.16. User population: account status.

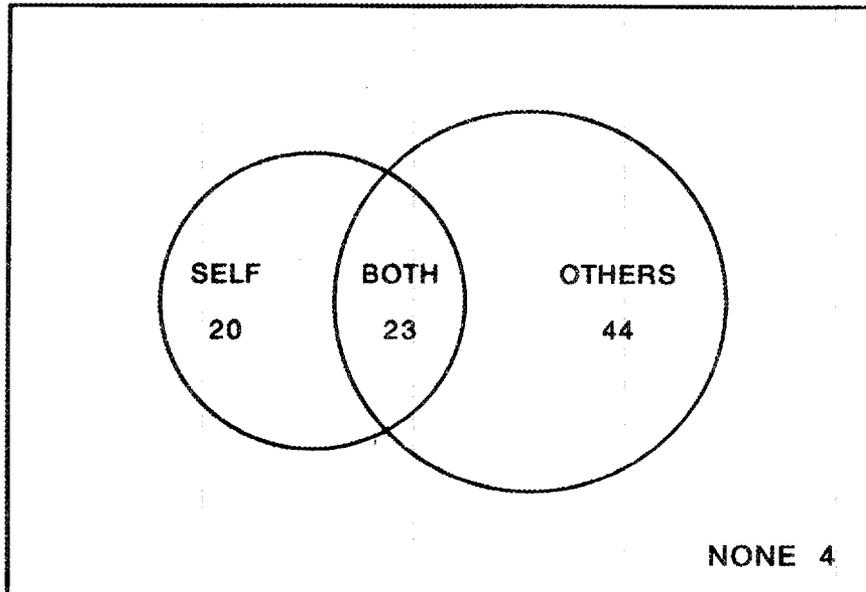


Fig. 2.17. User population: work direction.

NALDA at the direction of others could indicate several things. These users may be the most experienced or trained people and may be considered experts by those they support. There may be a very large number of people who need information from NALDA but are not able to get it for themselves due to lack of training, equipment, time, or other factors. On the other hand, it is possible that these other-directed users are in a position that does not require them to decide what information is needed and may, in actuality, be the less trained or experienced users. Whatever the underlying reasons, those people who do use NALDA as directed by others need particular expertise in understanding what it is they are being asked to do, translating the request into the appropriate NALDA/S2K commands, and, perhaps, interpreting the results for someone else.

2.3.5 Application Areas

The various user applications of NALDA, the number of users per application type, and the respective percentages are listed as follows:

Performing analysis (only)	26	29%
Formulating queries (only)	13	14%
Preparing reports (only)	12	13%
Combinations of the above	33	36%
All three	15	16%
Queries/reports	12	13%
Analysis/reports	4	4%
Queries/analysis	2	2%
None of the above	7	8%

The 8% listed in the "none of the above" category includes a user who is responsible for input of data, a user who had not worked with the system at the time of the interview, one person in an administrative position, and four interviewees who did not answer the question (Fig. 2.18).

NALDA users who had not received formal training are less involved in doing a combination of applications than those users who had received training (Fig. 2.19). Only five of the 27 users who had not received formal NALDA training (19%) are working in any of the combinations listed above, whereas 29 out of 64 (45%) of the trained users are working in more than one application area. One could conclude that the trained users are more versatile and/or feel more comfortable in dealing with NALDA information. Those without training are in situations where they are required to work strictly with analysis (26%), reports (26%), or formulating queries (15%). It should be noted that formulating queries is the least used application for those who have not been formally trained. Among the trained users who work in a single application area, 30% work in analysis, 14% are involved in queries, and 8% work with reports. As stated previously, 45% of this group are involved in using more than one type of application. Users with and without formal training are expected to do similar jobs.

2.3.6 Access Method

NALDA access methods are through batch or interactive modes. The interviewees were divided in their access method. Twenty-eight (31%) used the system exclusively or

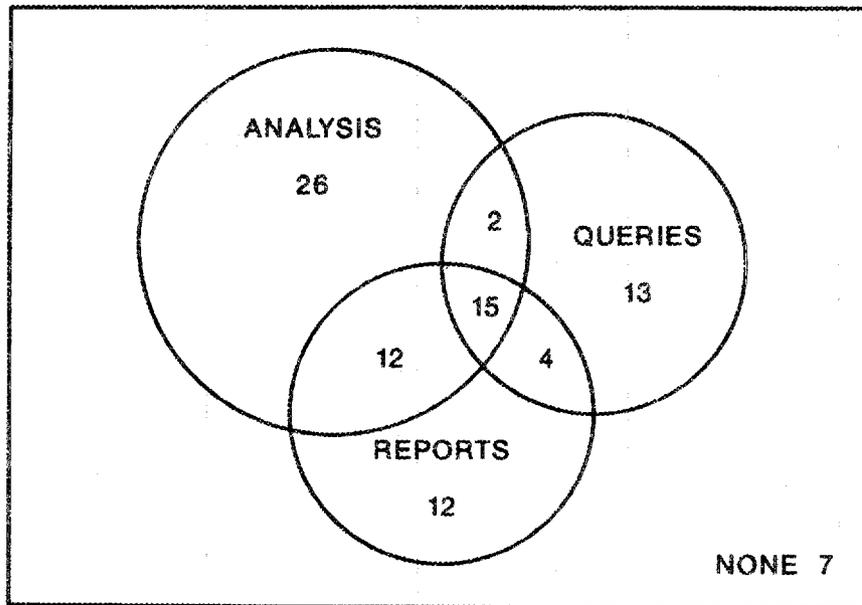


Fig. 2.18. User population: applications.

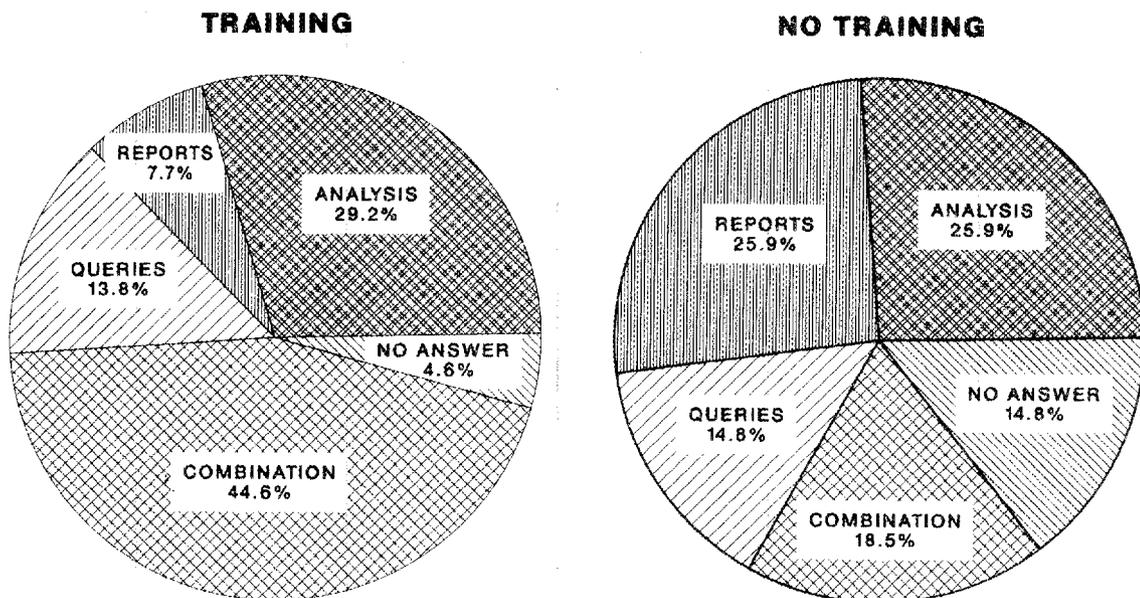


Fig. 2.19. User population: relationship of training and application.

primarily in interactive mode, whereas batch was used predominately by 39 (43%) of the group. The remaining users (Fig. 2.20) fell into two other categories: those who regularly used both modes (17 people or 19%), and the small group of users (7 people or 8%) who are still not using NALDA.

Users who were directed by others and users who were self-directed seemed to access the batch and interactive modes with similar frequency. The self-directed batch users numbered 11 (55%) of all self-directed users, while the other directed batch users numbered 22 (50%) of all other-directed users. Of those users who stated that they were both self- and other-directed, 26% used the batch access method and 49% used the interactive method, with 26% professing use of both interactive and batch methods of access.

A further analysis shows that the interactive method was used by 35% of the self-directed users as compared to 23% for the other directed users. Those claiming to be directed both by self and others represented 49% (11) of the group of interactive access method users.

Those users who followed the directions of others, as well as being self-directed in accessing the batch and interactive modes, comprised 26% of the group who claimed to be both self- and other-directed. Twenty percent (9) of the other-directed users accessed NALDA in both manners (interactively and batch), and 10% (2) of the self-directed users used both access methods.

A summary of these findings (Fig. 2.21) indicates that more users access NALDA in the batch mode than the interactive mode. This conclusion seems consistent with the

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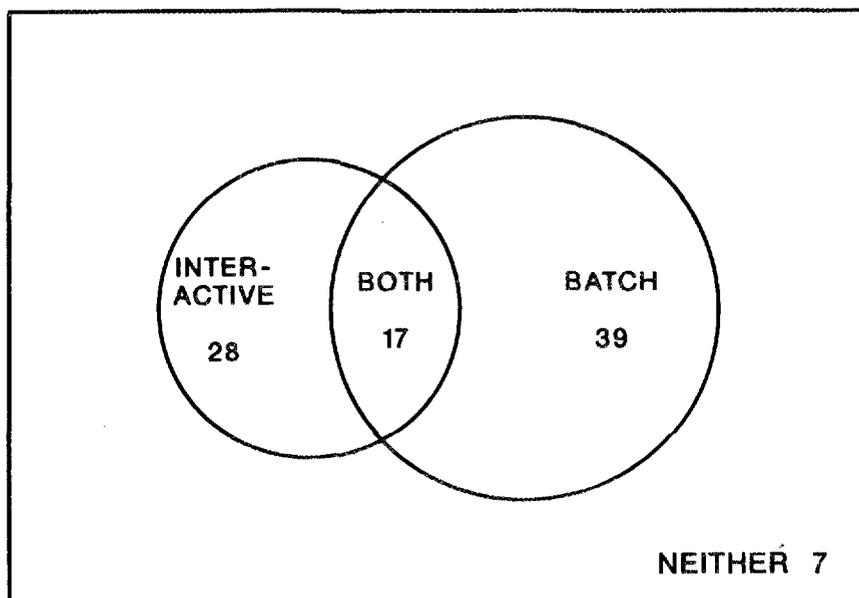


Fig. 2.20. User population: access method.

DIRECTION:	SELF	OTHER	BOTH	NEITHER	TOTAL
ACCESS:					
INTERACTIVE	35 25	23 36	49 39	- -	31 100
BATCH	55 28	50 56	26 15	- -	43 99
BOTH	10 12	20 53	26 35	- -	19 100
NEITHER	- -	7 43	- -	100 57	8 100
TOTAL	100 22	100 48	100 25	100 4	101 99

Fig. 2.21. Interaction of access method and direction (percentages).

information and instructions presented in the training classes. It is less expensive to access NALDA using the batch mode and when the information needed for analysis and/or reports is not needed immediately, it is even preferable. However, there are situations when data are needed quickly and users claim they are directed to access the system using batch anyway. This is often a source of frustration for the users as it can cause a considerable delay in accomplishing their work.

2.3.7 Hardware

There are a variety of terminals, smart terminals, and personal computers being used by the interviewees. Many of the users share equipment with other users at their installations; sometimes in the same office, same building, or within the confines of the installation. Forty-seven percent (43) of the sample population have access to exactly one device, which ranges from a TTY to the IBM System 36 (Fig. 2.22). Nine users (10%) claimed they did not have any equipment readily available to use. There were instances of users who had a terminal without a modem, shared a phone line with as many as eight other people, had cable and not equipment, or had equipment and no cable.

When interviewees were asked about projected hardware, 45% (41) did not know of any additional equipment having been promised to them. Many of the users who fell into this category were functioning with "dumb" terminals, TTYs, Datapoints, DECwriters and other "older" hardware. Only five of the users who were not expecting additional hardware were using more technologically advanced equipment such as an IBM PC/AT or the IBM System 36.

There were those who were expecting additional hardware in the form of the IBM System 36 (26% or 24 users). Most of the other users were expecting IBM PCs of some type or Zenith PCs (Fig. 2.23). It is difficult to calculate accurate percentages for planned hardware as many users mentioned that they expected more than one piece of equipment. At the present time, it is strongly recommended that each site have at least one PC which can be used for NALDA access and/or CAI training as it pertains to the use of NALDA.

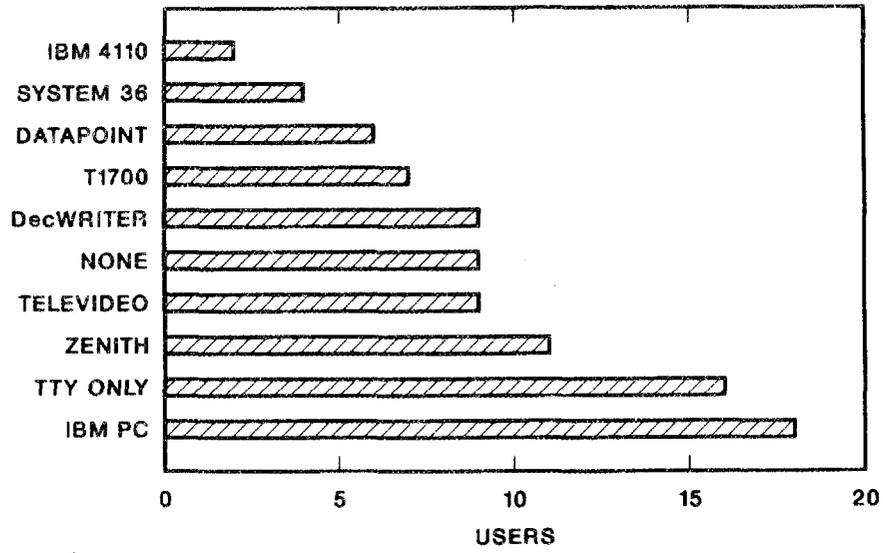


Fig. 2.22. User population: existing hardware.

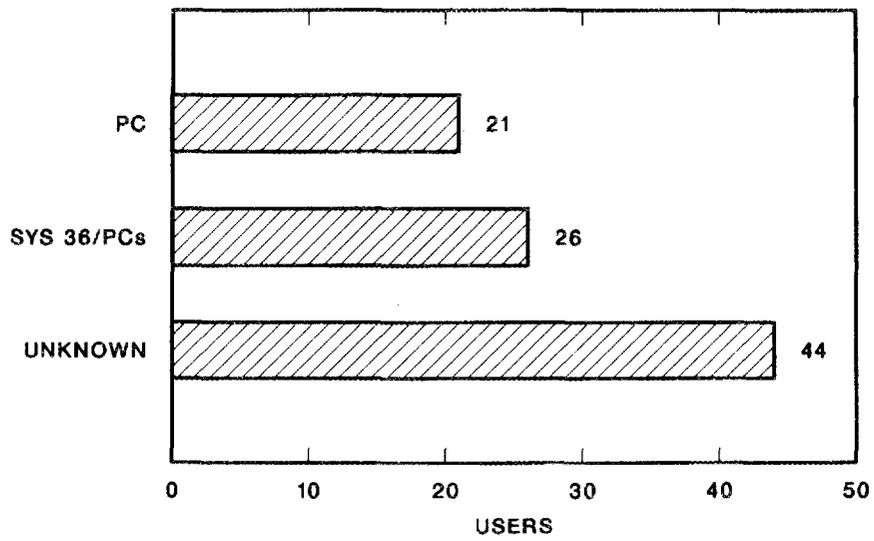


Fig. 2.23. User population: projected hardware.

3. INTERMEDIATE INTERVIEW RESULTS

One observation by the interviewers that was most pervasive is that the NALDA system users depend on the system and the data it supplies for the successful performance of their jobs. Although a high proportion of those interviewed thought the system could be improved, they wanted assurance that the current baseline level of functionality would be maintained. The confidence the users place in the data, however, varied from complete acceptance as accurate and valid to extreme distrust and frustration.

The users' comments, complaints, and suggestions have been grouped and categorized into general areas of need: training, S2K, 3M, and NALDA use (Fig. 3.1). It is important to mention that the information in Fig. 3.1 was gathered during open-ended interviews. This means that the users supplied the information that was most obvious to them rather than the interviewers having a list of suggested problem areas. If a user mentioned an area it was because the user thought of it, not because the interviewer "planted the seed." The interviewees were asked to name training problems, training suggestions, and to make general suggestions concerning NALDA. It is certainly feasible that other "problem" and/or "positive" areas exist, but escaped being mentioned during the interviews.

Each of the specific needs mentioned by the interviewees has been "assigned" a solution area and these potential solution areas are listed in Fig. 3.2. This listing gives a brief description of each need, indicates whether it is considered of high, medium, or low priority (based on frequency within the sample), and whether the solution could be provided by CAI, or a user friendly interface, or whether some other action is required. A more descriptive explanation of the problem areas and the potential solutions are presented in Sects 3.1 through 3.4, and each item presented in Fig. 3.2 corresponds to one or more of those sections.

3.1 TRAINING

3.1.1 Preclass

When asking previously trained NALDA users about training problems they had encountered, many mentioned the same problem areas. They felt that members of the class were on unequal footing since some knew about 3M and some had no knowledge of it (Item 1.3). Those who had some background were very bored with the first two days of training. Although the students remembered receiving preclass materials, many admitted that they did not read the materials, especially those who were unfamiliar with 3M, and found it to be too confusing (Items 1.1, 1.3, and 2.20).

TRAINING

1. Course

A. Manuals

- (1) Readability
- (2) Accessibility
- (3) Bulkiness
- (4) Number of volumes
- (5) Common index

B. Instruction

- (1) Brush up/review
- (2) Instructor
- (3) Follow up
- (4) Advanced
- (5) Frequency

C. Content

- (1) Learn how to analyze
- (2) Learn on own database

D. Structure

- (1) Break
- (2) Student screening
- (3) Partners
- (4) Training database
 - a. Employee
 - b. FOJTRA
- (5) Preparation
 - a. Preclass materials
 - b. Student entry levels
 - (1) 3m
 - (2) DBMS
 - (3) Experience/applications
 - c. Homework
 - (1) Value
 - (2) Lack of time when back at work
 - (3) Lack of equipment/manuals

(6) Physical conditions

- a. Temperature
- b. Terminals/Equipment
- c. Class size
- d. Time
 - (1) Room access when class not in session
 - (2) Practice/hands-on/lessons

(7) Type

- a. Managers
- b. Advanced
- c. By application/use

E. Availability

- (1) Many without formal training
- (2) Too few classes for number needing to enroll
- (3) Dependent on manager approval
 - a. Cost
 - b. Sparing the human power

2. S2K

A. Hierarchical/relational

B. Schema records

- (1) Disjoint conditions
- (2) Has/by

C. Key/non-key

D. Strings

- (1) Canned
- (2) Pooled
- (3) Creating

E. Queries

- (1) Concise
- (2) Efficient
- (3) More time to practice
- (4) Alternate forms
- (5) Correctness

Fig. 3.1. Common topic areas of user problems and suggestions

<p>F. Capabilities</p> <ul style="list-style-type: none"> (1) Library (2) Canned reports (3) Canned strings (4) Error messages <ul style="list-style-type: none"> a. Interpretations b. Correcting <p>3. 3M</p> <ul style="list-style-type: none"> A. Source documents B. Schema records C. Background knowledge <ul style="list-style-type: none"> (1) Previous use (2) Read preclass handout <p>4. Individual databases</p> <ul style="list-style-type: none"> A. Ambiguity <ul style="list-style-type: none"> (1) Data names inconsistent (2) Elements B. Not part of NALDA <p>NALDA use</p> <ul style="list-style-type: none"> 1. No formal training 2. Sharing/lack of <ul style="list-style-type: none"> A. Terminals B. Printers C. Phone lines <ul style="list-style-type: none"> (1) Slow transmission (2) Overload during classes D. Accounts E. Passwords 3. Graphics 4. Downloading <ul style="list-style-type: none"> A. Cleanup/reports B. Storing 	<p>5. Updates</p> <ul style="list-style-type: none"> A. Manuals B. Individual databases C. Passwords <p>6. Support</p> <ul style="list-style-type: none"> A. Professional center <ul style="list-style-type: none"> (1) On-line (2) By phone (3) In person (4) Available B. User group <ul style="list-style-type: none"> (1) Meetings (2) Electronic mail (3) Publications C. Quick references <ul style="list-style-type: none"> (1) On-line (2) By phone (3) Manuals D. Suggestions E. Friendliness <ul style="list-style-type: none"> (1) Menu driven (2) Adequate help (3) Prompting <p>7. Databases</p> <ul style="list-style-type: none"> A. Integrity of data B. Older than 18 months C. More current than three months D. Status <ul style="list-style-type: none"> (1) Down (2) Available (3) Being updated
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Fig. 3.1 (continued)

Object: Categorize needs into those which can be addressed in CAI, User Friendly Interface, or Require Other Action.					
Users of the NALDA system need:					
		CAI	UFI	ROA	Reference Paragraph
1.0 High Priority					
1.1	A facility for on-line review	x			3.1.1
1.2	Freedom to pace their own learning	x			3.1.2
1.3	Classes formed of students at an equal entry level	x			3.1.1 3.2.1
1.4	Time and equipment at work to practice writing queries, using system			x	3.1.2
1.5	Access to equipment and manuals in classroom when class is not in session	x		x	3.1.2
1.6	Formal training for those who were denied because of cost or the negative effect of their absence from work	x			3.1.5
1.7	Interface to handle disjoint conditions of S2K	x	x		3.2.3
1.8	Capability to create strings	x	x		3.2.2
1.9	Freedom to practice without fear of damage, high cost, or reprisal	x		x	3.2.2
1.10	To avoid overloading phone lines to access NALDA during classes	x			3.1.2
1.11	Dedicated phone lines at workstations			x	3.1.2
1.12	Access to on-line help, menus, and/or prompting on a demand basis		x		3.1.3 3.4.3
1.13	Improvements in data integrity			x	3.3.2
2.0 Medium Priority					
2.1	An ability to perform queries contrary to current hierarchical structure of the database		x	x	3.2.1
2.2	An ability to perform queries without detailed knowledge of the physical structure of the database		x		3.2.1

Fig. 3.2. Priority listing of NALDA user needs.

		CAI	UFI	ROA	Reference Paragraph
2.0 Medium Priority (continued)					
2.3	An ability to produce customized reports	x	x		3.2.4.1
2.4	A single index to the manual set		x	x	3.1.3
2.5	A condensed, streamlined reference (as in a quick reference, pocket guide, or wallchart)	x	x	x	3.1.3
2.6	Advanced and follow-up courses	x			3.1.4
2.7	An increased number of courses during the year	x			3.1.5
2.8	More training on analyzing the data	x	x		3.1.4
2.9	Selective training on a specific database that will be used on the job	x			3.1.4 3.2.1
2.10	An opportunity to work autonomously on training exercises	x			3.1.2
2.11	A baseline level of experience with database manipulation prior to class	x			3.2.1
2.12	Terminals at work for practice during two week break			x	3.1.2
2.13	Comfortable physical conditions during the training	x		x	3.1.2
2.14	Classes composed of people who use the same applications	x			3.1.4 3.2.1
2.15	Specific review information for understanding and handling schema records	x	x		3.1.4
2.16	More training in constructing efficient queries	x			3.2.2
2.17	Training in query construction beyond syntax (queries constructed actually ask what the user wanted to know)	x	x		3.2.2
2.18	Advance information on the amount of resources of a query will require (i.e., time, paper, money)		x		3.4.1
2.19	Increased awareness of system capabilities	x	x		3.1.2 3.1.4 3.2.4.2

Fig. 3.2 (continued)

	CAI	UFI	ROA	Reference Paragraph
2.0 Medium Priority (continued)				
2.20	x			3.1.1 3.2.1
2.21		x		3.3.2
2.22			x	3.1.2
2.23			x	3.1.2
2.24		x	x	3.4.3
2.25		x		3.4.1
2.26			x	3.3.2
2.27		x	x	3.4.1
2.28		x	x	3.4.2
3.0 Low Priority				
3.1		x	x	3.2.4.1
3.2				3.4.2
3.21		x		
3.22			x	
3.23			x	
3.3			x	3.3.2
3.4		x		3.4.1
3.5		x		3.2.2
3.6	x	x		3.2.2
3.7	x			3.1.4
3.8	x	x		3.1.2 3.1.3

Fig. 3.2 (continued)

3.1.2 Classroom Logistics

The physical conditions in the classroom were not always optimal. Comments in this area included uncomfortable temperatures (Item 2.13), classes being too large to provide needed individual attention, not having a terminal to use in the classroom, and being denied access to equipment for practice when class was not in session (Item 1.5). The pace of most classrooms is geared to the "average" learner. Those at either end of the continuum suffer from boredom if the class moves too slowly for them, or from confusion if the class moves too quickly (Item 1.2). The limited number of terminals in class required that students work in groups of 2 or 3. Some students monopolized the TTY's preventing their partners from experiencing hands-on learning (Item 2.10). Many students did not feel they had adequate time to complete the classroom lessons, practice with the system, or complete their homework as mentioned in Items 1.4, 2.12, 2.19, 2.22, and 3.8.

One of the comments made quite often regarding the training class was that the students felt it was a disadvantage to have received their training on equipment that was different than the equipment they would be using once they returned to work. An even more serious comment dealt with those individuals who would not have any hardware to use in their workplace. An advantage to the use of CAI as a means of training is that the training could very often occur on the same hardware that would be used in accessing NALDA.

There was much discussion concerning the actual length of time spent in the classroom. A great majority (3:1) of those interviewed disliked having a two-week break between the two one-week classroom sessions. Many felt that it was a waste of travel time and money and that they were not able to complete the homework once they had returned to work because of other responsibilities and/or lack of necessary equipment. If the equipment were available during the weekend, they would favor having a weekend break between classes. A major complaint regarding the two-week break was that the first two or three days of the second week were spent trying to relearn some basic material. Many quoted the adage, "If you don't use it, you lose it." This scheduling problem, coupled with the fact that many did not have an opportunity for hands on training due to lack of equipment or a partner who "did most of the work," created a less than adequate learning situation.

Many of the logistical problems previously cited could disappear with the use of a CAI package to augment NALDA training since the student would have more control over the learning environment. It is still a reality that the equipment would have to be made available, but the time and money for training could be managed in a much more flexible manner. Other NALDA users emphasized the problem of accessing NALDA when a class was in session; they found the phone lines to be overloaded (Item 1.10). Once the trained NALDA users return to their workplace, they may still be faced with equipment problems, such as a lack of dedicated phone lines (Item 1.11), slow data transmission (Item 2.23), and, unfortunately, even a complete lack of equipment.

3.1.3 Manuals and References

Perhaps the most mentioned reference to the existing set of manuals was the fact that there is a lack of a common index (Item 2.4). Users agreed that the manuals were well organized and that the color coded tabs helped in finding a needed reference, but they

didn't always know which manual to approach for the information needed. It is difficult to cross reference material and/or general information. Several users suggested the need for a condensed reference card or wall chart, in addition to the existing manuals, and expressed a desire for a comprehensive index. The streamlined reference guide concept could be extended to cover the use of S2K and/or 3M (Item 2.5).

CAI could be of considerable help by providing on-line documentation of the manuals, allowing access through a series of menus and/or help and/or a system of prompts (Item 1.12). This type of "user friendly" reference material would help in solving the physical problem of being sure that manuals were available near each terminal (Item 3.8). On-line documentation updates could be completed when software updates are made, thus helping to eliminate the lag in communication regarding such updates. The present method of updating manuals seems to be rather costly and somewhat inefficient in that the new pages are not always inserted in their proper position in the manuals. With an on-line "user friendly" form of documentation, updating should be much more efficient and the new material would replace the old material without individual installations having to do the physical work of inserting pages.

3.1.4 Multiple Levels of Instruction

Other areas of consideration pertaining to training include the desire to have follow-up training for review and/or a more advanced level of training (Items 2.6, 2.8, and 2.15). A manager's class for those who use NALDA data as a management information tool was mentioned by several users in a managerial position (Item 3.7). Users have mentioned that they do not fully understand the capabilities of the system (Item 2.19). The users interviewed in this sampling were concerned with the lack of homogeneity within the classroom. They expressed a desire to be in a class with people who were at a similar level and who used the same databases (Item 2.14). In addition, they preferred to have training on a database they would actually use rather than, or in addition to, the existing fleet originated job (FOJ) training base and/or employee database (Item 2.9).

3.1.5 Availability

At the present time, there are three NALDA training classes per year. The users who had not received formal training cited cost of attending, lack of available slots, and being unable to be away from their job for two weeks as "excuses" given to them when they asked about receiving formal training (Items 1.6 and 2.7). The use of a CAI package for training new users, and/or for refreshing experienced users, in the use of the NALDA system could very well eliminate some of these problems. A CAI package would allow the workers to pace their learning to their available time, thus eliminating the burden that is often placed on them and their co-workers by being away from their jobs for a long period of time.

Those users who had not received formal training expressed a desire to receive some form of training in the use of the NALDA system. Some had managed to get other people at their installation to help them, and some had tried to learn from the manuals. Several mentioned that they had asked to be included in the next class session and were also

seeking permission to attend the formal classes. Again, a CAI approach would be very beneficial in reducing and/or eliminating problems in this area.

Of the 64 users who had received formal training, slightly over half (33) stated that their system training had been adequate. Forty-two percent (27) of these trained users felt that the training they had received was less than adequate. Included in these 27 responses were 9 (15%) who stated that they strongly disagreed with the statement, "In your opinion, system training has been adequate," asked in the context of an evaluation of formal training. There were four users who did not respond to this question. One interesting comment, "If a new person were to come on the job now, I would not send them to class, I would teach them," was made by a user who had received the formal training and is now an experienced NALDA user.

3.2 SYSTEM 2000 (S2K)

3.2.1 Database Experience

More than half of the students had not worked with a DBMS prior to enrolling in the NALDA class. It would be expected that many of the students would have some difficulty learning about the structure of a database. The areas of difficulty included the understanding of disjoint conditions as applied to the schema records. Much of this difficulty stems from S2K being a hierarchical database (Items 2.1 and 2.2).

The users who had received the formal NALDA training indicated that it would have been helpful had members of their various classes had a baseline of experience with database manipulation prior to attending class (Item 2.11). The reasoning behind this criterion is similar to the reasoning used when stating that the students within a class should have similar backgrounds and job interests, it makes the class more homogeneous in nature (Items 1.3, 2.9, 2.14, and 2.20). One means of supplying this common baseline of preclass information is to issue a CAI package to each new NALDA user. This package would contain S2K information which could provide a stronger base for the new student and serve to provide a common base for those in the training sessions. The CAI could be provided on a floppy disk or through the NALDA system itself.

3.2.2 Queries and Strings

Students felt they should try to issue queries in several different forms to be sure that they had received the data for which they had asked, but often did not have ample time to do so (Item 2.17). Many stated "formulating queries was a problem for them after finishing the formal course and returning to work." Students were told that they should construct efficient queries, and users were questioned if their query costs were considered too high. Therefore, the new users did not feel free to practice writing queries or to experiment with the system (Items 1.9, 2.16, and 3.5). The construction of adequate queries was further hampered by the issue of key and non-key items. This subject was covered in class, but many felt it had been glossed over too quickly and therefore not emphasized enough. This complaint is included in Item 3.6, which indicates that there is a need for a more flexible method of accessing data.

Among the high-priority items listed by the users was the capability to create strings, store selected strings, and retrieve those strings that were used most frequently (Item 1.8). Many users felt incapable of creating efficient strings and felt further threatened about the possibility of practicing string creation.

Although it may have been categorized as a low-priority item, it was none-the-less mentioned that users needed a more flexible method of accessing data (Item 3.6). This item was mentioned to include a more flexible method of creating queries and/or strings, as well as to make reference to the structure of the S2K hierarchical database.

3.2.3 Structure

Some references to the hierarchical structure of the S2K database have been made in the two preceding sections; however, it is important to note that there were additional areas of concern mentioned during the user interviews. The handling of disjoint conditions caused many problems for the students. They found the concept difficult to understand and, thus, it was very difficult to actually use in constructing efficient queries. Many users felt that it was of utmost importance that an interface to handle disjoint conditions exist within the NALDA system (Item 1.7).

3.2.4 Capabilities

The database that is in use at the current time has a variety of capabilities. Unfortunately, many of the users are not aware of, or do not know how to use, these capabilities. For example, a library function exists within S2K batch, but most users admitted that they have never used it.

3.2.4.1 Reports

Many users do use the report facility, but would like to be able to customize their reports (Item 2.3). The more technically adept users have devised different ways of downloading information, saving it, and then using a word processor or editor to "pretty it up". It is desirable to have a process for creating canned reports available to all users and not just those who happen to be more knowledgeable about computers or happen to possess the software necessary to produce such reports. Item 3.1 indicates that users felt a need for a mechanism for storing extracted data. This mechanism would be helpful for those who want to customize reports as well as for those who need to store previously extracted data, thus saving them from repeating the extraction process at a later date.

3.2.4.2 Error Messages

At the present time, error messages are displayed to the user [i.e., (1) the user makes an error, then (2) the system displays an error message]. The problem is that the error messages are not always easy to interpret. The users find that they are not really sure what they have done incorrectly. If the error is more than a syntax error, the user may be at a loss as to how to make the necessary correction. The users would be much more productive if the error messages were tailored to be as specific as possible. In addition to clearly indicating the nature of the error, it would be an asset if the user could, if needed, receive some information concerning how to go about correcting the problem (Item 2.19).

3.2.4.3 Help

If the fact that many of the users did not mention the HELP facility means that they were unaware of its existence, then this is certainly a problem area. However, those users who did mention the facility indicated the need for its expansion. In particular, comments were made that stated that the HELP area was not effective, and that a better form of HELP was needed. One user never used the on-line HELP and preferred to read the books even though needed information was hard to find. In the current training program, little is mentioned and/or demonstrated concerning the use of the HELP function.

3.3 3M

3.3.1 Background Knowledge

Knowledge of 3M is not an uncomplicated issue and many of the "new" students were overwhelmed by the VIDS/MAF and other source documents. The comments that applied to the preclass CAI training could well be restated here (Sect. 3.2.1). If the enrollees had access to a preclass training package, even though they may have attended a 3M seminar, they would feel more "comfortable" with the 3M material.

3.3.2 Data

Many of the users were concerned with the integrity of the data they received from their NALDA queries, not because they were unsure of their ability to construct proper queries, but because they doubted the reliability of the actual information received (Item 1.13). Besides being concerned that the data may not have been current enough (Item 2.26), the users were bothered by the inconsistency of the data element names between databases (Item 2.21). They were also concerned with situations in which the data from other databases did not match that obtained for the purposes of cross-checking. This inconsistency often led to problems in constructing and validating queries.

According to some users, it is important for the data to cover a broader time period than 18 months (Item 3.3). Users concerned with historical tracking found that they needed "older" information, and many times, information from the most current three months. Many of the users expressed a desire to be able to easily access data for the preceding three months. Data, this current, are not readily available at the present time.

3.4 NALDA USE

3.4.1 Advance Information

Additional comments made by the interviewed users indicate that they would like to have some advance knowledge of the amount of resources a query would require (Item 2.18). For instance, in deciding whether to submit a batch job as a short, medium, or long job, it would be useful to have an estimation of the actual time needed to complete the processing. If a job is going to be very costly, the user may want to see if the query can be reconstructed in a more efficient and money saving manner. At times, it may even be desirable to know how much paper a job is going to require.

Users would like to receive information about the status of the system before they actually plan to use the system. In other words, it would be helpful to receive a message during log-in that states whether the system is down, being updated, available, or overloaded (Item 3.4). A log-in message pertaining to the status of the user's password is highly desirable. It is very frustrating to try to work on the system and not be able to gain access to it. Valuable time can be wasted trying to find out why access is being denied when the user's password has been changed without the user having been informed. A better means of communication is needed between the system and the user, especially regarding changes and updates (Items 2.25 and 2.27).

3.4.2 User Support

Many users have good ideas to share and suggestions to make regarding NALDA use; however, they don't always know what to do about these. A user group, local or otherwise, could be helpful by offering meetings and/or publications or, more favorably, some form of electronic bulletin board or mail facility (Item 2.28). To quote one user, "There should be something better than NALDAgrams to let the fleet know about developing stages and information." Many users reported that they read the NALDAgrams but often found them uninformative. Users want information and the ability to ask for and obtain it in an efficient and effective manner.

There seems to be a need for a responsive support center which is accessible on-line, by phone and/or in person (Item 3.2). Many users did feel that they were able to get help from others, but doing so often caused major delays in their work because they would have to wait until they could get in touch with someone who could help them. Students mentioned appreciation toward instructors who visited some of the installations "to touch base with some of their students." Those who had not experienced any form of follow-up contact mentioned this lack as a problem in their development as NALDA users.

3.4.3 Enhancements

Many of the items mentioned throughout this report can be included under possible enhancements to NALDA, but one stands out from the others in that it was mentioned very often. The users want a more "user" friendly system. They want to be able to use menus, have better help options, and have prompting when requested (Item 1.12). They want to be able to work at their own level. If they need the help or prompting, it should be available for them. If they want to work without being "bothered" by menu levels and prompting, they should have that option available to them also.

A more specific enhancement that was mentioned enough times to place it in the medium priority category was the need for graphics capability (Item 2.24). Many of the users who are responsible for reports prepare hand-drawn graphs or use some method of downloading the data and then using a spread sheet package to produce the needed graphics. An integrated graphics facility would increase the productivity of those who are using manual methods and could make additional analysis methods available to other users.

3.5 RATING SHEET RESULTS

Unlike the open-ended questions asked by the ORNL research team, the rating sheets were filled in by the individual users and forced them to consider specific issues and to respond within a given range of options. The rating sheet included an even number of ratings in order to mitigate the tendency toward "middle of the road" answers. Still most answers clustered around the less strong response options. Figure 3.3 indicates the frequency of responses to each item on the rating sheet. The rating sheets were filled in by the users interviewed who had actually received formal classroom training. Although there were only 64 users in this category, 66 rating sheets were received. The two users who had not received formal training answered some of the questions pertaining to NALDA use. Some of the users did not answer all of the questions. All of the users were told that they were free to make comments on any of the items asked; however, very few elected to do so. The comments that were made have been noted.

NAME _____					
OPINION/RANKING: 1 Strongly Agree					
2 Agree					
3 Disagree					
4 Strongly Disagree					
5 Don't Know					
6 Sometimes					
1. THE SYSTEM IS USER FRIENDLY					
1	2	3	4	5	6
(2)	(28)	(20)	(12)	(3)	(1)
2. INFORMATION FROM NALDA IS EASILY INTERPRETED					
1	2	3	4	5	6
(4)	(38)	(21)	(6)		(1)
3. THE USE OF NALDA REQUIRES KNOWLEDGE OF DEPARTMENTS/DIVISIONS WITHIN YOUR ORGANIZATION WITH WHICH YOU ARE NOT FAMILIAR					
1	2	3	4	5	
(4)	(14)	(36)	(11)	(2)	
4. FROM YOUR PERSPECTIVE, THE SYSTEM MEETS/EXCEEDS ALL OF ITS INTENDED PURPOSES					
1	2	3	4	5	
	(29)	(26)	(5)	(7)	
5. THE MAJORITY OPINION WITHIN YOUR ORGANIZATION IS THAT NALDA MEETS/EXCEEDS ALL ITS INTENDED PURPOSES					
1	2	3	4	5	
(1)	(19)	(28)	(5)	(16)	
6. IN YOUR OPINION, SYSTEM TRAINING HAS BEEN ADEQUATE					
1	2	3	4	5	
(2)	(31)	(18)	(9)	(6)	

Fig. 3.3. Rating sheet results.

7. THE HARDWARE USED TO ACCESS NALDA IS ADEQUATE TO MEET INTENDED SYSTEM PURPOSES

1	2	3	4	5
(7)	(34)	(10)	(11)	(6)

8. IN YOUR OPINION, YOU ARE ADEQUATELY INFORMED OF NALDA'S CAPABILITIES

1	2	3	4	5
(7)	(34)	(17)	(9)	(2)

9. YOU PRESENTLY HAVE ADEQUATE MATERIALS/RESOURCES WITH WHICH TO CONTINUE YOUR NALDA TRAINING

1	2	3	4	5
(8)	(26)	(21)	(5)	(9)

10. WHICH OF THE FOLLOWING RESOURCES HAVE BEEN MOST RESPONSIBLE FOR ANY INEFFECTIVE SYSTEM TRAINING. LACK OF:

29 TRAINING AIDS (system documentation, brochures, training software)

11 SKILLED INSTRUCTIONS

29 ADEQUATE TIME FROM DAILY DUTIES TO LEARN THE SYSTEM

27 INFORMATION ABOUT AVAILABLE TRAINING AIDS

15 THERE HAS NOT BEEN A LACK OF ANY OF THE ABOVE

11. THE LEVEL AND INTENSITY OF SYSTEM TRAINING HAVE BEEN SATISFACTORY FOR EFFECTIVE SYSTEM USE

1	2	3	4	5
(3)	(38)	(15)	(4)	(5)

12. IN YOUR OPINION, YOU FEEL FREE TO 'PLAY' OR EXPERIMENT WITH NALDA

1	2	3	4	5
(10)	(37)	(17)	(3)	

13. MANY TIMES A PIECE OF SYSTEM HARDWARE IS INTENDED FOR USE BY SEVERAL DIFFERENT PEOPLE—THIS IS A NALDA ACCESS PROBLEM FOR YOU.

1	2	3	4	5
(9)	(20)	(24)	(10)	(3)

Fig. 3.3 (continued)

4. PLANS

The results reported in this document are only preliminary. Additional compilation, integration, and correlation of results will continue; therefore, the interpretation of data is subject to change.

Based on the information gained in Task 2 and further evaluation, a detailed analysis of viable alternatives will be conducted. The prioritized needs and requirements of the NALDA user community will be used to evaluate and select the best approach to NALDA CAI. This activity will include finding answers to such questions as:

- On what system should the CAI training take place?
- What authoring system should be used?
- What type of CAI should be developed?
- What should be taught in the CAI?

The answers to these questions and others, and the rationale by which the answers were derived will be documented. A final report of findings and recommendations will be provided to NALC by the end of calendar year 1986.

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