LA-UR -84-2683

Los Alamos National Laboratory is operated by the University of California for the United States Department of Energy under contract W-7405-ENG-36

TITLE USER BEHAVIOR UPON INTRODUCTION OF A NETWORK HELP SYSTEM

LA-UR--84-2683

DEB4 016466

**AUTHOR(S): MARY L. STODDARD
KATHRYN P. BERKBIGLER
ROBERT M. WHEAT
EVA AU PETER**

**SUBMITTED TO ACM-SIGCHI
PROGRAM COMMITTEE**

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

By acceptance of this article the publisher recognizes that the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution or to allow others to do so for U.S. Government purposes.

The Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy.

MASTER
Los Alamos Los Alamos National Laboratory
Los Alamos, New Mexico 87545

USER BEHAVIOR UPON INTRODUCTION OF A NETWORK HELP SYSTEM

**Mary Stoddard
Kathy Berkbigler
Bob Wheat
Eva Peter**

**MS B260, Los Alamos National Laboratory
Los Alamos, New Mexico 87545**

ABSTRACT

An online help system, called ICNHELP, was implemented on the large Los Alamos Integrated Computing Network. Users from three different operating systems could quickly access summary information on network capabilities. Usage was monitored for a five-month period, and users were given the opportunity to comment online. There were three times as many accesses as users. Most users accessed ICNHELP to jog their memories about specific command information, but a high number used it as a browsing tool to learn about network capabilities. The study reveals that the user interface is important in user acceptance of an online user assistance tool, but the established patterns of user behavior and mode of advertising also strongly affect the success of the system.

INTRODUCTION

The option of whether or not to bring up online user assistance tools on a computer system seems to no longer exist.¹ Users are requiring it on most systems. However, our knowledge of user behavior with online help and documentation systems is limited. Houghton² and Relles, Sondheimer, and Ingargiola³ both state that much more research into online help systems needs to be done before such systems are able to meet the needs of diverse user populations. This article describes user behavior with an online help system brought up on the large network at Los Alamos National Laboratory. Software monitors, online user commenting, and interviews with users were methodologies used to determine patterns of user behavior.

THE HELP SYSTEM AT LOS ALAMOS: ICNHELP

The Los Alamos Integrated Computing Network (ICN). The ICN is one of the most powerful scientific computer networks in the world, with five different major operating systems, a huge common file system, and over 50 computers. The Cray Timesharing System (CTSS) is the major operating system; there are six Cray computers in the network. Other major operating systems are LTSS (Livermore Timesharing System) running on CDC 7600s, NOS, VMS, and UNIX. The network has over 6000 users throughout the United States.

The Structure of ICNHELP. In 1984 the VAX/VMS HELP system⁴ was adapted to provide users from LTSS, CTSS, and VMS access to quick reference information on network utilities. The local version was named ICNHELP. It meets or exceeds the guidelines provided by Williges and Williges⁵ for online documentation. ICNHELP is implemented on a VAX 11/780 running the VMS operating system on a network node known as FOCUS. Users on other systems run a simple program on those systems that uses process-to-process communication through the network to the program running on the FOCUS machine. ICNHELP uses the subroutine interface

to the VMS librarian. A separate help database is maintained for each of the operating systems from which ICNHELP is available. The information stored for each major topic includes a brief description of its function, the basic execute line used to invoke it, and optional descriptions of each of its options or subcommands. See Figure 1.

Who are the Users? There are approximately 1000 users per month on LTSS and CTSS. These users are primarily physicists, mathematicians, and computer scientists. Most are experienced computer users, although when they first come to Los Alamos they must learn those things unique to the network. Locally developed software enables users to perform functions ranging from text editing to file manipulation to dynamic debugging. The database for ICNHELP, structured similarly to the VAX/VMS HELP database, contains summary information for 83 utilities.

User Documentation at Los Alamos. Traditionally, all documentation has been accessed by ICN users in printed form. In 1983 the Computer Documentation Group at Los Alamos produced a "Plan for User Documentation."⁶ This plan proposed that on-line documentation become the core of Los Alamos generated documentation, with printed documents produced from the online source. An informal survey, performed in preparation of the plan, indicated that many users want online documentation.

Observations of and discussions with users revealed, however, that experienced users were dependent on and satisfied with the printed documentation. Users who were requesting online documentation tended to be those who (1) had difficulty obtaining up-to-date manuals, (2) had difficulty locating the correct printed documentation when they needed it, (3) preferred not to bother the consulting office with simple command usage questions, or (4) had used online documentation on other systems and had become dependent upon it (for example, the DOCUMENT system at the National Magnetic Fusion Energy Computer Center, see Girill and Luk⁷)

One of the most heavily used types of printed documentation at Los Alamos is the summary, or mini-reference. Small notebooks for both CTSS and LTSS contain approximately 150 pages

of command summaries on the 83 utilities. These summaries are used primarily by experienced users who know what they are looking for. They have already learned basic system usage and utility functions, but they need memory refreshers on exact command usage. It was this information that was adapted to be accessed online through ICNHELP.

How Users Find Out About ICNHELP. Users were informed of the availability of ICNHELP through one of two ways: articles in the monthly network newsletter and change control bulletin or by word of mouth from consultants or colleagues.

User Interface to ICNHELP. To access ICNHELP, users merely need to type ICNHELP or HELP. They are presented a menu with utility names (topics).

The ICNHELP database is hierarchically organized. At each level in the hierarchy the user is informed of all the subtopics (if any) that are available at the next lower level in the hierarchy. The user selects a subtopic by typing in the keyword for that subtopic and receives the information that is stored in the database. A single <return> is used to move up the hierarchy one level at a time. The experienced user may request information on a particular subtopic by specifying all the keywords to get to that point in the hierarchy on the invocation line. Special syntax is provided to allow the user to obtain all the available information about a particular topic with one command or to request information from a library other than the default library for the operating system. Abbreviations are permitted and result in the printing of information for all the topics that are matched. To be presented with the menu for the current level again, they type ?. To leave ICNHELP, users type ENDH or ENDI (for end HELP or end ICNHELP). A help package for ICNHELP is available from the main menu.

When users indicate they have concluded an ICNHELP session, they are given a prompt: "Do you have any comments on this utility? (Y,N,return = N)." If they type Y, they are able to enter comments until they respond to the "Comment?" prompt by typing ENDI or ENDH. These comments are collected in a data file and read once a month. Some users give their names

when leaving comments, but most are anonymous.

METHODS OF COLLECTING USER BEHAVIOR DATA

The Software Monitor. We were interested in discovering answers to the following questions: Was ICNHELP being used and if so, how and by whom? Was ICNHELP satisfying the need for quick reference information by users? What information did users ask about most often? What improvements were needed in the database and to the ICNHELP user interface? To help us answer these questions, we collected user number, date, and user input for each access of ICNHELP and put the information in a data file.

The Data Analysis Program. To facilitate analysis of the data, a program was written in the C language on a network VAX/UNIX machine. The program takes as input a data file, collected over a period of one month, and produces three output files. The input data file contains user number, date and time ICNHELP is entered and exited, and the actual input lines the user types. Comments solicited at the end of each terminal session for feedback are also recorded. The three types of output files produced by the data analysis program summarizes the following data:

- Daily user access count,
- Monthly user access count,
- Number of distinct users per day, per week, and per month,
- Average user count per day and per week,
- Average access count per day and per week,
- Standard deviation of elapsed time,
- Number of requests on each topic at the main menu level,

- User comments, and

- User errors.

Interviews with Users. To aid us in the correct interpretation of the usage information collected, we interviewed a sampling of users. We asked six questions regarding frequency and patterns of usage. Users were either contacted in person or by phone. The sample size was 32. Because the sample was representative of the entire user population on LTSS and CTSS, some users had never heard of ICNHELP while others used it frequently. The interviews took place in June 1984, after ICNHELP had been available to users for four months.

RESULTS

Frequency of Use. During the five-month period from February to July 1984, 17% of users accessed ICNHELP one or more times. A total of 529 distinct users were recorded. Of these users, 32% accessed it only one time, 26% accessed it 2-5 times, 25% accessed it 4-9 times, and 15% accessed it ten or more times. The number of users accessing ICNHELP each month was surprisingly constant during the first four months, with a noticeable increase during the fifth month (see Table 1).

Patterns of Use. There were three to four times as many accesses as users of ICNHELP. This pattern was consistent throughout the five-month period (see Table 1).

We delved into patterns of use, both through examination of the data file and through interviews. Interviews revealed that frequent users were performing a major problem-solving task and they found that online information provided them with what they needed more quickly than what they thought they could have found elsewhere. Most of those interviewed used ICNHELP as a memory jog, while 22% used it as a tutorial and 17% used it to help them get out of trouble (see Table 2). Examination of all data for two six-day periods provided more accurate information (see Table 3). Some users were obviously searching for an answer to one specific command

usage question (mean = 18%), while others were searching for answers to specific questions within one utility (mean = 34%). Many users appeared to be just looking for functional description of one utility (32%) or several utilities (10%).

Information Sought. Logically, a heavily used utility in our network, the utility that services the Common File System, is the most frequently asked about (see Table 4). Besides the help system itself, other topics frequently asked about are those that provide information on obtaining printed output, file characteristics, text editing, and production jobs.

User Errors. We recorded user input that were considered errors for the five-month period (N = 390). Only 14% were typing or spelling errors, and 11% were requests for information that was not contained in the database. Some errors were users trying to get back to the main menu or trying to get out, but not remembering the exact command to use (14%). Users commonly requested information that was not available at the level in the hierarchy where they were but was available at a lower or higher level (61%).

User Comments. Only 5.5% of the time ICNHELP is accessed do users choose to leave a comment. Of the 158 comments received in the five-month period, 28% were compliments on the new capability. Many specific comments were also received on the information in the database (38%). Several comments were also left in which users suggested improvements in the user interface of ICNHELP (11%). One finding that surprised us was that many users (18%) used the commenting option as an opportunity to ask a question or express a concern about a capability or feature of the network.

CONCLUSIONS

Implementation of a help system on a complex network with users traditionally dependent upon written documentation revealed that:

1. Behavior patterns of experienced users with documentation are difficult to change. When the online information is more comprehensive and up-to-date than the printed information, one would expect usage of online documentation to increase. Merely making an online help system available will not necessarily change the patterns of users already satisfied with printed documentation.
2. Users who are satisfied with printed documentation tend to be very regular network users who keep their library very well organized, accessible, and up-to-date. Users who prefer the online help over printed summaries tend to be either those accustomed to online help or other systems or casual users who do not keep their libraries easily accessible or up-to-date.
3. In spite of printed and verbal advertisement of new online help systems, many users were not even aware of the existence of the new facility. We believe increased usage in the fifth month that data were collected was caused by additional advertising in the fourth month. The successful implementation of an online help system depends on how the new system is introduced.
4. Users not normally accustomed to having an online commenting capability respond well to having the commenting option. The fact that many users took the opportunity to make comments outside of the realm of the help package indicated a need for system note files. Bannon and O'Malley⁸ discovered, however, that users found a similar commenting option on their system somewhat annoying. Few of our users found it annoying (17%).
5. Our error data revealed that users often forget where they were in the hierarchy and how to obtain the main menu, in spite of the availability of help for ICNHELP and the use of logical commands. Many of these so-called user errors would be avoidable by improvements to the user interface such as those performed by Magers.⁹

6. Leclerc et al.¹⁰ noted that the VAX/VMS HELP facility was not well suited to browsing. Our data reveals, however, that many accesses were of the browsing nature (about 20%).
7. Further study is needed to determine if any correlation exists between the quality of documentation, the usage of utilities, and the frequency of access of the help on particular utilities within ICNHELP. This information would provide additional insight into user motivation for consulting online help.

REFERENCES

1. Hiltz, S.R., *Online Communities*, Ablex Publishing Company, 1984.
2. Houghton, R., "Online Help Systems: A Conspectus," *Communications of the ACM*, February 1984, Vol 27 (2), pp.126-133.
3. Relles, N., N., Sondheimer, and G. Ingargiola, "A Unified Approach to Online Assistance," *National Computer Conference 1981*, pp.383-388.
4. "VAX/VMS, Command Language User's Guide," AA-D23B-TE, Digital Equipment Corporation, Maynard, Mass., 1980.
5. Williges, B., and R. Williges, "User Consideration in Computer-based Information System," *ON R Technical Report CSIE-81-2* (September 1981).
6. "Computing Division Plan for User Documentation," Los Alamos National Laboratory report LA-9807-MS (July 1983).
7. Girill, T., and C. Luk, "Document: An Interactive Online Solution to Four Documentation Problems," *Communications of the ACM*, May 1983, Vol 26 (5), pp.328-337.
8. Bannon, L., and C. O'Malley, "Problems in Evaluation of Human-Computer Interfaces: A Case Study," University of California at San Diego *Institute for Cognitive Science Report* No. 8402, pp.67-73.
9. Magers, C., "An experiment: Evaluation of On-Line HELP for Non-Programmers," *ACM-SIGCHI '88 Proceedings*, pp.277-281.
10. Leclerc, Y., S. Zucker, and D. Leclerc, "A Browsing Approach to Documentation," *IEEE Computer*, June 1982, pp.46-40.

TABLE 1. Usage of ICNHELP

Month	Number of Users	Average Number of Users/Week	Number of Accesses	Average Number of Accesses/Week
Feb-Mar	162	32.4	544	108.8
Mar-Apr	164	32.8	584	116.8
Apr-May	162	32.4	587	117.4
May-June	172	34.4	643	128.6
June-July	223	44.6	902	180.4

Total number of users per month = 1115.

TABLE 2. User Interview Results (N=32)

Question	Frequency (%)
1. Have you used ICNHELP?	
Yes	75
No	25
If no, why not?	
Because never heard about it.	75
Prefer hardcopy documentation.	25
If yes, how often on the average?	
more than once a week	24
once a week	20
once a month	12
very infrequently	44
What system do you access it from?	
CTSS	43
LTSS	27
VMS	30
2. Have you used ICNHELP?	
as a memory jog	61
as a tutorial	22
when in trouble	17
Why do you ask for information?	
forgot command usage	60
can't find printed document	28
can't find information in printed document	12
3. What do you think of the commenting feature?	
nice	61
annoying	17
no opinion	22

TABLE 3. Patterns of Usage of ICNHELP (for two six-day periods)

Usage Pattern	Frequency (%)	Frequency (%)
	week 1	week 2
Looked at several topics (browsed)	12	10
Looked at one topic and subtopic	22	16
Looked at one topic and multiple subtopics	32	36
Looked at one topic and no subtopics	35	30
Entered ICNHELP, looked at menu only	9	8

TABLE 4. Average Number of Accesses to Each Major Topic of ICNHELP (Top 20 Topics)
(period from February to June 1984)

Major Topic	Description of Topic	Average Number of Accesses/Month	Std. Dev.
mass	Interface to Common File System	57.75	8.5
help/icnhelp	Help package for the online help system itself	42.25	4.1
hsp	Send native text files to high speed printer	26.25	6.2
files	List file characteristics	26	11.1
fred	Network-wide line editor	23	14.0
prod	Submit and monitor batch jobs	22.25	11.9
cmp	Compare two disk files	21.75	10.9
cf	Cray Fortran compiler	17.75	3.9
info	Network news, temporary documentation	16.25	5.2
snoopy	Display computer bank account information	15.75	2.2
lib	Generate and maintain library files	15	5.3
e	Translator from CTSS syntax to software tools syntax	14.75	2.1
copy	Reproduce part or all of file into another file	14.75	5.5
who	Report a user's name when a user number is input	14.5	3.7
edit	Binary file editor	14.5	5.9
ddt	Symbolic dynamic debugging tool	14.5	5.8
cosmos	Job control language	14.25	5.8
allout	Send files from local file space to output devices	13.75	9.0
trans	Convert a file from one format to another	13.5	5.8
pfilm	Send graphics metafile to film output device	13	1.8

Figure 1. Structure of ICNHELP.