8-1-1985

Determinants of acceptance of computer mediated communication system

Computerized Conferencing & Communications Center

Starr Roxanne Hiltz
Upsala College, roxanne.hiltz@gmail.com

Elaine B. Kerr

Kenneth Johnson

Murray Turoff
New Jersey Institute of Technology, murray.turoff@gmail.com

COMPUTERIZED CONFERENCING & COMMUNICATIONS CENTER

at

NEW JERSEY INSTITUTE OF TECHNOLOGY

DETERMINANTS OF ACCEPTANCE OF COMPUTER-MEDIATED COMMUNICATION SYSTEMS: A LONGITUDINAL STUDY OF FOUR SYSTEMS

STARR ROXANNE HILTZ
ELAINE B. KERR
KENNETH JOHNSON

FINAL TECHNICAL REPORT TO THE NATIONAL SCIENCE FOUNDATION
DCR 8121865

RESEARCH REPORT 22
AUGUST 1985

c/o Computer & Information Science Department
New Jersey Institute of Technology
Newark, N. J. 07102

ABSTRACT

Acceptance of Computer-Mediated communication Systems (CMCS) by managers and professionals corresponds to its incorporation into their daily patterns of communication and work. Acceptance includes at least three inter-related dimensions: amount of use, subjective satisfaction with the process of using the system, and a perception that system use has positive impacts upon productivity.

Pre-use and follow-up questionnaires were distributed to 150- 250 new users of four different CMCS. Three are conferencing systems, designed to support "group work." They differ in terms of comprehensiveness or complexity of design, and size and nature of the user communities; COM/KOM, a Swedish system with mostly European users, was included to provide a cross-cultural dimension. The fourth system is a commercially available electronic mail system used for internal communication within a single corporation.

Users' pre-use expectations are the strongest determinants of learning time, getting to know other people online, and subjective satisfaction with the system interfaces. Satisfaction with CMCS as a mode of communication, particularly for emotional or personal content, is most strongly affected by group-level variables. Those who have not previously communicated (offline) with group members and who do not like or trust them have the most problems with expressive communication via CMCS.

Group membership and pre-use expectations in combination are the strongest determinants of amount of system use. The "dropout" rate varied from zero or 1% for some groups to over 50% for others. Among those who did use the three conferencing systems, the best predictor of cumulative time online at four months is the user's own expectation of the amount of time that would be spent online, made at pre-use. In turn, expected usage is explained by a combination of importance of the online task; convenient access to a terminal, especially at home; and previous lack of regular communication channels with the online group.

The pattern for the internal mail system was quite different; regular previous communication with the online group (rather than its absence) is correlated with use. The strongest correlate is an expectation that using the system will be hard; those who thought so simply did not use the electronic mail system. The contrasting pattern of association underscores the quite different functions of the two types of CMCS. Mail systems are used as a supplementary channel of communication to support ongoing communication within an organization. Conferencing system usage is maximized when it represents a new opportunity to communicate with others who were not conveniently available via traditional channels, about an important task.

An experimental intervention in training and user support suggests that interactive online tutorials can be an effective learning mechanism and increase time online. The placement of a single

personal telephone call offering assistance did not increase amount of use, within the context of the availability of a variety of other sources of information and support.

Two factors comprising productivity impacts were identified. "PRODUCTive" is comprised primarily of improvements in the quantity and quality of work, the overall usefulness of the system, and improvements in the ease of reaching people. "CAREER" encompasses contributions to long-term and short-term career advancement, and the provision of information and ideas.

The strongest correlates of PRODUCTivity improvements, for all four systems, are pre-use expectations about whether the system would increase productivity. The second strongest determinant appears to be the perceived leadership skill of the group moderator or leader. Another group-level variable, the level of satisfaction with previous channels of communication with one another, also significantly adds to predictions of productivity increases as a result of system use.

Four process variables play an important part in determining positive productivity outcomes. One is the perceived value of the items contributed by the other group members. Another is time spent online, which is positively related to perceived productivity impacts, once pre-use expectations and motivations have been taken into account. A third is whether or not there were "mode problems" encountered, and the fourth , how many new people users came to know online.

"SYSTEM" software differences do appear to make a significant impact on whether or not there will be productivity increases; but system enters the stepwise regressions in only fifth or sixth place, or not at all, depending on the combination of candidate variables entered.

The best equations for predicting productivity increases are markedly different for the four systems. This is the main impact of software differences: given four basically well designed but quite different CMCS, the social context and software differences will interact to affect the most productive way to use the system.

The best overall predictor of whether CMCS use will be seen to lead to CAREER advancement is whether the user was able to adequately express social-emotional content in communications in this mode. For individual systems, the specific variables and factors which are included in the best stepwise multiple regression equation to explain variations in CAREER vary markedly from one system to another, but all the equations include a subjective satisfaction factor in the selected variables. Career advancement depends to a large extent on strengthening and widening personal relationships with a network of peers and hoped-for peers. Thus, it is reasonable that this process was most likely to occur for those users who felt most comfortable and satisfied with the system as a communication mode. Only then is a user likely to go beyond the immediate task-oriented online activities and engage in the kinds of information exchanges and relationship-strengthening exchanges that may be related to general career advancement rather than just the efficient completion of a specific task at hand.

ACKNOWLEDGMENTS AND PREFACE

Work on this project has been partially supported by a grant from the National Science Foundation (DCR 8121865). The opinions expressed are solely those of the authors and do not necessarily represent those of the National Science Foundation.

Starr Roxanne Hiltz was Principal Investigator for this project. She took primary responsibility for the research design and supervision of data collection, analyzed the data, and wrote this report. Elaine Kerr assisted with the questionnaire design, supervised the data collection for two of the four systems studied, and assisted with the editing of this report. Kenneth Johnson advised and assisted with the data analysis, which was a particularly arduous task because the computer system we were using was switched out from under us two different times. Murray Turoff also participated in this project, but his time was spent mainly on topics related to but not incorporated into this report (see below.)

We are grateful to the many other people who have cooperated and assisted in this study, including Robert Arms, Cally Bark, Robert Ballentine, Seth Bostrum, Lincoln Brown, Christine Bullens, Judy Hinds, Sonia Khalil, Ellen Lieberman, Patricia Lipkus, Margaretta Mattsen, Robert Michie, David Morgan, Jacob Palme, George Reinhart, Danielle Roshirt, Andra Stam, Harry Stevens, Bart Voyce, and Lisa Voyce.

As a field study dependent upon the voluntary cooperation of the

participants, this study suffered from some unanticipated delays and complications in data collection, but benefitted from some unanticipated opportunities to study unique applications. The methodological tribulations are described in more detail in the first chapter, but their primary outcome was to make it impossible to complete the research within the original two year time frame. At the end of eighteen months, when the schedule called for us to be deep into data analysis and report drafting, we were still waiting for almost half of our follow-up questionnaires to be returned.

The National Science Foundation graciously granted us an extension to continue to work on the study beyond its original expiration date. No additional funding was granted, of course. At the time of this writing, it is three years since the study began, and we are still analyzing and integrating some of the data. Although this report is the main summary of the project and its findings, there are or will be several other reports related to the project.

A leadership manual for the facilitation of computerized conferences was completed and published as Research Report #20 of the Computerized Conferencing and Communications Center (Kerr, 1984).

Separate reports are being prepared on the personality data, the case study of the White House Conference on Productivity, and the online classes. These are data available only for EIES; this report includes all results of analyses of comparable data collected across the four systems in the study.

This report does not focus on software design differences and their consequences, since such differences are confounded with differences in user groups and applications. Software design issues related to information overload are treated separately in Hiltz and Turoff, 1985. We hope to return to further analysis of the detailed data on user reactions to the specific features of each of the four systems studied at a later date.

There are many aspects of the impact of software design and leadership behavior on acceptance of CMCS which can be better studied in controlled experiments than in field studies. Work on these issues continued as part of our research related to this project, and is published as research reports 18 and 21 of the Computerized Conferencing and Communications Center (Hiltz, Johnson, and Turoff, 1982; Hiltz, Turoff, and Johnson, 1985.)

TABLE OF CONTENTS

CHAPTER 1
DESCRIPTION OF THE STUDY

CHAPTER 2
EXPERIENCES ONLINE AND SUBJECTIVE SATISFACTION

CHAPTER 3
DETERMINANTS OF SYSTEM USE

CHAPTER 4
IMPACTS OF SYSTEM USE ON PRODUCTIVITY

LIST OF TABLES

CHAPTER 1

DESCRIPTION OF THE STUDY

INTRODUCTION

Computer-mediated communication systems (CMCS) use a computer to create, store, process, and distribute text files and databases. They include "electronic mail," computerized conferencing systems and office support systems (text processing and managerial decision support systems with group communication components). Pilot studies indicate that they can significantly increase the productivity of "knowledge workers" who now compose the majority of the labor force in the United States and other "post-industrial" societies (see Hiltz, 1984; Kerr and Hiltz, 1982; Johnson-Lenz, 1980; Uhlig, Farber and Bair, 1979; Johansen, DeGrasse, and Wilson, 1978). In addition to office use, they are being used increasingly at home by owners of microcomputers, for both work at home and networking.

For computer-mediated communication to be effective, however, all or most of the group or organization members attempting to use the medium to accomplish a task or exchange information must be active participants. The rejection or drop-out rate to date has been very high. During the operational trials of EIES, for example, about forty percent of invited users never accumulated as many as five hours of online time (Hiltz, 1984).

Bair (in Uhlig, Farber and Bair, 1979:243) notes that:

> The single most common cause of system failure is user rejection... This does not imply that the system design and performance are not also major factors in rejection. However, the way the system was implemented has caused most failures by not overcoming the threatening nature of the complex and intrusive technology. In some cases, rejection by potential users occurred before the technology ever entered the organization.

What factors explain or predict the acceptance of computer-mediated communication systems? "Acceptance" is broadly defined as the amount of use made of a system by its users, attitudes toward the system after about four months of use, and reported positive or negative impacts of using the system. This study attempts to explore these questions by examining new users of four different computer-mediated communication systems. Although there have been many case studies of single systems with one type of user, there has not yet been a study which applies the same research instruments in a longitudinal study of different CMCS with different kinds of users. Our study includes one American and one Swedish conferencing system, both of which operate for closed user communities on university-based computers. It also includes a commercial American conferencing system available on a large national network, and a commercial American electronic mail system used by many corporations for in-house communications. The system characteristics and users are sufficiently diverse that we are confident that findings which hold for all four systems probably hold for CMCS in general.

While the immediate focus of the study is to identify the predictors of acceptance or rejection of CMCS, it also represents an attempt to

test the relative predictive power of different types of variables or factors to explain human behavior in an interactive computer system. We hope that the study represents a contribution not only to the area of teleconferencing, but also the the broader field of computers and society.

ALTERNATIVE THEORETICAL APPROACHES

There are almost as many classifications of types of theoretical approaches to the study of social impacts of computers and of communication systems impacts as there are classifiers. Among the theoretical and empirical approaches to studying the acceptance and diffusion of technology and its impacts on society, four major theoretical approaches can be identified: Technological Determinism, the Social-Psychological approach, the Human Relations school, and General Systems theory.

TECHNOLOGICAL DETERMINISM spans the ideological range from Marxism to the "human factors" and "scientific management" studies conducted by applied social scientists at high technology corporations. Rob Kling, in his review of theoretical approaches (1980), identifies the "systems rationalists" as those who tend to believe that efficiently and effectively designed computer systems will produce efficient and effective user behavior. From this viewpoint, characteristics of the SYSTEM or technology determine user behavior. These technological and rational economic determinants would include the functions of a particular CMCS system, the characteristics of the interface through which the user has the system to perform these functions, and the cost in time and money of using the new system compared to other technological alternatives for human communication. Our

conceptualization of the "technology" or the "system" is thus very broad, and includes not simply the software of the CMCS, but also the documentation, the equipment used, and barriers to access (such as inconveniently located terminals).

The SOCIAL-PSYCHOLOGICAL approach to predicting human behavior when confronted with a new technology would emphasize characteristics of the INDIVIDUAL: attitudes and attributes, including "personality type," expectations, beliefs, skills, and capabilities. "Attitudes" consist of an affective dimension involving emotions ("Computers are fun") and a cognitive dimension based on beliefs ("Using this system will increase my efficiency.") In some investigations, attitudes have been shown to predict behavior (e.g., LaPierre, 1934), whereas in others, there seem to be attitude-behavior inconsistencies (e.g., Schuman and Johnson, 1976.) The strength of an attitude-behavior relationship seems to be increased when specific attitudes are correlated with specific behaviors, as compared to general attitudes correlated with specific behaviors (e.g., Hebelein and Black, 1976). As applied to this study, we would therefore expect pre-use expectations about the specific system to be better predictors of subsequent use of and reactions to that system than attitudes and beliefs about computers in general.

The HUMAN RELATIONS approach "focuses primarily on organizational members as individuals working within a group setting" (Rice, 1985). The small groups of which an individual is part are the most powerful determinants of behavior. From this perspective, participation in the decision to use CMCS, user training and support, the nature of existing ties among group members, and the style of leadership or

group management (electronic or otherwise) are crucial determinants of the acceptance and impacts of a new communications technology.

These approaches all posit a "prime determinant" of new technologies. By contrast, the GENERAL SYSTEMS approach to the study of communications and social change is based upon the fundamental assumption of complex feedback loops whereby the different subsystems (for example, the technology, the attitudes of individuals as fairly stable systems, the norms and social structure of the groups within an organization or a CMCS) constantly "co-determinine" each other (Parsons, 1951; Miller, 1972; Rogers and Rogers, 1976). Crucial to the survival of an organization are exchanges of information and resources with the environment. It is the "cosmpolites," usually located at the very bottom or the very top of an organization, who are most likely the boundary-spanners who maintain links with other organizations in the environment (Rogers and Rogers, 1976:67). The implications for hypotheses of the general systems approach are that we would expect all of the above types of relationships to occur. But in addition we would expect to see CMCS fitting into the existing panoply of communication alternatives as a means for intra-organizational or "boundary-spanning" communications. It would be used and seen as valuable to the extent that it facilitates new channels of communication and information exchanges among organizations.

Among these perspectives, the "general systems" perspective most closely fits the theoretical orientation of the authors and influenced the design of this research. In terms of the relative power of technological versus social determinants, it was

hypothesized that the social context (characteristics of the individuals, the user groups, and the larger organizational and social structure in which the technology is embedded) would be a more powerful predictor of acceptance than characteristics of the systems themselves (see Hiltz, 1983).

Previous Studies

Hiltz conducted a longitudinal case study of scientific research communities on EIES (the Electronic Information Exchange System at the New Jersey Institute of Technology; published as Online Communities, 1984). Table 1-1 indicates the variables included in that study, as well as new variables added for this study. One aspect of the classification scheme that may be confusing is that user training and support are included within the group and organizational context, rather than as part of the "system" or technology. This is because the implementation of a specific CMCS is in fact not the same for all user groups, but is chosen by or for a specific group or organization deciding to use CMCS. A user group may or may not provide face-to-face training, telephone support, special documentation, or other types of training and facilitation.

For the scientific research communities on EIES, the findings for determinants of amount of use were:

> The strongest predictor of level of EIES use is the participant's own estimate of the time that will be spent online, before ever using the system... In turn, the highest correlate with this estimate is the number of other group members who were already known, before signing on (Hiltz, 1984: 66-68).

As that study was being completed, the question which naturally came

to mind was: how generalizable were the results? Could the findings about the determinants of acceptance and impacts be applied to other types of users and to other systems?

As a follow-up to that project, we undertook a second project which systematically compared the findings for thirty possible predictors of acceptance of computer-mediated communication systems (See Hiltz and Kerr, 1981, for the final technical report; Kerr and Hiltz, 1982 for the book version.) The chronology of these previous studies is somewhat confusing since the Hiltz case study was begun in 1978 but not published until 1984, while the Kerr and Hiltz synthesis study was begun in 1980 and published in 1982). The sample consisted of all studies of CMCS for which there was an available published report. The evaluators were asked to reexamine their data and report their findings within a common conceptual framework. The studies for which correlates of acceptance were reported and which are summarized in Figure 1 are:

- .The Futures Research group on EIES (The Electronic Information Exchange System) (Martino and Bregenzer, 1980; Bregenzer and Martino, 1980)
- .The General Systems Theory group on EIES (Umpleby, 1980)
- .The Devices for the Handicapped group on EIES (McCarroll, 1980)
- .The Hepatitis group on EIES (Siegel, 1980)
- .The Joint Electron Devices Council on EIES (Johnson-Lenz, 1980)
- .The LEGITECH (state legislative science advisors) group on EIES (Lamont, 1980; Stevens, 1980; Johnson-Lenz, 1981)
- .The WHCLIS (White House Conference on Library and Information Services) group on EIES (Kerr, 1980)
- .The "Mental Workload" group on EIES (Guillaume, 1980)
- .The HUB system trials (Lipinski, Spang, and Tydeman, 1980; Adler and Lipinski, 1981)
- .The COM system in Sweden (Adriansson, 1980)

.NLS (onLine System, subsequently marketed as Augment by Tymshare (Bair, 1974; Edwards, 1977)

.OICS (Office Information Communication System, a field trial at Bell Northern Research) (Tapscott, 1980)

Figure 1 summarizes the results of this synthesis. There is sparse and conflicting evidence for many of these determinants. Note that no previous study included all of the variables which seem to be important. Thus, their relative importance and interactions could not be tested. Conflicting results from different studies for the same factor may be due to the use of different indicators, the fact that user populations were very different, or to differences among the systems.

Much of the data reported for this synthesis of previous research was qualitative. Thus, one cannot determine the interaction among factors or their relative power in predicting acceptance. This current study systematically includes most of these factors plus those shown in Table 1-1 in a single longitudinal study which includes a variety of different types of users and four different systems. Three of the factors appeared to be potentially key variables and were selected for special concentration: personality factors, leadership behavior, and pre-use expectations. In addition, we decided to focus attention on user training, which was not included in the synthesis study because no previous study systematically varied the type of training given to users. However, research on other types of interactive computer systems indicates that user training is a key factor.

When possible, a variable in the table 1-1 or 1-2 was operationalized by transforming it into one or more questions on the pre-use questionnaire administered to new users of all systems in the current study. For measures or interventions requiring special programming or procedures, data collection was limited to EIES, where a systems analyst was available to create the necessary software.

Table 1-1

TYPES OF DETERMINANTS OF
ACCEPTANCE OF COMPUTER-MEDIATED COMMUNICATION SYSTEMS

I. SYSTEM OR TECHNOLOGICAL FACTORS

A. WORK STATION EQUIPMENT
1. Type of Equipment (CRT and/or printer, micro or dumb terminal, etc.)*
2. Access at work and at home*

B. QUALITY AND CONVENIENCE OF CONNECTION BETWEEN WORK STATION AND CMCS (modem baud rates, communication software, telephone and packet switched network reliability, etc.)*

C. CMCS FUNCTIONALITY

D. CMCS INTERFACE

E. CMCS DOCUMENTATION*

II. CHARACTERISTICS OF INDIVIDUALS

A. ATTITUDINAL VARIABLES
1. Attitudes toward task
    a) Relative importance or priority*
    b) Liking of the task
2. Attitudes toward media
    a) Attitudes towards computers in general*
    b) Expectations about the specific system
        1) Anticipated usefulness (amount of use)*
        2) Anticipated impacts on productivity*
        3) Anticipated difficulty of use
    c) Attitudes toward alternative media (telephones, writing letters, travel, etc.)
3. Attitudes toward the group (liking, respect, whether they are an important reference group)
4. Expectations about how system use will affect relationships with the group*
5. Perceived pressure to use the system*

Table 1-1 Continued

B. WORK-RELATED SKILLS AND CHARACTERISTICS
1. Personal communication skills
    a) Reading speed*
    b) Typing speed*
    c) Preference for speaking or writing*
    d) General literacy (writing ability)
2. Previous related experience
    a) Experience using computers*
    b) Use of computer terminals*
    c) Use of other computer based communication systems*
3. Physical or intellectual disabilities
4. Productivity
    a) Hours per week worked*
    b) Number of publications or other output measures*
5. Connectivity
    a) Number of persons in field with whom one is in contact*
    b) Number of persons on system with whom one was in previous contact*
    c) How well known person is in field*

C. DEMOGRAPHIC CHARACTERISTICS
1. Age*
2. Sex*
3. Educational level*
4. Race, nationality or subculture

D. PERSONALITY CHARACTERISTICS

III. GROUP AND ORGANIZATIONAL FACTORS WHICH MAY AFFECT SYSTEM USE

A. STRUCTURE
1. Size*
2. Degree of geographic dispersion
3. Centralized vs. decentralized control
4. Pre-existing communications ties or network

B. LEADERSHIP
1. Style
2. Level of effort or activity by the leader*

C. COHESIVENESS
1. Socio-metric ties
    a) Have they met face to face?
    b) How many members of the group are known to each other before they begin communicating on the system?*
    c) Have they worked together previously?
    d) Do they form cliques, have many "individualists," or are they an integrated group?*
2. Competitiveness*
3. Trust or openness among members*
4. Status (are most group members prestigious in their fields, or not?)*

Table 1-1 Continued

D. ORGANIZATIONAL CONTEXT
1. Available resources, including secretarial support
2. Position in the organization (or status in informal group)*
3. Amount of pressure to use the system (from superiors and peers)*

E. USER SUPPORT
1. Training
2. Amount and source of user aid (online, in person, by telephone)

This list of factors is expanded and adapted from Hiltz, 1984; which was in turn expanded and adapted from earlier work at the Institute for the Future.

* Indicates that one or more measures of this factor were included in the Hiltz 1984 study

Table 1-2
SUMMARY OF FINDINGS OF PREVIOUS STUDIES OF CMCS ACCEPTANCE

	MANY STUDIES (5 or more)	FEW STUDIES (less than 5)
AGREE	Pre-existing communications network (2++;6+)	Task importance (1++;3+)
	Leadership style (1++;4+)	Education (3+;1=0)
	Previous experience (4++; 3+;1=0)	Liking for task (1++;2+;1=0)
	Own vs shared terminal (3++;2+)	
	Expectations about system (3++;2+;1=0)	Degree of pressure (1++;2+;1=0)
	Geographic dispersion (2++; 3+)	Innovativeness (1++;3+)
	Anticipated usefulness (3++;3+;2=0)	Introversion vs. extroversion (1++ 1+)
	Terminal to take home (2++; 2+;1=0)	
	Night or weekend hours (2++;3+;1=0)	Basic values (1++;1+)
	Attitudes toward computers (4+;1=0)	Perceptions of professional role (3+;1=0)
DISAGREE	Typing speed (1++;3+;3=0)	Type of terminal (2+;1=0)
	Attitudes toward group (3+; 2=0)	Reading speed (1+;2=0)
	Age (1--;2-;2=0)	Previous productivity (1++;1+;2=0)
	Leadership effort (4+;1-; 1=0)	Work hours/day or week (1++;1+;1=0)
		Access to alternative media (1++; 1-)
		Centralized vs decentralized (2+; 1-;1=0)
		Size of group (1++;1+;1-;1--)
		Direct vs indirect use (1++;1=0)

KEY

"Agree" means that 75% or more of the studies reporting results reported that the variable did predict acceptance (in terms of amount of use); and that there is agreement in the way in which the variables are related, positively or negatively.

The numbers in parentheses summarize the observations. For example, "2++; 6+" means that two studies reported a strong quantitative, positive relationship; six reported a qualitative or weak quantitative positive relationship. A notation that "3=0" means that three studies found that the factor did not predict acceptance.

Source: Kerr and Hiltz, 1982: 87

METHOD

The methodological design for this study called for data collection on 150 to 200 new users of four to six CMCS systems, to be collected over the course of a year, with a goal of at least a 66% response rate and 100 subjects for each system. Data analysis and reporting were to be completed by the end of the second year. We also originally had an ambitious plan for controlled experiments with the EIES subjects that included leadership training for the moderators of half the new groups, an extensive series of online interactive lessons to vary training, and an online "tour" to provide a special kind of orientation for half the new users. A combination of substantial funding cuts from the granting agency and the realities of dealing with "real world" user groups with their own plans and demands for similar treatment of all members forced us to cut back the experimental interventions. For example, more than half the new groups during the experimental period had included funds and plans for training or consultation for their moderators, face-to-face training for their group members or telephone follow-ups. They were unwilling to allow us to assign half their members to receive special treatments and half to receive no special help or training. We did retain a modest attempt at experimental interventions. In addition, we encountered an unanticipated series of both obstacles and opportunities for studying new users, which resulted in unequal sample sizes and a much lengthier data collection period.

Procedures

The data for this study include pre-use and follow-up questionnaires plus system usage time for new users of four systems. Pre-use questionnaires were distributed to 379 new users of EIES and 289 new users of the Swedish COM system. Both are not-for-profit academic-based computerized conferencing systems. In addition, 221 users of a commercial conferencing system and 150 users of a commercial electronic mail system, both in the United States, were included. The COM questionnaires were translated into Swedish for those respondents not fluent in English.

An online database record was created when the pre-use questionnaire was mailed, and was used to manage the distribution and recording of data collection efforts for all subjects. This online file tracked and recorded the progress of subjects through all phases of the study, including the issuing of reminders, second mailings of questionnaires, thank you notes, etc.

Follow-up questionnaires were mailed to each participant after four months of use. Ideally, an abbreviated version was sent if they had been online less than three hours. In practice, up-to-date information was not available for all systems, so that the long version was sent when in doubt. For both the pre-use and follow-up questionnaires, online reminder notices were sent to nonrespondents after three weeks. A mailed version of this reminder was used for those who had not yet signed online. Additionally, after another

three weeks of nonresponse, a new copy of the questionnaire was mailed with a reminder letter.

For the non-EIES participants, the two questionnaires, plus computer-monitored data for the total number of hours used on the system, were the only data collected. The questionnaires for all systems were identical, except for a system-specific module included in the follow-up questionnaire. Appendix One of this report includes the pre-use questionnaire and the long version of the follow-up questions common to all systems. The short version of the follow-up ended after the checklist of reasons for limited use of the system. The system-specific modules, not included in the Appendix, asked about the usefulness and quality of design of each of the major features of each system.

For the EIES subjects, a personality test and experimental interventions were also included. An invitation to take the personality test was sent as an online message to each EIES subject when the account was established. A reminder message was sent about three weeks later to those who had not yet responded. Personality data were also collected from approximately 100 regular EIES members who took this test.

Half the EIES users were assigned to an experimental condition in which they were invited to take four interactive "CAI" modules or "lessons," designed to teach the basic mechanics of using the system. These included lessons on how to send a message, how to enter conferences and add a comment, the basics of text editing, and how to find the identity of someone on EIES.

A second experimental factor was the availability of personal assistance from a human facilitator. Half the new users were randomly assigned to a follow-up condition to test the effectiveness of the availability of human facilitation. Three weeks after receiving their account, they were contacted by a telephone call and asked if they had any problems, difficulties, or questions. Steps were then taken to help them with any of these requests.

Subjects were randomly assigned to these two intervention conditions in a 2 X 2 factorial design. That is, one of every four new users received both the online lessons and the follow-up telephone call at three weeks; one received the lessons but not the call, one the call but not the lessons, and one received none of these interventions.

The questionnaires were coded by one of the professionals working with the study, rather than by a student, to increase the confidentiality of responses and protect the data. The student assistants doing data input worked only with the coded data and did not see the questionnaires.

Delays, Obstacles, and Opportunities

In field projects working with organizations and people in their natural settings, the researcher cannot control the nature and timing of events and opportunities affecting the research. At the end of eighteen months, when we had planned to be analyzing results and drafting reports, we were still collecting new data. The events that led to this situation included both unanticipated obstacles and unanticipated opportunities.

One commercial message system kept promising that they would get us 200 to 400 new users. They finally backed out after 14 months. Since we felt it was necessary to include commercial message system, we substituted participation by another commercial message system. However, the follow-up data on many of those users was not completed until 20 months after the study began.

Because the system on the public network does not include a directory with member addresses, the only way to produce a sample was to send invitations to new users (whose online "handles" or names were supplied to us) to ask them to send us their address and receive a mailed questionnaire. It took a totally unanticipated 2000 invitations before we had a sufficiently sized sample in the study . Therefore, some of these questionnaires were also still trickling in after two years.

An example of an unanticipated opportunity too good to refuse was when a 200-member group came onto EIES when we needed only about 15 more people for that sample. The American Productivity Center brought an executive group online to prepare recommendations for the White House Conference on Productivity. As a large and elite group, we did not want to miss the opportunity to include them, but it did make our EIES sample about twice as large as planned, and more than twice as much work, since they required a supplemental online questionnaire and some site visits for proper study. Another unique type of application on EIES that demanded some special additional questionnaires and observation was the presence of online college or graduate level courses.

The Four Systems

The systems selected vary in the software capabilities included, the style of their interfaces, and the size and nature of their user communities. Appendix Two includes transcripts of short sessions on each system, which give the reader some impression of what they are like. However, reducing an interactive computer session to print does not adequately represent what it feels like. In an actual session, there is the tactile and intellectual involvement of interaction with the

system, as it prompts and responds to input from the user. In addition, the short transcripts do not include examples of the full range of software capabilities present on each of the systems.

EIES

EIES (the Electronic Information Exchange System) is a computerized conferencing system located at the New Jersey Institute of Technology. It includes messages, conferences, notebooks, and a large number of special structures and tailored features. Its development and initial years of operation were financed by the National Science Foundation's Division of Information Science and Technology. Users include corporations, research groups, and individuals. Users pay a membership fee of $75 per month, with no additional hourly charges for the system's use. At any time, there are approximately 2000 users in total; thus, EIES can be considered a

relatively small, closed community.

COM

This conferencing system was developed at the Swedish National Defense Research Institute by Torgny Tholerus Most users are researchers at various technical institutions in Sweden and Europe. The Swedish language version of this system is called KOM. It has been installed on five computers within Sweden plus some outside that country, with the capability for automatically transferring items among the different computers. This is a sophisticated conferencing system, including messages, "open" and "closed" (or public and private) conferences, search and retrieval capabilities, text editing, and voting facilities. However, the novice interface is very easy to use. New registrants in both the COM and KOM versions located at the QZ computing center at the University of Stockholm were included. Since other versions of COM do not all include all the features of the QZ version, the results are labelled QZCOM to indicate that a specific implementation with a specific type of user was included in this study.

PUBLICON

This is a pseudonym (standing for PUBLIC CONferencing system) for a conferencing system located on a commercial network available nationally to subscribers, and also available for sale or lease on other computers. The commercial network service had approximately 50,000 users at the time of this study; thus, PUBLICON was much more like an electropolis compared to the electronic villages of EIES and

COM. The version included here has since been replaced by a "new and improved" version and the developers did not want the results of this study to identify their system by name. "PUBLICON" includes electronic mail and a branching form of private and public conferences. While PUBLICON is used by both individuals and groups, it has a higher proportion of individuals using the system for exploratory and intellectual entertainment purposes than the other systems included, since membership is drawn from existing Public Network members as well as those attracted only to the PUBLICON subsystem. It is used by many private corporations, as well as by individuals.

INTMAIL

"INTMAIL" is a pseudonym for a commercially available electronic mail system generally used for INTernal MAIL communications within an organization. It is used by a large number of private corporations, as well as by individuals. Bulletin boards, which function as read-only conferences, are also included. The users in this study were all employees of a single large multi-national corporation.

The INTMAIL sample consisted of 150 new users who registered in October, 1983. All were internal employees of or consultants to a single large multi-national corporation, located throughout the United States and some foreign countries. Executive, managerial, analytical, clerical, and operational personnel were included. Departments included public affairs, government affairs, marketing, finance, engineering, planning, data processing, materials management, human resources, and telecommunications.

Differences Among Users of the Four Systems

Far more than software differences existed among the four systems. The actual sampling differed. PUBLICON users were self-selected, while all new users of the other three systems for a specified period of time were included. Whereas the other systems registered new users and distributed questionnaires with user materials, the users of PUBLICON simply paid a "value added" price for their use of the conferencing system, just as they might pay to use Dow Jones or a database on the network. No up-to-date records were maintained for billing or other purposes, since this was handled by the network. We did receive notification of all new sign-ons, which frequently were by pen name. All we could do is send a message asking the user to participate in the study and to reply with name and address. More than 3000 messages were sent to yield just over 200 replies. The PUBLICON "sample" is therefore a highly self-selected sample of new users, rather than a time-slice of all new users over a period of time, as is the case for the other systems. This self-selected sample can be expected to be more favorable toward the system and to differ in unknown other ways from the more than nine out of ten new users of PUBLICON who did not volunteer to participate.

Response rates also varied a great deal among systems (see Table 1-3). The best response rates were for EIES and PUBLICON, and the worst were for COM. Much of the problem with COM involved distance. Since air mail took more than a week to cross the Atlantic, we were unable to precisely time follow-up mailings. More importantly, for

long periods of time, we were unable to reach COM/KOM via international TELENET, which changed its protocols mid-study. This meant that a large portion of COM users did not receive their online reminders or thank-you notes.

System users differed significantly along a number of dimensions (see Tables 1-4 and 1-5; the questions corresponding to the variable names are included in the Appendix). The typical EIES user was a member of a task-oriented group, had a terminal or microcomputer at home, had infrequently communicated with distant group members before system use, and was a senior executive or manager with a master's degree or doctorate. EIES had the largest proportion of complete novices in the use of computers, and the smallest proportion who used computers on a professional basis.

PUBLICON users were very different. Very few belonged to a task-oriented group; on the contrary, they wandered onto the system because they were "just curious" and were likely to be using the system for entertainment or exploration. Unlike most of the users of other systems, they were paying for their online time themselves.

All except a handful of the users of INTMAIL of course worked in business, rather than government, academia, or other types of organizations; that handful described themselves as consultants. Four out of five were managers or executives. Only one out of ten had a terminal or microcomputer at home. INTMAIL users were most likely to have felt "required" to use the system as a condition of their employment. The variable "HOWIMP" refers to the importance of communicating with others on the system, with 1 corresponding to

"very important" and 7 to "not important." The internal mail users, who were using the system to support their everyday internal corporate communications, reported the highest importance for communication.

COM users are "somewhere in the middle" on most dimensions, but are distinguished by being the youngest, on the average, and the least likely to be employed by business or to be managers or executives. The modal COM user was a Swede employed by academia (30%) or government (25%) in a technical staff position. They were using the system for information exchange about technical subjects.

Experience with and attitudes toward computers also differed. The modal user of the internal mail system had previously used computers "occasionally" (the variable PREVEXP, where "1" was novice and 4 is professional; Chi Square= 88.3, p= .001). Computers were central to the work of the typical COM or PUBLICON user. Differences in attitudes were significant for almost all pre-use questions; the Chi Square or F ratio and significance levels are not included in Table 1-4 in order to summarize results concisely. For instance, EIES and COM users had the most negative attitudes toward computers, while PUBLICON users were the most positive. Feelings of liking toward the online group were weakest for COM. Frustration with other modes of communication was lowest for EIES, and COM users were distinguished by their relative willingness to accept change on the job.

One of the most important differences is whether or not users belonged to task groups, and the size and nature of these groups. Only on EIES were there a number of task-oriented groups on the same

system with more than ten respondents in our study. Among those in groups, only 5% of EIES respondents could not identify a group leader or moderator, but a quarter to a third of group members on other systems could not. Among those in groups, only 5% of EIES respondents could not identify a group leader or moderator, but a quarter to a third of group members on the other systems could not. Table 1-6 shows some of the major groups, the nature of their online tasks, and the number of respondents who identified themselves as belonging to these groups.

Given this diversity of user populations and applications, a variable must be extremely strong to overcome the other factors and differences to produce consistent effects across the four systems. When we have inconsistent findings for different systems, we cannot determine which of the many differences in software and user population is responsible. However, when we have consistent findings across the systems, we have confidence in the generalizability of the finding.

The differences in sample sizes, response rates, and user composition also have important implications for interpretation of the combined "ALL SYSTEMS" results. The combined results are disproportionately influenced by the EIES cases, which constitute over a third of all questionnaire responses in the study. Within the EIES results, about half the respondents are from one application, the executives who participated in the White House Conference on Productivity. This composition of the "all systems" respondents must be remembered when interpreting the results.

Table 1-3

RESPONSE RATES BY SYSTEM

SYSTEM	BOTH	PRE-USE ONLY	FOLLOW-UP ONLY	NONE	TOTAL
EIES	46%	14	10	30	100%= 348
QZCOM	22%	13	18	47	100%= 234
PUBLICON	49%	25	6	20	100%= 197
INTMAIL	28%	15	22	36	100%= 156
ALL	38%	16	13	33	100%= 935

CHI SQUARE= 95 p=.001

Table 1-4

CHARACTERISTICS OF USERS AT PRE-USE, BY SYSTEM

VARIABLE	EIES	QZCOM	PUBLICON	INTMAIL
PREVEXP (% novices)	35%	8%	9%	13%
EVERUSED	22%	32%	40%	21%
IN GROUP	77%	47%	14%	46%
LEADER	95%	68%	78%	62%
JUST CURIOUS	23%	44%	69%	35%
REQUIRED	12%	6%	1%	18%
USEFULEX (mean)	3.0	3.2	4.0	3.0
PAYING SELF	7%	7%	63%	2%
HOME TERMINAL	56%	30%	88%	10%
HOWIMP (mean)	3.8	4.2	4.2	2.9
FREQCOM <3MOS	60%	31%	31%	6%
FEMALE	17%	20%	9%	27%
AGE: 40+	60%	16%	24%	34%
GRAD DEGREE	62%	45%	46%	18%
BUSINESS	46%	30%	54%	96%
MANAGERS	57%	22%	40%	80%

NOTE: All differences significant at .05 level

KEYS: See Appendix for complete wording of questions corresponding to each variable.

PREVEXP= Previous experience with computers

EVERUSED= Ever used a CMCS before

IN GROUP= Are you joining the system as a member of a group?

LEADER= Does this group have an official leader, manager, or moderator?

JUST CURIOUS= Motivation to use the system; "just curious" about how such systems work vs. use on a specific project.

REQUIRED= incentive for using the system; required, requested, or free to use it as participant wishes.

USEFULEX= Overall, how useful do you expect the System to be for your work? (1= Very Useful, 7= Not Useful at All)

HOWIMP= How important is it for you to communicate with the people whom you expect to be online? (1= Very Important, 7= Not Important)

FREQCOM= Before using the System, how frequently did you communicate with those in your group who are distantly located? (1= Daily, 7= Less than once every three months, 8= never)

BUSINESS= Employed by business (vs. academic institution, government,

etc.)

MANAGERS= Position primarily management, administration, or senior executive.

Table 1-5

Primary Online Activity or Task, by System
(Proportions of Users)

ACTIVITY	EIES	QZCOM	PUBLICON	INTMAIL
EDUCATION	15	2	1	0
INFO EXCHANGE	14	51	36	35
PROJECT TEAM	50	37	13	65
ENTERTAINMENT OR EXPLORATION	9	5	47	0
OTHER	12	5	3	0
N responding (100%)	137	57	106	17

Chi Square= 150.44 p= .001

Table 1-6

Major Groups, by System

NAME	N	DESCRIPTION
EIES Instrument Society of America (ISA)	28	Committees of this professional society
Western Behavioral Sciences Institute (WBSI)	10	Online classes
CRT	11	A commodities trading brokerage firm
Hospital Corporation of America (HCA)	10	Online classes
American Productivity Center	157	Preparation of recommendations for the White House Conference on Productivity
CONED	33	Continuing professional education courses at NJIT held on EIES
Fund for the Improvement of Post-Secondary Education (FIPSE)	13	Online courses for college teachers
COM BIOCON	4	U.N. sponsored conference on the Bioconversion of Lignocelulose
PUBLICON American Institute of Architects (AIA)	5	Information exchange among architects

Plan of Analysis

In this chapter, we have introduced our theoretical framework and listed our independent variables. We have also examined the nature of the samples for the four systems studied, and how the users differ on many of the independent variables of interest. In subsequent chapters, we will first describe our operational definitions of our three major dimensions of acceptance: subjective satisfaction, amount of system use, and perceived positive or negative impacts of system use on productivity.

In each of those chapters, we will follow a similar analytic sequence. First we will develop and describe our dependent measures. In the case of subjective satisfaction and impacts, the dependent variables will be based upon a factor analysis which combines and clusters the results of many separate questions into the distinct dimensions or "factors" which comprise it. In the following section, the logic of factor analysis will be briefly explained.

Having developed our dependent variable measures, we will then look at frequency distributions and/or means and standard deviations to understand the overall results for the combined "all systems" sample. Then we will use cross-tabulations and/or analysis of variance to see how the values of the dependent variable differ by system.

The third step in the analysis of each set of dependent variables is to look at the bivariate relationship between each component of the dependent variable and each of our independent variables. This will

be done for the combined "all systems" samples and then broken down for each of the four individual systems. The results of these analyses will be very large tables of correlation coefficients which display the strength of association between each independent variable and each dependent variable.

The final step will be a multivariate analysis, using a stepwise multiple regression procedure. This identifies the best combination of independent variables to predict the value of the dependent variable, and indicates how much of the total variance in the dependent variable we are able to account for with the combination of independent variables included in this study.

Factors as Variables

For a number of key variables in this study, we included several questions which tap different dimensions. We used a factor analysis procedure to construct a combined index measuring the entire variable. This procedure is a statistical technique that looks at correlations among a set of interrelated variables and identifies a smaller set of relatively independent and interpretable, but not directly observable, underlying factors (Norusis, 1984). The analyst must make the interpretation and name the underlying factors or dimensions which are thus identified. "Factor loadings" show how strongly each item correlates with each factor. We used the "default" or most common factor analysis procedures in SPSSX, with varimax rotation; this rotation procedure minimizes the number of variables that have high loadings on a factor, and thus aids the clarity and interpretability of the factors. Having identified the factors, the scores for each individual on each factor were written

to an output file on SPSS and added to the case records. The factor scores can then serve as variables for subsequent analysis. Besides combining several related items into a single measure, the factor scores have the advantage that they are standardized; the mean score for all respondents is always zero, and the standard deviation is one. This statistical transformation enables us to use regression analysis and analysis of variance for dependent variables in the form of factor scores, rather than being limited to just cross-tabulations.

The tables in this section show the factor loadings or components of each factor used as an independent variable, and the names that we will use for the factors. This information serves as the necessary background to understand subsequent analyses which use the factor scores. Factors which measured subjective satisfaction and impacts (dependent variables) will be described in the appropriate chapters.

PRE-USE ATTITUDES TOWARDS COMPUTERS

Three fairly clear factors emerge from the ten questions included in the study on pre-use attitudes toward computers (Table 1-7). We have named these factors "DULL", "UNRELIABLE," AND "DIFFICULT." The procedure in identifying and naming or interpreting the factors is as follows. We examine the factor loadings for each of the dimensions or factors that were extracted. The factor loading is a standardized regression coefficient; thus, its sign shows whether the values in the data were used as coded, or reversed in computing the equation. We look at the original questions for the items which load most heavily into the equation for a factor, and see from the sign (minus

or not) how the responses were used. We can then understand the main components in the statistically constructed factor, and give it a name which captures the essence of the questions which load most heavily. The interpretive procedure will be reviewed for the first factor extracted, so that the reader can understand subsequent tables of results of factor analyses.

"DULL" is composed primarily of the images of computers as dull and dreary. We see this in Table 1-7 because the question which correlates most strongly with the factor we have named "DULL" is the semantic differential scale where 1= Stimulating and 7= Dull. There is no minus sign in front of the .89 factor loading score for the question called "STIM" and the factor extracted first, which we subsequently named "DULL" for its chief component. This means that high scores are near the "dull" end of the scale. The second strong component of this factor, loading at .68, is the question called "FUN." On this question, fun was scored as 1 and "Dreary" was scored as 7. Once again, there is no minus sign in front of the factor coefficient, so the scores were not reversed in computing the factor score. So, high factor scores on the first factor extracted correspond to responses that computers in general are relatively dreary. No other questions loaded highly on the first factor.

UNRELIable is most strongly related to the concept that computers are unreliable, followed by images of computers as relatively inefficient and undesirable, and as hindering rather than helpful. The item on hindering vs. helpful scored hinder as "1" and helpful as "7;" the minus sign in front of the .37 coefficient for this item shows that the scores were reversed in the equation for computing the factor

score for this second factor. The reversal makes high scores correspond to negative opinions about computers, as do the high scores for the other questions which contribute strongly to the factor.

"DIFFICULT" is composed of responses on the difficult, threatening, and demanding ends of those scales, with some impersonality thrown into the mix.

In interpreting these factors, one must take into account that most of the actual ratings are favorable. Thus, the scores on the negative attitude factors represent relatively negative ratings, not absolute negative ratings.

COMMUNICATION AND CHANGE ON THE JOB

A series of Likert-scale items at the end of the pre-use questionnaire probed attitudes about current on-the-job communications and doing things in new ways. These clustered into two distinct factors (Table 1-8).

"COMmunication FRUStration ("COMFRUS") is most strongly correlated with items measuring level of frustration with current communications modes, particularly the telephone. We know that high scores correspond to a lack of frustration because strong disagreement with statements such as "I reach too much time trying to reach people on the telephone" was coded as "5" and strong agreement as "1." There is no minus sign in front of the .72 coefficient between "Telwaste" and the first factor in Table 1-8; thus, the scores were not reversed

in computing this factor score. So, high scores on the "COMFRUS" factor correspond to NOT feeling frustration with the telephone, meetings, or mail.

"CHANGE" consists of a lack of opposition to doing things in new ways. In other words, high scores represent relative acceptance of change on the job. The biggest coefficient is for the question on whether the respondent would prefer to stay with a job that was easy to handle (coded as 1) vs. changing to a new job were "most things would be new," coded as 5. The other strong components are disagreement that it is disturbing to change to new methods, and disagreement that doing things in a new way is "trouble."

GROUP ATTITUDE FACTORS

The pre-use items on impressions of the group and its members cluster into a liking factor and a competitiveness factor (Table 1-9). These will be tricky when used in analyses because we will have to remember that low scores are "good" and high scores are "bad."

LIKEGP is primarily composed of liking the group members, trusting them, considering them competent and cooperative. Because of the way the individual questions were coded, low scores indicate relatively favorable attitudes.

COMPETE is determined almost entirely by the competition question. Low scores indicate relatively intense competition among members, and high scores a lack of competition.

Table 1-7

PRE-USE ATTITUDES TOWARD COMPUTERS

FACTOR NAMES AND LOADINGS

ITEM	FACTOR 1 DULL	FACTOR 2 UNRELI	FACTOR 3 DIFFICULT
STIM	.89	.22	.09
FUN	.68	.28	.35
PERSONAL	.25	.22	.36
HINDER	-.21	-.37	-.18
EFFICIENT	.12	.47	.11
RELIABLE	.06	.68	.08
DESIR	.31	.55	.18
EASY	.14	.08	.63
THREAT	-.12	-.17	-.42
DEMANDING	-.03	-.07	-.51

Note: Items are 1 to 7 semantic differential scales
(Means in parentheses - N=510)
Stimulating - Dull (2.1)
Fun - Dreary (2.3)
Easy - Difficult (3.4)
Personal - Impersonal (4.3)
Hindering - Helpful (5.6)
Threatening - Unthreatening (5.9)
Efficient - Inefficient (2.6)
Demanding - Obliging (3.7)
Reliable - Unreliable (2.7)
Desirable - Undesirable (1.8)

Table 1-8

FACTOR LOADINGS
PRE-USE ATTITUDES TOWARD
COMMUNICATION AND CHANGE ON THE JOB

ITEM	FACTOR 1 COMFRUS	FACTOR 2 CHANGE
TELWASTE	.72	-.01
MEETMUCH	.49	.09
REACH	.45	-.05
MAILFRUS	.45	.01
PREFSTAY	-.12	.82
DISTURB	-.03	.66
TROUBJOB	.13	.43

ITEMS: Five-point Likert scales ranging from strongly agree (1) to strongly disagree (5):
TELWASTE: I waste too much time trying to reach people on the telephone.
MEETMUCH: I spend too much time in meetings.
REACH: The system will make it easier for me to reach people with whom I need to communicate.
MAILFRUS: Using the mails for communication is frustrating.
PREFSTAY: I would prefer to stay with a job that I know I can handle than to change to one where most things would be new to me.
DISTURB: When I get used to doing things in one way it is disturbing to have to change to a new method.
TROUBJOB: The trouble with most jobs is that you just get used to doing things in one way and then they want you to do them differently.

Table 1-9

Pre-Use Attitudes Toward the Group

Factor Loadings

ITEM	LIKEGRP	COMPETE
LIKE	.85	.01
TRUST	.78	-.11
COMPETENT	.78	-.11
COOP	.53	.12
COMPETITIVE	-.02	.87

Items:
COOP: 1= Very Strong Cooperation and Cohesion; 7= Non-existent
COMPETITIVE: 1= Very Intense competition, 7= non-existent
COMPETENT: 1= Members of group competent; 7=Incompetent
LIKE: 1= Like Them; 7= Dislike Them
TRUST: 1= Trust Completely 7= Not at all

THE LEADERSHIP FACTOR

For those who identified themselves as belonging to an online "group" and who were able to identify a "leader" or moderator for that group, four questions rated the leader's abilities or skills. These cluster into a factor called "LEADSKIL". High values indicate dissatisfaction with the leader. It is most strongly related to the "overall rating" of leadership performance as poor rather than excellent (see Table 1-10). It is also strongly related to perceptions of the leader as having poor task-oriented skills and poor social skills. It is not significantly related to whether the leader is perceived as egalitarian or authoritarian.

Table 1-10

LEADSKIL, THE LEADERSHIP RATING FACTOR
FACTOR LOADINGS

	LEADSKIL
TASKSKIL	.83
SOCSKIL	.84
OVERLEAD	.93
AUTH	.03

Note: Questions are seven-point semantic differential scales:
TASKSKIL: "task oriented skills" (1= excellent, 7= poor)
SOCSKIL: social skills related to maintaining group cohesiveness (1= excellent, 7= poor)
OVERLEAD: overall leadership performance (1= excellent, 7= poor)
AUTH: leader is self-oriented (authoritarian), group-oriented (egalitarian) (1= authoritarian, 7= egalitarian)

SUMMARY AND DISCUSSION

We do not define "acceptance" of Computer-Mediated Communication Systems (CMCS) as something that is unidimensional or passive. We essentially mean its enthusiastic incorporation into the daily communication habits of users. Acceptance encompasses amount of use of the sytem, subjective satisfaction while using it, and a perception that its use, over the long term, increases the user's productivity.

General Systems Theory forms the theoretical framework for this comparative study of user acceptance of four CMCS. Characteristics of the technology (including functionality, pricing, interface, and documentation) are measured and related to aceptance. So are characteristics of the individual, including attitudes and attributes such as previous experience with computers, typing skills, and gender. Characteristics of user groups within the systems are also examined; most fundamentally, whether or not the user identifies himself or herself as part of a specific group, with a specific task. If the user is a group member, attitudes toward the other members and perceived characteristics of the group leader's performance are measured. Each of these categories of variables is expected to have some direct impact on acceptance. However, the perspective of General Systems Thoery is that there will also be "feedback loops" and interactions among all of these factors, rather than simple linear relationships. For example, though an individual may start out with one set of expectations and beliefs about the value and "user- friendliness" of the CMCS, the attitudes and beliefs of the

other group members will soon be communicated and will modify the individual's expectations and beliefs about the CMCS. Though specific software and documentation help to comprise "the system" at Time 1, users will feed back information (including the amount of use made of the system and thus the revenues generated or not generated as well as complaints or praise about specific attributes) that will result in evolutionary changes in that system and its documentation. A model of the causal loops would look something like a diagram for a "DYNAMO" model of a complex social process (e.g., see Meadows et. al., The Limits to Growth), with scores of subsystems in the model and hundreds of feedback loops and causal paths. However, whereas DYNAMO models specify "closed" systems in which all the variables are known, we envision an "open systems" version, whereby unknown and unpredictable exchanges with the larger social structure take place--for example, new laws or government regulations that fundamentally affect the way the technology can be used. Or, hackers could break into a corporate mail system and so compromise its confidentiality in the eyes of its users that they refuse to entrust important communications to it any more. These external events which impinge on a CMCS and its users are not measured in this study, but we must remain aware that they are there.

We used the same pre-use and follow-up questionnaires for new users of four difference CMCS. EIES is an American university-based system which is the most comprehensive (or complex, depending upon your point of view) of the four. COM/KOM is a Swedish university-based conferencing system, with mostly Swedish and other European users; it is less complex than EIES in terms of the number of functions and subsystems it presents to users. Both of these systems, however, are

fairly small user communities (under 5000), in which directory functions make it possible to find out who can be accessed, and their actual identities in terms of off-line names and addresses. The commercial American conferencing system included in the study, dubbed "PUBLICON", in order to disguise its identity, is located as one among many services available on a network with over 50,000 subscribers. Many users register only by pen-name or "handle", and it is not possible to use directory functions to find out who can be accessed via the system. In terms of software, it is distinguised from the other two conferencing systems by a "branching" architecture within conferences, whereby sub-conferences split off into separate discussions which then split off yet again. A diagram of the structure of the group discussion would look like the branches and smaller limbs and finally twigs of a tree. However, in the version studied, the user cannot see the outline of the whole tree, but must creep further and further out on each branch and limb to see what is there.

The fourth system is very different than the other three; it is a commercial American electronic mail system, rather than a conferencing system oriented toward supporting group discussions and group tasks. The user base is also very different. They are employees of a single large corporation making extensive use of it for internal corporate communication, rather than users from many different employers engaged in many different kinds of activities, as on the conferencing sytems.

It is important in interpreting the results of this study to emphasize that much more than software differences exist for the

samples of users of these four systems. The users themselves differed a great deal in terms of pre-use attitudes, attibutes, and online group memberships. Sampling procedures and response rates differed markedly. For PUBLICON, there is no record kept of names and addresses of first-time users, let alone prospective users. Anyone can wander into PUBLICON from the large network and try it. For that system, all we could do is send a message to first-time users addressed to their registered (generally pen-name) identity, and ask them to volunteer to participate and to send us their address. The sample is thus self-selected for this system, with less than 10% of those receiving a message responding by volunteering to participate. For the other three systems, the sample includes all new users during a span of time long enough to collect at least 200 names and addresses. However, the response rates to these 100% samples differ. Response rates are lowest for COM, despite the trouble taken to produce Swedish language in addition to English language versions of the cover letters and questionnaires.

With the diversity of software features, user characteristics, and response rates represented by these four systems, we can feel comfortable concluding that any hypothesis supported by data for all four samples probably holds for all CMCS, and perhaps for many related types of interactive computer systems.

However, when there are differences among the systems, we will be unable to definitively determine the reasons for the observed inconsistencies: software, differences in individual and group characteristics, or sampling differences.

Chapter 2

EXPERIENCES ONLINE AND SUBJECTIVE SATISFACTION

In this chapter, we describe some of the reported feelings and experiences of users when they communicated online, including learning time, meeting new communication partners, and reactions to system features. Four basic factors or dimensions are extracted from the numerous items on subjective satisfaction. The correlates of these subjective satisfaction factors are then examined.

LEARNING TIME

The follow-up questionnaire included three items about learning time. Although most users tend to learn the basic mechanics of CMCS in less than an hour, "feeling comfortable" communicating in this new medium takes many people considerably longer, and some "never" do. Table 2-1 shows the distributions for the four systems. Some of the differences clearly are due to software and documentation differences, but a considerable amount of the apparent differences among systems is due to differences in individual and group characteristics among users, reviewed in the previous chapter. The users of COM, the simplest of the three systems, are most likely to take only an hour or two to feel comfortable, followed by the users of the simple internal mail system. However, the mail system users are also most likely to "never" feel comfortable. This may because of the formal, internal-memo like structure of mail systems in general. The structures and group discussion norms of the conferencing systems encourage more informal chattiness, and may thus help users to feel more comfortable.

How did users go about learning to use the systems? All systems include printed documentation, but it is read by only a minority of users. Most merely skim the printed documentation (Table 2-2). The column of table 2-2 showing the correlation between whether or not a learning source was used and total hours online at follow-up indicates that those who skimmed were also likely to be those who logged fewer online hours. The large public network users are most likely to rely on online documentation, and least likely to have received personal or group training sessions. For all systems, the most popular method of learning is "trial and error." Unfortunately, most systems are not designed to support trial and error learning very well, and correlations with usage indicate that it was not as effective as other modes. The system for which trial-and-error has the strongest positive association with time online is COM. Its interface offers a limited list of commands at each choice point, constantly re-arranged so that the most probable (default) choice is always presented first. Whether it is this characteristic of the COM interface which helps to support trial-and-error learning is worthy of further investigation via controlled experiments.

The correlates of learning time are examined in Table 2-3. Learning time was recorded to the nearest hour, with "never" coded as 99 hours. Note that the statistical effect of coding "never" as 99 when very few responses given in hours are above 50 is to disproportionately emphasize the influence of this 8% of cases when calculating regression coefficients and Pearson's R. To try to reduce the overload of information if all data (coefficients, N responding, and significance level) were reported for all

correlations, some simplifying conventions were adopted for displays of correlation matrixes. If a relationship was not significant at the .10 level or better, the coefficient was not shown. Rather than display the exact significance level, a P between .05 and .02 is indicated with an asterisk, and a probability level of .01 or less with a double asterisk. The N of cases on which the statistic is based depends upon the number of respondents who answered both questions (generally one on the pre-use, and the learning time questions on the follow-up questionnaire). Though this varies slightly from question to question, it is about 280 for most items, but reduced to about 135 for questions relating to the group, since self-identification as a group member was necessary to answer these items. Thus, the N is shown only for sample items of specific types.

Previous experience with computers decreased learning time for advanced features slightly, but otherwise had no effect. Attitudes toward computers in general also have little effect on learning time. Attitudes and expectations about the specific system have weak to moderate relationships with subsequent learning time. Those who felt that the system would be hard to learn or frustrating took longer for all three levels of mastery. Those who believed at pre-use that using the system would increase the quality of their work and/or who expected the system to be very useful took less time to feel comfortable and to learn the advanced features. Females reported learning the basics faster than males, and older people took somewhat longer for all levels of system mastery.

The variables "HOWIMP" and "TIMEX" have a particularly interesting relationship with learning time. Those who felt that communicating

with others online was "very important" took more time to learn the basic but reported less time spent on more advanced levels, and were particularly less likely to "never" reach the more advanced levels of mastery. A similar pattern occurs for pre-use expectations about amount of time that would be spent online, with a sign change in the correlations between the basic and more advanced levels.

None of these correlations is particularly strong, but there are a lot of significant correlations. The overall impression is that expectations and attitudes play a dominant role in learning time, and that there is a definite distinction between learning the basics and more advanced levels of mastery of CMCS.

Table 2-1

Time to Feel Comfortable, by System

HOURS ONLINE	1-2	3-4	5-9	10+	NEVER	TOTAL
EIES	30%	22	25	19	5	100% = 142
QZCOM	69%	5	14	7	5	100% = 42
PUBLICON	47%	20	16	8	9	100% = 99
INTMAIL	56%	20	7	3	14	100% = 70
ALL	44%	19	18	11	8	100% = 353

Chi Sq = 48.2; p= .001

Table 2-2

Learning Mode, By System and Subsequent Time Online

(Percent Checking Each Mode)

MODE	EIES	QZCOM	PUBLICON	INTMAIL	R TIME4	P
PRINTED	49	9	36	25	.20	.001
SKIMMED	47	57	40	51	-.10	.02
ONLINE	30	30	68	14	.07	.08
PERSONAL	33	29	4	21	.18	.001
GROUP	40	11	0	14	.23	.001
HUMAN	22	9	10	12	.25	.001
TRIAL	72	80	80	53	.12	.01
NOTYET	7	14	5	10	-.14	.01

QUESTION: How did you learn to use the System?
(Please check all that apply.)

PRINTED: Careful study of the printed user materials
SKIMMED: Skimming the printed user materials
ONLINE: Online documentation, tutorials, or automated HELP facility
PERSONAL: Personal individual instruction from a human teacher
GROUP: Group instruction from a human teacher
HUMAN: Online help from a human teacher
TRIAL: Trial and error learning on my own
NOTYET: Have not yet learned to use it

Table 2-3
Correlates of Learning Time
All Systems Combined

	HRSBASIC	HRSCOMF	HRSADV
PRE-USE FACTORS (SEE CHAPTER 1):			
DULL			*-.12
N	273	274	239
UNRELI		-.09	
DIFFICULT	.09		
COMPETE			**.22
N	132	136	110
COMFRUS	**.15	**.22	*.11
OTHER PRE-USE VARIABLES:			
PREVEXP	-.09		*-.11
N	280	281	244
HARD	**-.21	**-.23	**-.17
IMPER		*-.11	-.08
FRUS	-.09	**-.19	**-.20
INCEFF		**.17	**.14
INCQUAL		**.22	**.21
USEFULEX		**.23	**.20
HOWIMP	*-.11	**.22	**.19
TIMEX	**.21	-.08	*-.11
IMPORT		**.14	**.21
ENJOY	.08		**.21
SEX	**-.21		
AGE	*.12	**.16	**.21
LEADSKIL		-.13	
N		122	

NOTES:
HRSBASIC= Hours to learn basic mechanics
HRSCOMF= Hours to feel comfortable
HRSADV= Hours to learn advanced features
* Significant at .05 level
** Significant at .01 level
See questionnaire in Appendix for wording of items.

SYSTEM FEATURES: NOBODY LOVES THEIR EDITOR

The respondents to the long version of the follow-up questionnaire were given a system-specific module on which they rated the value and quality of the design of each main feature. This was to provide feedback to the designers who had cooperated with the research. Detailed analyses of differences in system design and their implications are beyond the scope of this report; some are reported in Hiltz and Turoff, 1985.

A design problem that all these systems share and which requires work should be noted. The least popular feature in the four systems was the editor. Respondents were asked to rate each feature on a one-to-five scale on which 1 was "Well Designed" and 5 was "Poorly Designed." We arbitrarily established a 20% cutoff to consider the design of a feature as a problem, meaning that at least one in five users rated it poorly designed. The EIES features with these substantial negative ratings are:

Direct text edits: 42%
Indirect edits (formatting): 37%
Searches: 29%

For COM, this is the list of problem areas:

COM Editor: 56%
Calling external editor: 33%
"Review" command: 31%
Finding a user or conference you are searching for: 43%
List users: 33%

PUBLICON did not include any editor. The user had to leave the system, go to an editor on the same computer or network, and then transfer the edited item back to the conferencing system. This procedure is so tedious that few users edited and the designers requested that we not even include it. Among the features asked

about, these received substantial negative ratings:

Prompts: 36%
User profiles: 31%
Conference branching: 30%
Helper function: 30%
Messaging: 22%

For the internal mail system, only these features received poor ratings:

"Edit saved workspace": 32%
Editor: 24%

In terms of design, at least two editors are needed: a line editor for printer terminals and a screen-oriented editor. People prefer the editor they get used to. The solution probably means more transparent text uploading and downloading for editing on a personal computer with a local editor. Other design problems on several systems are directory-type functions for finding individuals and conferences, and searches and retrievals to find and review communications.

As part of the follow-up, respondents reported on the number of other people online with whom they exchanged regular communications ("NUMOTHS"), the number who were personal friends ("FRIENDS2"), and how many of these they had gotten to know online ("GETKNOW"). This varies significantly by system (Table 2-4). As might be expected, the internal mail system is used primarily to communicate with those who were previously known. The public and group conferences and membership directories of the conferencing systems facilitate meeting new people, who may subsequently become regular communication partners. "NUMOTHS" is also lowest for the mail system. However, "FRIENDS2" is lowest for PUBLICON (X= 1.7), followed by INTMAIL (X=1.9). Apparently, users may get to know others in large public conferencing systems, but are less likely to become personal friends than in the smaller, more closed communities represented by EIES and COM.

Table 2-4
Getting to Know People, by System
Mean Number of People and
Analysis of Variance

INTMAIL	1.1
QZCOM	3.9
PUBLICON	4.7
EIES	5.5

F=2.9 p=.03

Getting to know people online is significantly related to:

Liking the group to which one belongs (R= .19),

Positive pre-use attitudes toward the system (e.g, Pearson's R for the belief that it will increase efficiency and "GETKNOW" is .21; for TIMEX it is .32, the highest of the observed correlates).

Number of friends at pre-use (R= .27). Apparently, pre-existing friendship networks provide a kind of "growth node" for introductions to others who then become acquaintances or friends.

The expectation that the task would be enjoyable (R= .20).

The leadership skill of a group leader (R= .24).

SUBJECTIVE SATISFACTION FACTORS

Fourteen items in the follow-up questionnaire probed the users' "reactions to the system as a means of communication and work." Some repeated items asked about pre-use expectations. Four underlying dimensions were extracted and identified with a factor analysis (see Table 2-5).

High scores on "SYSSAT" (system satisfaction) correspond to high satisfaction. The primary components are perceiving the system interface as understandable, courteous, and therefore not feeling "distracted by the mechanics"; finding the system easy to learn, friendly rather than impersonal, not frustrating; and, overall, a "good" rather than "bad" system.

PROD (perceived productiveness) is composed primarily of the online items being productive rather than unproductive, time saving, and stimulating. It is also related more strongly than any other factor to the overall rating of the system as good versus bad. High scores are positive ratings.

UNEXPR (unexpressive) is primarily composed of feelings about being able to conduct social-emotional communication online: being unable to express views or get an impression of personal contact. It is also related to being bored rather than stimulated by the system. High scores indicate dissatisfaction (not being able to "always" or "almost always" express views and feel in personal contact).

MODEPROB (problems with the mode of communication itself) is composed of feeling distracted by the mechanics, constrained in the types of contributions (communications) that can be made, and being overloaded with information. High scores represent positive attitudes, or a relatively low perception of difficulties with the communication mode.

Table 2-5
POST-USE SYSTEM SATISFACTION FACTORS
FACTOR NAMES AND LOADINGS

ITEM	SYSSAT	PROD	UNEXPR	MODEPROB
Overall	-.42	-.51	.36	-.10
Stim2	-.29	-.48	.41	.06
Under2	-.77	-.25	.14	-.07
Courteous	-.63	-.35	.19	-.06
Hard2	.70	.09	-.03	.28
Imper2	.56	.32	-.25	.09
Frus2	.67	.23	-.03	.33
Waste2	.30	.79	0	.27
Unpro2	.26	.83	-.17	.24
Express	-.06	-.05	.68	-.04
Impress	-.10	-.13	.60	-.01
Distract	.50	.15	-.06	.62
Constrain	.12	.07	-.30	.58
Overload	.09	.15	.17	.52

Note: Items include seven-point semantic differential scales or five-point Likert-type scales:

OVERALL: "Overall, the system is..." (1= Extremely good, 7= Extremely bad)
STIM2: 1= Stimulating, 7= Boring
UNDER2: The language of the system (system interface) (1= Understandable, 7= Confusing)
COURTEOUS: 1= Courteous, 7= Unfriendly
HARD2: 1= Hard to learn, 7= Easy to learn
IMPER2: 1= Impersonal, 7= Friendly
FRUS2: 1= Frustrating, 7= Not frustrating
WASTE2: 1= Time wasting, 7= Time saving
UNPRO2: 1= Unproductive, 7= Productive
DISTRACT: Distracted by the mechanics of the system (1= Always, 5= Never)
CONSTRAIN: Constrained in the types of contributions you could make (1= Always, 5= Never)
OVERLOAD: Overloaded with information (1= Always, 5= Never)
EXPRESS: Able to express your views (1= Always, 5= Never)
IMPRESS: Able to get an impression of personal contact (1= Always, 7= Never)

Given the size of our sample, it would be difficult to untangle software differences from differences in the characteristics of users and groups to determine which is responsible for what proportion of the observed differences in subjective satisfaction scores. There are clear, apparent differences in scores (Table 2-6), with system differences seemingly explaining as much as 10% of the variance. Two differences stand out as probably too large to be attributed to differences among users rather than software differences. These are the superior ratings of the QZCOM interface and the lesser communication mode problems in the simple mail system.

These are distinct factors related to subjective satisfaction, and as might be expected in the world of system design where one is always making tradeoffs between mutually conflicting objectives, no one system consistently rates as the best or the worst on the different dimensions of subjective satisfaction. In particular, the two simplest systems (COM and INTMAIL) have the best ratings on the average for reaction to the interface; but they have the worst average ratings for UNEXPRessive. One can speculate that the added features in EIES and PUBLICON designed to promote a lively group discussion simultaneously encourage more expressive communication and make the system more complicated and distracting to use.

Table 2-6
Subjective Satisfaction with the System
Mean Factor Scores by System
Analysis of Variance

SYSTEM	SYSSAT	PROD	UNEXPR	MODEPROB
EIES	.07	.16	-.22	-.16
QZCOM	.67	.22	.24	.24
PUBLICON	-.30	-.31	-.15	-.22
INTMAIL	.09	.34	.39	.59
F	11.4	9.6	11.4	19.2
P	.001	001	001	001
Eta	.31	.29	.31	.39
Eta Squared	.10	.08	.10	.15

Note: Factor Score interpretation:

SYSSAT: System Satisfaction; perceiving the interface as understandable, courteous; high scores indicate high satisfaction with system interface.

PROD: The system itself is perceived as being productive rather than unproductive or time wasting; high scores are positive ratings.

UNEXPR: Unexpressive; High scores indicate dissatisfaction with being able to express ones views and feel in personal contact on the system.

MODEPROB: Mode Problems; Feeling distracted by the mechanics of the medium, constrained, overloaded. High scores indicate lack of perceived problems.

Determinants of the SYSSAT factor

Table 2-7 displays the results of statistical analyses of the bivariate relationship between each of the independent variables in this study and the dependent variable, SYSSAT. Pearson's R is the measure of correlation displayed, unless the independent variable was dichotomous, in which case point biserial correlation was used. It is the first of eight tables in this report which will display the results of Pearson's correlation analyses in a similar format. For each of the tables in this series, the results for the combined samples from all four systems are shown in the first column, followed by results for the separate systems. Correlates are grouped into pre-use attitude factors, other individual items from the pre-use questionnaire, reasons for low use reported on the follow-up, and items from the long version of the follow-up questionnaire.

For this first table of correlations, the N of cases on which the statistical analysis was based is displayed. This does make the table very large and hard to read. The of cases will not be shown for similar tables in the remainder of this report; Table 2-7 will serve as the reference. The precise Number of cases on which a correlation statistic is based does not vary more than one or two cases from the numbers shown in Table 2-7, when other factors or questions are used as the dependent variable.

Some general pre-use attitude factors appear to influence reactions to the system interface design ("SYSSAT"). If computers in general were felt to be difficult to use, four months later, users were more likely to express dissatisfaction with the interface of the system

they were using. This is consistent across all systems. A less consistent but interesting finding is that those who liked their group more were also more satisfied with the system interface.

Previous experience with computers does not generally predict SYSSAT, but for the two systems in which it does, it is those with less previous experience who were most satisfied. There are moderately strong and generally consistent relationships between the items measuring pre-use expectations about the specific system, and SYSSAT after four months of use. In particular, those who felt that the system would be easy rather than difficult to use, personal rather than impersonal, and not frustrating, retained the same sorts of attitudes after using the system. These are the strongest observed correlates.

Those who at pre-use anticipated that their task would be important and enjoyable were more satisfied. Looking at the group-level variables, "HOWSAT" is most strongly related to SYSSAT. However, the relationship is not what one might expect; those who were most satisfied with their previous modes of communication with other group members were also most satisfied with the system interface of the CMCS. Perhaps some people are just hard to please? There is an overall relationship for "HOWIMP;" if it was important to communicate with those online, users tended to be more satisfied with the interface. However, this relationship is reversed for COM; perhaps it is because of the small N of cases, or perhaps it really is because the social dynamics are different for the Swedes.

Looking at individual characteristics, females were more satisfied

with the system interfaces than males. For COM, the correlation level is similar to that for other systems (-.19), but there are so few female respondents that the relationship is not statistically significant. There is a slight tendency for the younger users and the less highly educated users to be more satisfied. (Remember that in this population, "less educated" means the ones without doctorates.)

Items from the list of limitations on system use, completed at the same time as the responses to the SYSSAT factors, can be interpreted as implying causation only with caution. The most important relationship in this group of variables is that those who indicated that poor documentation was a very important factor in limiting their use were also most dissatisfied with the system interface. The high correlation with "COMPLI" (the system is too complicated") and "POORDES" (the system is poorly designed) are redundant measures of the SYSSAT factor itself; they help validate it, but not explain it. In terms of expanding social networks online, those who were most satisfied with the system interface were also most likely to use the system to get to know others.

Table 2-7
Correlates of SYSSAT Factor

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
		PRE-USE FACTORS			
DULL		*-.16			-.25
N	(262)	(113)	(24)	(86)	(38)
UNRELI		-.31			
N	(262)	(113)	(24)	(86)	(38)
DIFFICUL	**-.21	**-.35	-.28	*-.21	*-.27
N	(262)	(113)	(24)	(86)	(38)
LIKEGP	**-.19	**-.32			
N	(128)	(81)	(12)	(13)	(22)
COMPETE					
N	(128)	(81)	(12)	(13)	(22)
CHANGE		*.15			
N	(266)	(115)	(23)	(88)	(39)
COMFRUS	-.08				
N	(266)	(115)	(23)	(88)	(39)

CORRELATES OF SYSSAT, CON'T

OTHER PRE-USE VARIABLES

PREVEXP			*-.35		**-.39
N	(267)	(114)	(25)	(87)	(40)
TIMEX	*.12			**.35	*.28
N	(268)	(113)	(25)	(89)	(40)
MOTIV			-.33		
N	(245)	(96)	(23)	(89)	(40)
HARD	**.43	**.45	**.59	**.37	
N	(268)	(115)	(24)	(88)	(39)
IMPER	**.31	**.38	.28	*.22	*.33
N	(267)	(115)	(24)	(89)	(39)
FRUS	**.45	**.47	**.52	**.44	.21
N	(268)	(115)	(25)	(88)	(39)
WASTE	**.29	**.38		.14	.23
N	(268)	(115)	(25)	(88)	(39)
UNPRO	**.24	**.37		.16	
N	(268)	(115)	(25)	(88)	(39)
INCEFF	**-.18	**-.28	**.61	-.14	-.21
N	(267)	(114)	(24)	(88)	(40)
INCQUAL	**-.17	*-.19	.27	-.14	-.22
N	(268)	(115)	(24)	(88)	(40)

CORRELATES OF SYSSAT, CON'T

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
USEFULEX	**-.22	**-.23	.28	-.15	*-.30
N	(268)	(115)	(24)	(88)	(40)
INCENT		.14	**.61		
N	(267)	(114)	(24)	(88)	(40)
HOWENT		*-.17	*-.34	**.23	
N	(269)	(114)	(25)	(89)	(40)
KNOW					
N	(243)	(108)	(23)	(84)	(27)
FRIENDS	*.13			*.20	
N	(247)	(109)	(23)	(84)	(30)
HOWIMP	**-.19	**-.27	*.41	-.15	
N	(266)	(114)	(23)	(88)	(40)
IMPORT	**-.15	*-.15			*-.33
N	(266)	(112)	(25)	(89)	(39)
ENJOY	**-.16	**-.22	**-.42	-.14	-.24
N	(265)	(110)	(25)	(89)	(40)
NUMGRPR					
N	(118)	(84)	(11)	(11)	(12)
GP	*.10		*-.37		
N	(268)	(113)	(25)	(89)	(40)
GPNAME	.10		-.35		
N	(252)	(112)	(22)	(84)	(33)
FREQCOM		**-.29		*.54	*-.41
N	(133)	(83)	(14)	(13)	(23)
HOWSAT	**-.24	**-.26		*-.49	
N	(127)	(78)	(14)	(12)	(23)
HOURSWK		-.13			-.24
N	(256)	(113)	(24)	(83)	(35)
SEX	**-.20	*-.19		*-.20	-.20
N	(289)	(131)	(28)	(89)	(40)
AGE	**-.15	**-.24			
N	(269)	(115)	(25)	(88)	(40)
EDUC	**-.14	*-.16		*-.31	
N	(270)	(116)	(25)	(88)	(40)
POSITION					
N	(265)	(116)	(20)	(88)	(40)

CORRELATES OF SYSSAT, CON'T

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
TYPING		*.15			
N	(270)	(116)	(25)	(88)	(40)
	FOLLOW UP REASONS NAMED FOR LIMITED USE				
TERMS	-.07			*-.19	
N	(319)	(128)	(31)	(96)	(63)
DOC	**.44	**.51		**.44	*.24
N	(316)	(127)	(31)	(97)	(60)
PHONE			*-.34		
N	(315)	(128)	(29)	(96)	(61)
PACKET	-.08				
N	(311)	(127)	(29)	(97)	(58)
COSTREAC	-.08		*-.29	*-.-.20	*-.22
N	(316)	(127)	(31)	(97)	(60)
COSTUSE			*-.33		**-.29
N	(316)	(127)	(31)	(97)	(60)
BADEXP	**.18	**.25	.-.25	.14	
N	(317)	(128)	(31)	(97)	(60)
TYPDIF					
N	(317)	(130)	(31)	(96)	(59)
PREFPH		.11			
N	(316)	(129)	(30)	(96)	(60)
NOTLIKE	**.12	**.09			.19
N	(314)	(128)	(30)	(95)	(60)
COMPLI	**.54	**.54		**.62	**.45
N	(317)	(129)	(30)	(96)	(61)
POORDES	**.56	**.49	**.41	**.63	**.51
N	(313)	(127)	(30)	(95)	(60)
NOONE					.20
N	(314)	(127)	(30)	(96)	(60)
NOTINT				-.16	
N	(318)	(128)	(31)	(97)	(61)
OTHERAC			-.27		**.28
N	(319)	(130)	(31)	(97)	(60)

CORRELATES OF SYSSAT, CON'T

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
NOTWORTH	**.11				
N	(317)	(129)	(30)	(97)	(60)
LEADSHIP	.08				.20
N	(308)	(127)	(27)	(95)	(58)
JUSTTRY					
N	(302)	(122)	(25)	(95)	(59)

OTHER POST-USE VARIABLES

NUMOTHS				*.17	
N	(310)	(121)	(31)	(95)	(62)
FRIENDS2	**.13			**.26	
N	(311)	(122)	(31)	(97)	(60)
GETKNOW	**.17	*.17		**.25	
N	(296)	(117)	(29)	(91)	(58)
TIME4R	*.11		.25	**.26	
N	(312)	(131)	(28)	(96)	(39)

NOTE:

Correlations listed only if p<.10

*Significant at .05

**Significant at .01

STEPWISE MULTIPLE REGRESSION

The best way to determine the interaction of the various individual and group determinants of SYSSAT with system software variations would be to do many analyses of variance with System as a covariate, but this would be extremely tedious to follow and would not let us simultaneously examine all the factors and their interactions. A rough idea of the interactions and relative power of system software and other predictors can be gained from a stepwise multiple regression, as in Table 2-8. The problem with this approach is that the explanatory power of system differences is underestimated, since system is a nominal level variable with four categories, rather than an interval level measure, or better, as is assumed by regression procedures. This does mean that its explanatory power is slightly underrepresented in the stepwise procedure.

Because this is is the first of many tables showing the results of a stepwise procedure, display convention is spelled out. In the first column after each variable is the "Multiple R" which resulted at the end of that step. The second column, R squared, is the total proportion of variance in the dependent variable explained by the combination of variables up to a specific step in the procedure. The third and fourth columns are from data produced at the last step in the procedure, showing the coefficients for the variables in the final equation. The coefficient "b" is the slope, which would actually be used in the equation. If there is a minus sign before b, the scores on the question are inversely related to the factor. Beta

is the standarized regression coefficient, which lets us compare the relative explanatory contribution of each variable in the final equation. The constant is the intercept ("a") in the final equation. Thus, for instance, in the first equation produced by the stepwise procedure presented in Table 2-8 for the prediction of SYSSAT would be, for any individual,

SYSSAT= -1.44 + .17 times the value of "FRUS" + .43 times the value of the answer to "DOC," etc.

For the variables having to do with attitudes toward the group, there are many missing responses. Including them would substantially decrease the degrees of freedom. Thus, in the first version of the equation shown in the table, variables present only for those who answered questions related to the task group to which they belonged were excluded from the candidate variables. The candidate variables in equation 1 are those shown as selected plus the list of additional variables not selected, shown as a footnote.

The strongest single correlate selected by the stepwise procedure for predicting SYSSAT is a pre-use expectation about the system, with those who anticipated that it would not be frustrating to use the most satisfied four months later with the system interface. In step 2, only the unexplained variance left after the variance associated with "FRUS" has been removed is used as the target for selection. Reported lack of problems with system documentation adds the most to predicting SYSSAT at this point, increasing the proportion of explained variance (R SQUARE) from 21% to 32%, a substantial improvement. Once we have users who did not expect the system to be

frustrating and who did not find the documentation to be poor enough to be a barrier to use, the variable which adds most to our predictive power is sex: females are more satisfied than males.

Only at this point does "SYSTEM" enter the equation. Thus, although we can see that variations in system software make a statistically significant difference in reported satisfaction with the interfaces of CMCS, they are not as important as other factors. It must be remembered of course that all four systems are successful, widely used, and basically well designed systems.

The final two variables selected, TIMEX and HARD, are related to specific expectations about the system at pre-use.

In a second version of the equation, group-level variables (FREQCOM, LIKEGP, HOWSAT, and COMPETE) were added as candidate variables. The equation stays the same up until the fifth step, when HOWSAT is selected instead of another pre-use variable. However, the total ability to predict SYSSAT (the multiple R squared on the final step) does not appreciably improve. Generally, if there is no improvement when group variables are added, the equations will not be shown.

Turning now to the equations for SYSSAT for specific systems (Table 2-9), although the specific combination of predictors selected varies somewhat by system, there is much similarity among the three conferencing systems. For both EIES and "PUBLICON", problems with the documentation are most strongly related to dissatisfaction with the interface, followed by measures of pre-use expectations toward the specific system. For COM, documentation does not appear to be a

serious problem. It is pre-use expectations in combination with anticipated enjoyment of the task that best predict subsequent satisfaction with the interface. This equation for COM explains almost all of the variance with three factors (INCEFF, ENJOY, and HARD). However, it must be remembered that the sample of respondents to the long follow-up questionnaire was very small for COM. We cannot assume that the results are generalizable to all COM users, given the low response rate.

For INTMAIL, none of these factors contributed to a multivariate equation. The only variable selected for that system was previous experience, with those who had more previous experience using computers least satisfied with the interface. This is probably because, unlike the more complex conferencing systems which provided alternative interfaces for novice users and expert users, this simple mail system had only one interface, and it was oriented toward novices, thus likely to frustrate for expert users. Whenever only one variable is selected for a stepwise procedure, the equation will not be displayed.

ANOTHER LOOK AT THE INFLUENCE OF SYSTEM

The finding that factors other than variations in the specific system design itself are most important in determining user satisfaction with the system interface is too critical to the theoretical premises of this study to be accepted if there is any chance that it could be an artifact of the statistical analysis used, the stepwise multiple regression. That procedure, as mentioned above, underestimates the explanatory power of differences among the four systems somewhat, because the system is a nominal variable

without any particular rank order as it is set up to enter the equations.

To be absolutely sure of our conclusion on the relatively small contribution of system differences to explaining differences in "SYSSAT" for these four systems, we used a pair of analyses of covariance. We used the results of the stepwise multiple regression to select the three covariates: "FRUS,", "DOC" and SEX. In the first version of ANOVA, the standard analysis of covariance was done, with variance in SYSSAT due the to three covariates first removed, and then the proportion of remaining variance associated with SYSTEM determined. The results are very similar to those for the stepwise multiple regression procedure. System makes a statistically significant improvement in predicting SYSSAT, but the relationship is nowhere near as strong as for the three covariates. (F for combined covariates= 45.2, p=.001. F for system= 7.8, p= .001.)

To make sure that "SYSTEM" has every chance to show up as important, the analysis of covariance was then repeated using a special option which processes the covariates concurrently with the main effect variable, rather than giving the covariates the "first chance." The results are almost the same. The F values, indicating roughly the relative strength of the predictors in acconting for variance in SYSSAT, are 44.3 for DOC, 29.6 for FRUS, 11.3 for SEX, and 7.8 for SYSTEM. Multiple R with this analysis is .62, almost identical to the .63 by step 4 of the stepwise procedure shown in Table 2-8. Thus, we can feel assured that the findings about the relative power of SYSTEM are not an artifact of the stepwise procedure; and the tedious double-checking with versions of analysis of covariance will not be repeated for subsequent factors measuring subjective satisfaction.

Table 2-8
REGRESSION EQUATIONS FOR SYSSAT (ALL SYSTEMS)

Equation 1 (df= 241)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	FRUS	.45	.21	.17	.29
2	DOC	.57	.32	.43	.34
3	SEX	.60	.36	-.43	-.18
4	SYSTEM	.63	.39	-.12	-.15
5	TIMEX	.64	.41	.10	.14
6	HARD	.65	.42	.09	.16
	(CONSTANT)			-1.44	

Variables not in the equation: PREVEXP, DULL, UNRELI, DIFFICUL, COMFRUS, MOTIV, IMPER, WASTE, UNPRO, INCEFF, INCQUAL USEFULEX, KNOW, HOWIMP, IMPORT, ENJOY, GPNAME, AGE, TYPING

Equation 2: Group Variables added, Leadskil Excluded
(DF=125)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	FRUS	.45	.21	.23	.38
2	DOC	.57	.32	.43	.34
3	SEX	.60	.36	-.43	-.18
4	SYSTEM	.63	.39	-.15	-.19
5	HOWSAT	.65	.42	-.11	-.17
6	HARD	.66	.44	.11	.19
	CONSTANT		-.63		

Additional Group Variables entered but not selected: FREQCOM, LIKEGP, COMPETE

Table 2-9
SYSSAT Multiple Regressions for Specific Systems

EIES Equation 1 (df=94)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	DOC	.51	.26	.47	.42
2	FRUS	.62	.39	.16	.27
3	WASTE	.65	.43	.15	.22
4	SEX	.68	.47	-.43	-.20
	CONSTANT			-1.57	

EIES Equation 2 (df= 76)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	DOC	.51	.26	.52	.47
2	FRUS	.62	.39	.13	.22
3	FREQCOM	.70	.48	-.12	-.29
4	WASTE	.72	.52	.15	.23
5	SEX	.74	.55	-.37	-.17
	CONSTANT			-1.02	

COM Equation 1 (df= 20)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	INCEFF	.61	.37	.28	.67
2	ENJOY	.84	.71	-.29	-.55
3	HARD	.95	.90	.22	.45
	CONSTANT			-.76	

Remaining unexplained variance <1%

PUBLICON, Equation 1

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	DOC	.44	.19	.63	.43
2	TIMEX	.56	.31	.28	.34
	CONSTANT			-2.57	

Determinants of the "UNEXPRESSIVE" Factor

This factor is on the opposite end from SYSSAT in terms of dimensions of subjective satisfaction with a CMCS. Rather than being concerned with the way the system presents itself to users, the UNEXPRessive factor centers on the ability to express oneself in this medium of communication. It encompasses the social-emotional dimensions of communication, such as expressing views and feelings, getting an impression of others, and feeling socially stimulated, as contrasted to feeling like you are communicating with an impersonal machine.

From the correlation matrix in Table 2-10, we observe the following:

PREVIOUS EXPERIENCE: Whereas previous experience with computers does not have much relationship with most aspects of acceptance of CMC, those who have less previous experience with computers are less likely to feel themselves constrained by the computer as a communication mode with other humans. However, this overall relationship is highly influenced by the strong relationship for COM; it seems to be a much stronger feeling of professional Swedish computer users. In any case, the relationship is interesting, even if not particularly strong and consistent across systems. It suggests that if people become used to using computers only as computational or database tools, they will find it harder to think of them as a good medium for personal communication.

TYPING: Another set of variables that is significantly related to this factor, although to little else, is typing skill, and whether one enters all of one's online communication oneself, or has others do it ("HOWENT"). Better typists find the medium more suitable for expressive and personal communications, as do those who enter text themselves.

GROUP attitudes and relationships are relatively more important for UNEXPRessive than pre-use expectations about the system. Liking the group, having previously communicated with the group offline, and enjoying the group task are all related to the feeling that the medium is good for expressive communications. For COM, trust in the group has a strikingly high correlation with subsequent feelings that the system is good for expressive or personal communication.

LEADSKIL: Although the perceived skill of the group leader is related to the ability to use the system expressively, most of this relationship appears to be due to the EIES cases.

COST: Looking at the follow-up reasons checked for low usage, the strongest correlate is the cost of using the system, one that does not appear in many other analyses. Evidently, those who feel constrained by the money they are paying also feel constrained about being able to be expressive or personal. This suggests the very stilted and impersonal style of the telegram, where every word costs additional money. Evidently, to feel comfortable communicating online, one cannot feel pressure to keep everything short and fast

in order to minimize costs.

STEPWISE MULTIPLE REGRESSIONS

Table 2-11 shows the interaction of these variables for all systems combined. Enjoyability of the task emerges as the best predictor of how expressive one is likely to feel online. The second variable selected in this analysis is "system;" software design differences evidently play a relatively strong role in determining whether one is likely to engage in social-emotional or personal writing styles online. At the extreme, one can imagine that an internal mail system which forces the format of a formal memorandum on the user, and does not allow any other format, would end up having communications that are just as unexpressive and impersonal as the typical offline memorandum. Poor typing, extensive prior use of computers, and using surrogates to enter text also made significant contributions to the "UNEXPRESSIVE" factor.

In the second version of the equation, the group-dependent variables were added as candidates. For this particular dimension of subjective satisfaction, the group context variables are the most powerful. Previous communication with the group ("FREQCOM"), and the factor encompassing pre-use liking of the group, are the first two variables selected; then comes enjoyability of the task. When the group variables are included, system does not get selected as a predictor for the equation.

Table 2-10
Correlates of UNEXPRESSIVE factor

VARIABLE:	ALL	EIES	QZCOM	PUBLICON	INTMAIL
			PRE-USE FACTORS		
DULL	*.10	*.19			*.31
UNRELI	**.13	**.29	.29		.23
DIFFICUL					
LIKEGP	**.25	**.36	*.48		
COMPETE			**-.81		
CHANGE	-.08	*-.16			
COMFRUS	**.17		**.45		**.41
			OTHER PRE-USE VARIABLES		
TIMEX	**-.24	**-.29			
PREVEXP	**.15	.12	**.54	.17	
HOWENT	**.22	**.23		.14	.21
MOTIV		*-.18			
HARD			-.27		
IMPER	**-.16	-.13	**-.51		*-.30
FRUS				.17	-.21
WASTE		**-.22	-.30		*-.35
UNPROD	**-.14	**-.27			**-.38
INCEFF	**.14	**.27			*.33
INCQUAL	**.15	.14	.27	.16	.22
USEFULEX	**.14	**.19		.16	**.39
INCENT			-.27		
KNOW					
FRIENDS		.14			
HOWIMP		.15		-.15	**.39
IMPORT	**.13	*.19			.22
ENJOY	**.28	*.17		**.29	**.35
NUMGRPR					
GP					
GPNAMR		.14			
FREQCOM	**-.29	*-.17		-.37	
HOWSAT		**.32			
LEADSKIL	**.24	**.32			
HOURSWK	**-.15				
SEX					
AGE	-.09	-.14			
POSITION					
TYPING	**-.17				**-.27
EDUC				*.19	

Correlates of UNEXPRESSIVE Factor con't.
FOLLOW UP REASONS NAMED FOR LIMITED USE

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
TERMS	-.08				
DOC					**-.22
PHONE				*.24	-.14
PACKET					
COSTREAC	*.09		**.43	.19	
COSTUSE	**.21		**.42	.18	**.29
BADEXP					
TYPDIF			**-.38		
PREFPH	**-.16	**-.22		-.19	
NOTLIKE	**-.19	**-.28			*-.18
COMPLI					**-.32
POORDES	-.08		*.30	-.19	**-.27
NOONE	**-.13				**-.23
NOTINT	*-.10				*-.17
OTHERAC	*.12				
NOTWORTH	-.07	-.13			-.14
LEADSHIP	-.07	*-.15	-.29		**-.24
JUSTTRY	-.08				*-.22
		OTHER POST-USE QUESTIONS			
NUMOTHS	*-.09		*-.30	*-.18	
FRIENDS2	**-.16	*-.18		**-.26	
GETKNOW	**-.27	**-.34		**-.26	
TIME4R	**.17	*.14		**.26	

NOTE:
Correlations listed only if p<.10
* Significant at .05
** Significant at .01
See Table 2-7 for N of cases.

Table 2-11
REGRESSION EQUATIONS FOR UNEXPRESSIVE (ALL SYSTEMS)

Equation 1 (df= 241)

STEP	VARIABLE	MULT R	R SQUARE	b	Beta
1	ENJOY	.28	.08	.14	.24
2	SYSTEM	.36	.13	.14	.19
3	TYPING	.39	.15	-.12	-.15
4	PREVEXP	.41	.17	.10	.14
5	HOWENT	.43	.18	.15	.14
	(CONSTANT)			-.81	

Variables not selected into the equation: DULL, UNRELI, DIFFICUL, COMFRUS, TIMEX, MOTIV, IMPER, FRUS, WASTE, UNPRO, INCEFF, INCQUAL, USEFULEX, KNOW, HOWIMP, IMPORT, ENJOY, GPNAME, AGE, SEX, DOC

Equation 2: GROUP VARIABLES ADDED (df= 75)

STEP	VARIABLE	MULT R	R SQUARE	b	Beta
1	FREQCOM	.30	.09	-.12	-.33
2	LIKEGP	.43	.18	.23	.27
3	ENJOY	.47	.22	.13	.21
	(CONSTANT)			.21	

Additional variables not in the equation: LEADSKIL, HOWSAT, COMPETE

EIES Only, Equation 2, LEADSKIL eliminated (df=76)

STEP	VARIABLE	MULT R	R SQUARE	b	Beta
1	LIKEGP	.36	.13	.27	.37
2	TIMEX	.47	.22	-.15	-.25
3	UNRELI	.52	.27	.21	.23
4	FREQCOM	.56	.32	-.08	-.23
	(CONSTANT)			.67	

COM Only Equation 2 (df=10)

STEP	VARIABLE	MULT R	R SQUARE	b	Beta
1	COMPETE	.81	.66	-.68	-.77
2	PREVEXP	.94	.88	.38	.47
	(CONSTANT)			-.75	

Correlates of the MODEPROB Factor

MODEPROB indicates general problems with CMCS as a mode of communication. It correlates most strongly with being "distracted by the mechanics," followed by feeling constrained in the types of contributions (communications) one can make, information overload, and frustration. High scores indicate a lack of "mode problems."

Table 2-12 shows the list of correlates of this subjective satisfaction factor. Even a quick glance shows that the coefficients are much lower than we are accustomed to seeing. Of the pre-use variables, "FREQCOM" has the highest coefficient: those who had previously communicated more with their group had less trouble using this mode of communication. The general pre-use expectations of the system as measured by "TIMEX" has the most consistent relationship across systems. An expectation that the system would be frustrating carries through four months later in predicting the MODEPROB factor of which frustration is a part. But this explains little. The missing factors may be software design or deep seated cognitive and personality factors.

We don't yet have data ready for personality and cognitive style variables. But the first table in this chapter showed that the between-systems differences were greatest for the MODEPROB factor. The hypothesis that system software differences are primary for this dimension is supported by the fact that the highest observed correlate is a report at follow-up that the system being "too complicated" seriously decreases use. Before proceeding to a

multiple regression analysis, let us examine in a little more detail the pattern of system differences underlying the overall differences in the frequency of Mode Problems. Table 2-13 shows the cross-tabulation of the strongest component of MODEPROB, "DISTRACTED," by system. There is, first of all, a clear difference between the conferencing systems and the simple mail system. There are not many commands and subsystems for different kinds of group communication on the mail system. Since it is simpler, users are less often distracted by trying to remember what they must type. Of the three conferencing systems, COM has the simplest design, and its users much less frequently report being distracted by the mechanics of the system.

MULTIPLE REGRESSION

The system's perceived complexity is the strongest of the correlate of MODEPROB (Table 2-14). Even with this system design factor extracted, "system" again shows up again in the equation. When group-level variables are excluded, pre-use expectations, specifically in the form of expected time online and the perception that the system would not be time-wasting, enter the equation after the complicated design factor. Being a poor typist adds significantly to the prediction that there will be "mode problems," after system design and pre-use attitudes and expectations are taken into account.

In the second version of the equation, some of the group-level variables and factors are added. How complicated the system is still emerges as the chief determinant. This is followed, however, with "FREQCOM," with the direction of the correlation indicating as before

that if group members infrequently communicated before coming online, they will have more problems with CMCS as a mode of communication. Pre-use expectations in the form of the global "TIMEX" variable then enter the equation third and last.

Table 2- 12
Correlates of MODEPROB factor

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
		PRE-USE FACTORS			
DULL		-.12			
UNRELI		**-.21	.28		
DIFFICUL	-.08			-.15	
LIKEGP					*.35
COMPETE		*.18			
CHANGE COMFRUS					
		OTHER PRE-USE VARIABLES			
PREVEXP		.14			
TIMEX	**-.27	**-.24		-.15	-.24
MOTIV					
HARD	**.20	**.22			
IMPER	*.10	.14			
FRUS	**.24	**.32			
WASTE	**.22			**.23	
UNPRO	.10				
INCEFF	-.08				
INCQUAL					.25
USEFULEX					
INCENT		*.16			
KNOW	*.11				
FRIENDS	*.12				
HOWIMP				.16	
IMPORT		**.22	-.29		
ENJOY					-.25
NUMGPRP				*-.61	*.50
GP					
GPNAMR		-.13		-.17	
FREQCOM	**-.31				
LEADSKIL			**-.88		
HOURSWK	*-.10	*-.16		.167	
SEX				.16	*.31
AGE				-.15	
POSITION					*-.30
TYPING	**-.13	*-.16			
HOWENT	**.18				
EDUC	**-.15	-.12			

Correlates of MODEPROB factor con't.

	FOLLOW UP REASONS NAMED FOR LIMITED USE				
VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
TERMS				**.29	
DOC	**.27	**.35		*.17	*.26
PHONE	*.10	**.23			
PACKET					
COSTREAC	.07		.24		
COSTUSE	**.17		.27	.13	
BADEXP	**.19	**.22	.27		
TYPDIF					
PREFPH		*.18			
NOTLIKE	*.11	**.21			*.23
COMPLI	**.34	**.43		**.24	.17
POORDES	**.24	**.26		**.23	
NOONE	*.09				
NOTINT	**.13				*.24
OTHERAC	**.29	**.26	.25	.15	*.21
NOTWORTH	**.19	.13		*.22	*.22
LEADSHIP	**.13			*.21	
JUSTTRY	**.16			*.18	
	OTHER POST-USE QUESTIONS				
NUMOTHS		*-.16	.25		
FRIENDS2				.15	
TIME4R	**.17	*.14		**.26	
GETKNOW					

NOTE

Correlations listed only if p<.10

* Significant at .05

** Significant at .01

See Table 2-7 for N of cases.

Table 2-13
Feeling Distracted by Mechanics, by System

	EIES	QZCOM	PUBLICON	INTMAIL	ALL
Always	4%	3%	11%	0	5%
Almost Always	12%	3%	14%	3%	10%
Sometimes	58%	45%	60%	43%	54%
Almost Never	19%	42%	16%	37%	24%
Never	6%	8%	0	17%	7%
Total	100%	100%	100%	100%	100%
N	144	38	104	70	356

Chi Sq= 54.9 p= .001

Table 2-14
REGRESSION EQUATIONS FOR MODEPROB (ALL SYSTEMS)

Equation 1 (df= 241)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	COMPLI	.34	.1	.41	.33
2	TIMEX	.46	.21	-.17	-.26
3	WASTE	.49	.24	.11	.19
4	SYSTEM	.51	.26	.13	.18
5	TYPING	.53	.28	-.11	-.15
	(CONSTANT)			-1.03	

Variables not in the equation: PREVEXP, DULL, UNRELI, DIFFICUL, COMFRUS, MOTIV, HARD, IMPER, FRUS, UNPRO, INCEFF, INCQUAL USEFULEX, KNOW, HOWIMP, IMPORT, ENJOY, GPNAME, SEX, AGE, TYPING, DOC

Equation 2:GROUP VARIABLES ADDED (df= 125)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	COMPLI	.34	.12	.45	.36
2	FREQCOM	.46	.21	-.08	-.24
3	TIMEX	.51	.26	-.16	-.23
	(CONSTANT)			-.34	

Additional variables not in the equation: HOWSAT, LIKEGP, COMPETE

Correlates of the PROD Factor

Although we asked respondents to answer the questions about subjective satisfaction in terms of their reactions to using the system itself, responses related to the PROD factor probably also include non-system factors, such as the ease or difficulty of working with the group and attributes of the task. This is evident in the correlations in Table 2-15.

The strongest correlates of feelings that using the system is productive, after four months of use, are the pre-use expectations about components of this very same factor. Thus, the highest correlations appear for the pre-use expectations that the system would increase efficiency, be productive, and be useful. The next highest correlates are with the importantance of communicating with the online group (if a group member), and with the felt importance of the online task. Frustration with previous modes of communication is also a relatively strong correlate. Those who were most frustrated with previous modes of communicating with the group find the system relatively more productive to use as a means of communication. Liking the group is related to considering that the system feels productive. Being pressured to use the system (MOTIV) is related to a feeling that using it is not productive.

Looking at the follow-up reasons cited for limiting use of the system, the strongest correlates of the feeling that using the system is not productive are the perception that there is "no one to communicate with" and that the items that are available are "not worth reading."

"System" does not emerge as a significant determinant when all factors are considered in a multiple regression equation (Table 2-16). Without the inclusion of the group factors, the first variable to be selected is the pre-use expectation of how useful the system would be, overall; the pre-use expectation that the system would be productive is also in the equation. The belief that it is important to communicate with those online is included in the equation to predict how productive using the system seems, as are the assertions that by the time of follow-up, the items were "not worth" reading or there was "no one" with whom they really wished to communicate.

In the second version of the equation, the group-level variables are added as candidates. "HOWSAT," (how satisfied they were with other modes of communication with the group before system use) is selected as a significant predictor; "USEFULEX," "NOTWORTH" and "HOWIMP" stay in the equation. However, using the group level variables does not improve our ability to account for the variance in the PROD factor, it simply changes the variables that are selected for making the prediction.

Table 2-15
Correlates of PROD Factor

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
		PRE-USE FACTORS			
DULL		-.14			*-.27
UNRELI	**-.15	**-.26			**-.38
DIFFICUL			.32		*.-27
LIKEGP	**-.21	**-.31	-.41		
COMPETE	.12		**.63		
CHANGE			-.31		
COMFRUS	**-.30	**-.36		**-.31	
		OTHER PRE-USE VARIABLES			
PREVEXP			*.46		
TIMEX	**.18		**.49	**.31	.22
MOTIV	**.23			**.27	
HARD					*.30
IMPER	**.16	*.20			
FRUS	**.19	.12		**.25	**.39
WASTE	**.38	**.29	.27	**.33	**.39
UNPRO	**.40	**.38		.43	**.39
INCEFF	**-.43	**-.30	**-.62	**-.34	**-.56
INCQUAL	**-.33	**-.26	**-.59	**-.41	*-.29
USEFULEX	**-.43	**-.21	**-.50	**-.47	**-.49
INCENT		.14			*.26
KNOW	**.19				**.48
FRIENDS					
HOWIMP	**-.43	**-.30	**-.66	**-.39	-.23
IMPORT	**-.34	**-.20	**-.65	**-.25	**-.40
ENJOY	**-.17	**-.33		*-.23	*-.34
NUMGRPR					
GP	**.19			**.31	
GPNAMR	**.18			**.24	
FREQCOM	-.11				
HOWSAT	**-.26	**-.44	**-.64		*.38
LEADSKIL				*.47	
HOURSWK					
SEX	*-.09				**-.27
AGE	*.11				
POSITION					
TYPING					
EDUC	**-.14		*-.26		

Correlates of PROD Factor Con't.

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
	FOLLOW UP REASONS NAMED FOR LIMITED USE				
TERMS	**-.12				*-.19
DOC		*.19			-.16
PHONE	*-.09	**-.22			
PACKET					
COSTREAC					
COSTUSE	**.12		*.30		
BADEXP			**.33	.15	*-.21
TYPDIF					
PREFPH		**.26		*-.25	*.-24
NOTLIKE	*.11	**.29			
COMPLI	*.09				
POORDES	**.27	**.31		**.25	
NOONE	**.33	**.25	**.44	**.49	
NOTINT	**.19		.27	**.32	
OTHERAC	**.14	**.20	*.30		.16
NOTWORTH	*.29	**.26	**.51	**.29	
LEADSHIP	*.10	*.14			
JUSTTRY	**.19		**.54		.18
	OTHER POST-USE QUESTIONS				
NUMOTHS			.27		
FRIENDS2	**.18	**.18		.16	.19
GETKNOW	.09	.15			*.23
TIME4R	**.17	*.14		**.26	

NOTE

Correlations listed only if p<.10

* Significant at .05

** Significant at .01

Table 2-16
REGRESSION EQUATIONS FOR PROD (ALL SYSTEMS)

Equation 1 (df= 241)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	USEFULEX	.43	.19	-.09	-.16
2	NOTWORTH	.51	.26	.19	.13
3	HOWIMP	.55	.30	-.11	-.23
4	NOONE	.58	.23	.27	.21
5	UNPRO	.60	.36	.16	.21
	(CONSTANT)			-1.29	

Variables not in the equation: SYSTEM, PREVEXP, DULL, UNRELI, DIFFICUL, COMFRUS, TIMEX, MOTIV, HARD, IMPER, FRUS, WASTE, INCEFF, INCQUAL, USEFULEX, KNOW, IMPORT, ENJOY, GPNAME, SEX, AGE, TYPING, DOC

Equation 2:GROUP VARIABLES ADDED (df= 125)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	USEFULEX	.43	.19	-.15	-.26
2	NOTWORTH	.51	.26	.37	.26
3	HOWSAT	.55	.31	-.14	-.21
4	HOWIMP	.59	.35	-.11	-.23
	(CONSTANT)			.414	

Additional variables not in the equation: FREQCOM, LIKEGP, COMPETE

Table 2-17
ATTITUDE SHIFTS: T-TESTS
ALL SYSTEMS COMBINED

VARIABLE	MEAN	DIFF	T VALUE	PROB
HARD	4.67			
HARD2	4.38	.29	2.99	.003
IMPER	4.42			
IMPER2	4.37	.56	.58	.56
FRUS	4.38			
FRUS2	4.18	.21	2.14	.033
WASTE	4.75			
WASTE2	4.48	.28	3.21	.001
UNPRO	5.29			
UNPRO2	4.75	.54	6.47	.000
INCEFF	3.56			
QUAN2	4.54	-.99	-9.51	.000
INCQUAL	3.51			
QUAL2	4.44	-.92	-9.28	.000
USEFULEX	3.25			
USEFUL2	4.02	-.77	-7.88	.000

We have seen that pre-use expectations are consistently good predictors of subjective satisfaction four months later. Five of the fourteen items from which we constructed the four subjective satisfaction factors, as shown in Table 2-5, were repeated at the two times. A T-Test can enable us to understand how much shift is taking place and the direction of attitude shifts, and whether the shift in means between the two times is statistically significant. Table 2-17 displays the results of this test for the all-systems sample. The first five items were included in the subjective satisfaction scales; the last three will be included in impact scales in the fourth chapter.

What we see is that for seven of the eight variables, the means at the two times are significantly different, in a statistical sense. However, the absolute shift is in all cases less than one on the one-to-seven scales. The direction of the shifts that do occur is negative. After four months of using the system, there has been some disillusionment, on the average, rather than an improvement in attitudes. The average user feels that the system is somewhat less easy to learn than he or she expected at pre-use. The systems are also perceived as somewhat more frustrating, less time-saving, less productive; quantity and quality of work is not percieved as having increased as much as was expected.

The T-Test procedure was repeated for each of the four separate systems, with almost identical results. The main difference is that

with the relatively small number of respondents on the long follow-up questionnaire for individual systems, many of the shifts are not statistically significant. However, they replicate in the same direction and about the same magnitude for all four systems.

Why do we observe shifts that are both relatively small and negative? One possible explanation is that the pre-use measures are not really "pre-use" in many cases; the user uses the system for a short while before filling in the questionnaire. Many of those who have not actually used the system themselves before filling in the pre-use questionnaire have probably seen a demonstration or watched somebody else using the system. So we might think of the first measures as in many cases "first impressions" rather than completely "pre-use" attitudes.

In any case, much more extensive use does not improve subjective attitudes about ease of learning and use of these systems or their impacts, but rather sees some degradation or disillusionment setting in. Attitudes, on the average, are still on the positive side of neutral, but they are just slightly positive rather than strongly positive after four months of system use.

SUMMARY AND DISCUSSION

The most frequently used learning mode for users of each of the four systems in this study is "trial and error." However, this does not appear to be a very effective learning mode, as indicated by subsequent time online. The implication is that systems should be designed to support trial-and-error learning. System characteristics which do support trial-and-error learning need to be investigated

experimentally, but the fact that the COM system seems the best of the four in this study for trial-and-error learning might give some hints about what an interface for a self-teaching system looks like.

Pre-use expectations and motivations affect learning time. Those who expected the system to be hard to use in fact took significantly longer to learn the basics and to feel comfortable. Those who did not expect the system to be very useful were most likely to take a long time or to "never" feel comfortable online or to learn the advanced features of the system.

Editors are the most universally nominated as "poorly designed" features on these systems. Mispellings, omitted words or phrases, and poor formatting that results in wrap-around or uneven lines detract from the clarity of written comunication. The users of these systems typically think and revise as they compose. Moreover, most are not very good typists. For all these reasons, it is important that simple to use but powerful editing and text formatting facilities be integrated into the text composition functions of CMCS. Given the difficulty of most users in making do with an unfamiliar editor, the best approach is probably easy to invoke processes for uploading and downloading text from the microcomputer, where the user's personal editor can be employed.

Getting to know new people online occurs more in the conferencing systems. It is also related to positive pre-use expectations about the system, the number of friends who were online at preuse, the expectation that the task would be enjoyable, and leadership skill. Thus, the phenonmenon of CMCS leading to the expansion of personal

communication networks is affected by a combination of software characteristics, individual attitudes and expectations, and the social or group context in which the individual user is located.

A factor analysis identified four dimensions of the users' subjective satisfaction with the CMCS. Two factors (SYSSAT and PROD) are primarily task-oriented or instrumental dimensions, while the other two (UNEXPRessive and MODEPROB) are social-emotional dimensions. A review of the correlates of SYSSAT and UNEXPR emphasizes the marked difference in apparent determinants of the different factors which make up subjective satisfaction with using a CMCS.

SYSSAT is the factor measuring relative satisfaction with the user interface. Differences in the software of the four systems appear to explain a maximum of 10% of the variance in SYSSAT. The strongest correlate is pre-use expectations about the systems: in particular, those who expected the systems to be "frustrating" to use at pre-use were less likely to be satisfied with the user interface four months later. When a multivariate analysis is used to determine the best combinations of variables to explain SYSSAT, then the second variable to enter the equation after pre-use expected FRUStration is satisfaction with the documentation. This is followed by sex (females are more favorable than males). "System" does not enter the equation until the fourth step of the stepwise multivariate procedure. Thus, satisfaction with a CMCS interface is clearly not only or even primarily determined by software. It is also dependent upon documentation and attitudes of the users. Though group variables individually have significant correlations with SYSSAT, on the other hand, their inclusion in a multivariate procedure does not

significantly improve its prediction.

Those who scored high on the UNEXPRessive factor feel that they are unable to express their views and feelings in this medium of communication or to receive enough social-emotional cues in the written text to form an adequate impression of others. The correlates of this factor are fascinating because they are quite different than correlates of SYSSAT and other instrumentally-oriented factors and variables. Those who have more previous experience using computers are more likely to feel that they cannot be used adequately for expressive communication. This is particularly true of the Swedish COM/KOM users, and appears to be a cultural difference. Swedes who use computers professionally share images of them as cold and impersonal, and thus not suitable as a medium for personal, expressive human communication.

Whereas typing skills are generally not significantly related to most aspects of acceptance of CMC, better typists do feel more able to express their feelings in this medium. Similarly, awareness of the cost of online time is not strongly related to task-oriented dimensions of acceptance, but it does interfere with the ability to feel comfortable taking the time to express oneself in a personal and sociable manner.

Attitudes and relationships with the group are relatively more important than individual pre-use attitudes and expectations. Adding them to a multiple regression improves the total explained variance in UNEXPR and it is the group-level variables which are selected as the best predictors. Those who communicated least frequently with

their group prior to coming online have the most problems with expressive online communication. Those who score high on the "LIKEGP" factor, meaning that they do not like or trust the other members of their group, understandably feel less able to express social-emotional feelings online. Trust in other group members is particularly important for the Swedish users of COM. Again, we have evidence of cultural differences playing a role in the acceptance of CMC. Perhaps it is because the Swedes are often more guarded and taciturn in face-fo-face conversations than the typical American; in this new medium, they appear to be especially reluctant to "let down face" and communicate in a personal and emotional way.

There are moderate but consistent relationships between gender and various measures of satisfaction with CMCS, with females being more favorable than males. They take less time to learn the basics, and are more satisfied with the system interfaces, for instance. This is consistent with the results of previous controlled experiments (Hiltz, Johnson, and Turoff, 1982). We can speculate on the possible reasons, which include the fact that females tend to be better typists and have better verbal skills than males. They may also appreciate the opportunity to "have their say" in a medium where they cannot be shut out of active roles in a group by dominant males. Another possibility is the sex ratio on these systems, which is generally five or more males to every female; this may provide a pleasant social environment for the relatively rare sex. The reasons underlying the generally more favorable reactions of females than males to CMCS deserve further investigation.

Several identical attitude items were repeated on the pre-use and

follow-up questionnaires. A T-test for significant differences between the means of the repeated items indicates some interesting processes which also need further investigation. There are small but statistically significant shifts in attitudes after four months of use; but they are consistently in a negative direction. On an absolute basis, attitudes are still positive on the average, but somewhat less positive than were expectations. Put another way, the CMCS studied are not quite living up to the expectations and hopes of their users.

CHAPTER 3

DETERMINANTS OF SYSTEM USE

MEASURES OF AMOUNT OF USE

System use was measured automatically by system monitor statistics collected as part of billing procedures. These data are more accurate and complete than recall would be, but are still far from perfectly valid measures of relative amount of system use. They were obtained for users approximately four months after receiving their accounts. Elapsed time is not exact and may vary by as much as a month among users. The useage statistics are produced only once a month, whereas new users can begin in mid-month. If an account was established during the first seven days, then the end of "month 1" was considered to be at the end of that calendar month; otherwise it was at the end of the next calendar month. A second problem is that a user might not have actually begun regular use on the day an account was established; thus, "four months" is only a rough description of the elapsed time.

Time online is connect time; this is affected by modem baud rate, and by whether a user composes and reads while online, or uses a microcomputer to upload and download. In the latter case, the total amount of time spent on composing input for the system and on reading output from the system is much greater than the "connect time." Thus, "connect time" is an incomplete measure of time spent on system use for many of those using a microcomputer as a terminal.

We also have no way of distinguishing true "zero" use from a few

minutes use, since an account may log a few minutes of time just as part of the process of the system monitor's setting it up and checking it out the first time, or as part of a demonstration, never followed up.

The data on connect time were rounded to the nearest hour. Anything less than 30 minutes use was thus considered "Zero hours." The mean for all systems was 14 hours, with a range from zero to 646 hours (N= 925). The data are severely skewed towards the high use end (skewness =10.7) and do not resemble a normal distribution (Kurtosis= 183).

The dependent variable, hours online, was categorized and used in three other ways, each of which has certain advantages and disadvantages.

First of all, in order to use it in cross-tabulation tables, it was categorized into five groups ranging from no use (<30 minutes) through relatively high use (50+ hours online). In examining the determinants of "drop-out" behavior, the bottom two categories, no use and one to three hours use (less than an hour a month; not enough to learn the systems and maintain familiarity) are considered "drop-outs." Finally, for those who did make at least some use, the log of cumulative hours online is used for analysis. (There is no such thing as a log of zero). This produces a dependent variable that is distributed in a pattern much closer to a normal curve (skewness= .05, kurtosis= -.55) than is raw hours of connect time.

Table 3-1 gives an overall picture of the distribution of total time online after about four months, for all users in the sample, whether or not they responded to any questionnaires. Overall, about one out of five users did not sign on at all or signed on for only a few minutes; another one out of five spent at least half an hour online, but became a "dropout," having accumulated less than an hour a month online by the end of four months. Another one out of five, approximately, became a "casual user," spending about 15 minutes to half an hour online each week: enough to pick up some messages or conference entries, but not to make substantial contributions to any exchange. And approximately two out of five became moderate to heavy users, regularly spending substantial amounts of time online.

The distributions are significantly different for the four systems. INTMAIL and COM have the largest proportion of dropouts. PUBLICON appears to have the least; but it must be remembered that the PUBLICON sample is self-selected, and thus the many who tried that system once or twice and then dropped out are unlikely to have volunteered to answer our questionnaires. Two of the conferencing systems, EIES and PUBLICON, appear to have the largest proportions of heavy users, regularly spending substantial amounts of time online.

Table 3-1
Amount of Use by System
.CE (Proportion of Users in Each Category)

SYSTEM	<30MINS	1-3HRS	4-9 HRS	10-49	50+HRS	N
EIES	15	12	18	47	8	353
QZCOM	27	35	19	16	2	232
PUBLICON	1	20	33	40	6	190
INTMAIL	34	28	27	10	2	149
ALL	19	22	23	32	5	924

Chi Sq= 197; p=.001
Eta= .40

Overall, for all four systems, 27% of the responding samples of new users became "drop-outs:" they used less than an hour a month, which is too little time to acquire and maintain familiarity with a system and to actively take part in a communication exchange. This figure is different than that in the previous section, because it includes as respondents only those for whom we have some other data (a pre-use and/or follow-up survey) in addition to the automatically collected data on time online. Comparison of the two figures (27% vs. 41%) indicates that the sample of respondents to the questionnaires contained a smaller proportion of dropouts than the population of all users from whom questionnaires were requested. The higher non-response rate for dropouts than for users would be expected; however, we do have at least some questionnaire data on the majority of the dropouts.

There is no one explanation for CMCS dropout behavior, but a number of significant correlates in the weak to moderate range:

AVAILABLE HELP- 42% of those who felt that there was no one available to help them, either online or offline, are in the dropout category. Those who had only offline help dropped out in similar numbers: 38%. However, those who felt that there was human help available online were less likely to become dropouts. (Cramer's V=.19; p=.001).

TERMINAL ACCESS- Home terminal access appears to be important. Only

7% of those with a home terminal are "drop-outs", vs. 38% of those with only an office terminal at pre-use (Cramer's V= .25, p=.001).

TASK ENJOYABILITY- 18% Of those who rated their online task as 1 or 2 (on a one to seven semantic differential scale where 1= enjoy very much and 7= enjoy very little) became dropouts, vs. 43% of those who answered "5" or more.

FREQUENCY OF PREVIOUS COMMUNICATION- These results are the opposite of what might be expected. The proportion of dropouts decreases steadily as the frequency of previous communication with the user group goes down, from 34% dropouts among those who already communicated at least once a week, to 9% of those who had never communicated before with the members of the online group (Cramer's V= .27, p= .001, N=225 members of groups responding). Thus, it is the new communication opportunity which is most likely to stimulate users to learn to use the new medium of communication, rather than an additional channel to reach people with whom they already frequently communicate.

GROUP MEMBERSHIP AND SIZE- Being a member of a specific group decreases the likelihood of becoming a dropout. Twenty one percent of those indicating a group membership at pre-use became dropouts, vs. 32% of those who had no group (Chi square= 7.4, p= .01). Among group members, 25% of those in groups sized 15 or less became dropouts, vs. 15% of those in groups larger than 15.

Only a minority of our respondents were able to identify themselves

as being in a particular group at the time of the pre-use questionnaire, and most of these were on EIES. As indicated in Table 3-2, the specific group to which a person belonged was an extremely strong predictor of the likelihood of becoming a dropout: for instance, none of the WBSI group, 1% of the APC group, but 61% of the ISA group became dropouts.

PREVIOUS EXPERIENCE WITH COMPUTERS- Only 14% of the complete novices became dropouts; there were no consistent differences among other experience levels. This is most likely a partially spurious result, since a disproportionate number of the APC group of executives on EIES were novices, and their group did not have dropouts.

Table 3-2
Proportion of EIES Dropouts, By Group

GROUP NAME	%	N
ISA	61	18
WBSI	0	10
APC	1	93
CONED	13	15
OTHER	34	82

Cramer's V= .50; p=.001

In both the short and long versions of the follow-up questionnaire sent about four months after a user was first given the opportunity to use a CMCS, we included an extensive self-reporting of factors or reasons why system usage had been limited. Each respondent was asked to check each reason as being "Very Important" (code 1), Somewhat Important (2) or Not Important (3) in limiting amount of system use. Table 3-3 summarizes the results of cross tabulations of these reported reasons by whether or not the user became a dropout. In order to present the results concisely, the proportions saying "somewhat" or "not" important are omitted from the summary table.

The self-reports are interesting because only if there is a significant difference between dropouts and non-dropouts can we say that a factor may "cause" low usage. For instance, by far the most frequently given reason given by dropouts is that "other activities" must take priority over their online task. This is reported as very important by 43% of the dropouts. However, it is also reported as very important by 34% of the non-dropouts, and the difference is not significant.

The next most frequently named reason is inconvenient terminal access, and this does differ significantly between dropouts and users. Other reasons named which significantly distinguish between dropouts and users are preference for the telephone, not liking CMCS as a mode of communication, and "just trying" the system rather than having a specific task.

Table 3-3
Limitations on Use as Explanations of "Drop Outs"

Proportion of Dropouts and Users
Naming a Source as "Very Important" in Limiting Use
All Systems: N=421 Respondents

PROBLEM AREA	DROPOUTS	USERS	CRAMER'S V	P
TERMINAL ACCESS	26	14	.16	.001
DOCUMENTATION	19	12	.10	.15
TELEPHONE	18	11	.09	.19
PACKET NET	13	7	.18	.001
COST REACH	13	12	.02	.92
COST USE	17	20	.05	.63
BAD EXPER	12	11	.09	.22
TYPING	2	4	.05	.63
PREFER PHONE	10	5	.16	.01
NOT LIKE	7	2	.20	.001
COMPLICATED	9	8	.07	.40
POOR DESIGN	7	8	.05	.58
NO ONE	18	8	.15	.01
NOT INTERESTED	11	7	.06	.52
OTHER ACTIVS	43	34	.08	.22
ITEMS NOT WORTH	11	7	.08	.28
LEADERSHIP	8	12	.05	.57
JUST TRY	14	6	.22	.001

THE EXPERIMENTAL INTERVENTIONS

All new EIES users receive a printed beginner's manual, instructions on how to retrieve online documentation, and instructions on how to send a message to "help" whenever they are having difficulties. Some groups also provide face-to-face demonstrations or hands-on training sessions for their members.

We hypothesized that either a follow-up telephone call or the availability of interactive online tutorials would help new users in overcoming problems learning to use the system, and would lead to greater use. In implementing this experiment, we did encounter some difficulties. We began assigning new users randomly to the telephone follow-up or no follow-up condition soon after the beginning of the study. However, we do not know to what extent those in the "no follow up" condition may have been contacted by telephone by their own group leaders, or called into EIES personnel themselves to discuss difficulties. In addition, approximately one third of the participants who were assigned to receive a follow-up telephone call could not be reached, despite repeated attempts.

The online tutorial was offered to half of the new users, randomly selected, when it was ready. It consisted of four lessons, which those who entered the command "+guide" could select from a menu: how to send a message, how to participate in a conference, a primer on text editing, and using the directory to find people. A piece of software was to track how many actually took each module, but it soon became inaccurate, as people seemed to start modules and stop in the

middle, and/or go back and retake a module. The "tutorial treatment" is thus an OPPORTUNITY for an online tutorial, which was not necessarily taken advantage of.

The results are displayed in Table 3-4. The online tutorial appears to be effective, whereas the telephone call was not.

The average number of hours online at the end of four months was highest for those participants who were offered the online tutorial but did not receive a telephone call. There is no significant effect for the telephone call or the interaction between the tutorial and the call; only the tutorial makes a difference.

In a different context, where no other source of personal help is available, a telephone call might aid users. EIES users had a variety of other mechanisms for obtaining help when they needed it. The online "human helpers," the user consultants, are available to give personal assistance at all times. This is a very heavily used and liked support function on EIES. In addition to receiving personal online assistance, users are given a telephone number to call for assistance at any time. We speculate that when human assistance is available at all times, it will be used whenever needed, and mechanisms such as a single telephone call will have no discernable impact on ease of learning and subsequent use of the system.

Table 3-4
IMPACT OF TUTORIALS AND TELEPHONE CALLS ON SYSTEM USE
MEAN NUMBER OF HOURS ONLINE AT FOUR MONTHS
ANALYSIS OF VARIANCE

	TUTORIAL	NO TUTORIAL	ALL
CALL	19.0	17.1	17.9
N	30	40	
NO CALL	27.2	16.4	20.5
N	108	175	
ALL	25.4	16.6	20.0

ANALYSIS OF VARIANCE
TUTORIAL F=7.3, p= .007
TELEPHONE CALL F=.56 p= .46
INTERACTION TUTORIAL X CALL F= 1.2 p=.28

For those who did not have less than half an hour online, which was coded as zero hours, the log of the cumulative time online at four months was used as the dependent variable, to find the best predictors of amount of system use. The strategy followed is to first examine individual predictors, and then explore interactions and combinations of predictors with multiple regression equations.

Table 3-5 shows the Pearson's correlation coefficients for predictors of LOGTIM4, arranged by type of variable and time collected: pre-use factors and variables, reasons named for limited use at follow-up, other follow-up factors and variables from the long version of the follow-up questionnaire.

Overall, both for all systems combined and for each of the conferencing systems, the best predictor is the user's own estimate of amount of weekly use ("TIMEX"), estimated at the time of the preuse questionnaire, which has an overall correlation across systems of .56 with our dependent variable. In untangling the determinants of amount of system use, therefore, we will have to determine what explains "TIMEX".

Glancing through the coefficients, the next strongest predictors after "TIMEX" appear to be "FREQCOM," having a terminal at home, and aspects of of the online task. As we saw in examining correlates of dropout behavior, FREQCOM is related in a counter-intuitive manner. For all systems except INTMAIL, the less frequently the user

communicated with distantly located members of the group before CMCS use, the more the system was used. In other words, the conferencing systems were used more if they opened up new channels of communication with colleagues who were not easily reached by traditional modes.

Having a terminal at home is significantly related for only two of the systems, EIES and COM. Attributes of the task (importance and enjoyability) predict for all systems.

Looking at other factors and variables measured at pre-use, general attitudes toward computers are not good predictors of amount of CMCS use. Of the other pre-use factors, only COMFRUS is significantly related, and even it explains less than 2% of the variance. However, specific attitudes and expectations about the CMCS itself do have some predictive power. Which specific expectation best predicts varies somewhat by system; for EIES it is expectations that the CMCS will increase efficiency, for COM belief that communicating online will be personal vs. impersonal, and for INTMAIL, belief that the system will be easy rather than hard to use.

For specific systems, the patterns of association are sometimes markedly different. For EIES and TELEMAIL, for instance, being free to use the system rather than required or requested, is a significant determinant, whereas it has no relationship at all for the other two systems. Age is negatively related to system use on COM and positively related on TELEMAIL, and has little relationship at all for the other two systems. Whereas FREQCOM is important for EIES, COM, and PUBLICON, there is a slight negative relationship for the

internal mail system. Having previous friends and acquaintances online is important for predicting COM use but not a good predictor for the other systems. Lack of satisfaction with previous modes of communication with the online community ("HOWSAT") is a strong predictor for COM (.43), a moderate predictor for EIES, and not important for the other two systems.

Among the pre-use factors measured, the only strong predictor for the internal mail system is the belief that the system would be "HARD" to use.

Turning to reasons named for limiting system use, it must be remembered that because of the way the data were coded, only coefficients with minus signs indicate that a person who named a reason as important was less likely to use time online. Another way of thinking about the meaning of these coefficients is that a positive correlation means that high users were most likely to say that the reason was "not important at all" in limiting their use. Having "no one" to communicate online is the most important of the predictors in this group of variables, and it holds across all four systems.

The number of others with whom one is actively communicating online at four months ("NUMOTHS"), the number of people one got to know online, and the number of personal friends online at four months are also significant correlates. The direction of causation is not clear, since the time online could have resulted in meeting people, making friends, and thereby increasing the number of communication partners, just as much as the number of partners increased the time

spent online communicating. In other words, we interpret these correlations as part of a systems feedback loop.

Subjective satisfaction with the system and the leader also show some significant correlations. The relationships with satisfaction factors is strongest for "EXPRESS," the factor for which a high score indicates a perceived inability to express one's views and emotions and feel in personal contact while using a CMCS. Those who are not able to express themselves in this mode are not heavy users; once again, we probably have a feedback loop, with more useage leading to greater expressive ability and vice versa. The "LEADSKIL" factor, for which high scores indicate a perceived poor level of both task and social-emotional skills on the part of a group leader, is also significantly related to amount of system use. In fact, this is the highest single predictor of use of the internal mail system, with a correlation of .54, though the N on which it is based is too small to result in statistical significance.

Table 3-5
CORRELATES OF SYSTEM USE
(Dependent Variable= Log of Cumulative Hours Online, for Users)

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
			Pre Use Factors		
DULL	-.01	-.03	0	-.09	.13
UNRELI	-.04	.01	-.05	-.08	-.13
DIFFICULT	.06	.04	-.01	0	-.02
LIKEGRP	.01	.02	-.12	-.09	.15
COMPETE	-.01	.12	.31	.23	.09
CHANGE	.06	.11	-.03	-.05	-.07
COMFRUS	**-.13	**-.23	-.10	-.06	.12
			Other Pre-Use Variables		
TIMEX	**.56	**.59	**.54	**.51	.16
PREVEXP	**-.16	**-.19	0	-.08	.03
HARD	-.01	-.02	.04	.13	**.40
IMPER	*-.08	-.03	-.19	.06	-.13
FRUS	**-.13	*-.13	-.02	.04	.10
WASTE	-.02	.08	.07	-.10	.07
INCEFF	*-.07	*-.15	.01	-.11	.09
INCQUAL	**-.12	*-.13	-.12	**-.19	.09
USEFULEX	*-.09	-.11	-.07	*-.18	-.04
MOTIV	*.08	**.22	-.04	-.05	-.08
INCENT	**-.14	**-.26	.07	.01	-.22
KNOW	0	.03	**.29	**-.20	0
FRIENDS	.05	-.08	*.25	.13	.20
NUMGROUP	.10	*.17	.10	-.22	.06
HOWIMP	**-.15	**-.22	-.15	-.12	-.05
OFFICE	**-.13	**-.22	.02	.03	-.03
HOME	**-.30	**-.37	*-.25	-.08	.21
IMPORT	**-.20	**-.33	-.07	*-.18	*-.24
ENJOY	**-.20	**-.26	-.12	**-.24	0
FREQCOM	**.43	**.34	*.34	*.44	-.11
HOWSAT	*-.12	**-.22	**-.43	-.08	.15
LIKE	-.03	-.01	-.13	.04	.10
TRUST	*.12	*.17	.02	-.27	.18
SEX	.02	.02	-.01	-.06	-.09
AGE	**.14	.09	*-.24	.02	*.27
EDUC	.06	.03	*-.23	-.09	.02
POSITION	0	-.05	*.29	.04	.06
TYPING	.04	-.02	.03	.13	.08
READING	*-.08	*-.14	.01	-.03	.08
HOURSWK	**.16	**.17	-.03	-.04	-.04
WKHOME	**-.12	.04	*-.22	.09	-.05

Correlates of System Use, Cont.

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
Reasons Named for Limiting System Use					
TERMS	**.12	*.13	.09	-.01	-.04
DOC	.01	*.13	.08	-.01	*-.25
PHONE	*.10	.09	.02	.07	-.02
PACKET	-.03	-.10	-.01	-.01	-.21
COSTREACH	.03	.06	.15	-.11	.08
COSTUSE	.04	.08	.18	**-.25	.17
BADEXP	0	0	.12	.04	-.10
TYPDIF	-.05	-.09	.13	.01	.11
PREFPH	.07	.09	**.30	-.03	-.18
NOTLIKE	**.15	**.21	*.25	*.21	-.18
COMPLI	*.11	**.19	.07	*.21	-.12
POORDES	**.13	**.19	-.05	*.21	-.11
NOONE	**.22	**.21	**.30	**.31	*-.23
NOTINT	**.12	.03	.09	**.28	-.17
OTHERAC	*.09	**.23	**.36	.05	-.06
NOTWORTH	.03	.01	.01	.13	-.06
LEADSHIP	*-.09	-.12	.03	.15	-.07
JUSTTRY	**.21	*.17	**.32	*.20	.07
Other Follow-Up Factors and Variables					
NUMOTHS	**.21	**.31	**.44	.13	.17
FRIENDS2	**.27	**.24	.27	*.20	**.31
GETKNOW	**.35	**.45	*.35	**.24	-.13
SYSSAT	**.14	.08	.13	**.28	.01
UNPROD	**.19	*.15	.29	**.34	-.03
UNEXPR	**-.35	**-.33	-.07	**-.45	.03
MODEPROB	**-.19	0.01	-.14	*-.20	-.07
LEADSKIL	*-.20	*-.22	-.36	-.06	-.54

*Significant at .05 level
**Significant at .01 level
See Table 2-7 for N of cases.

From the statistics in Table 2-6, we can begin to understand the components of estimates of amount of time that the system would be used that were made at pre-use. Those who felt that they would spend the most time online were:

.More likely to feel that their task would be important and enjoyable.

.More likely to feel that communication with their prospective online group was important.

.Most frustrated with current modes of communication with members of that group.

.Most likely to have terminals at home and at the office

.Most likely to be busy people with long work hours, and to work at home.

.Least likely to feel that computers are dull.

.Most likely to have positive expectations about the system itself, particularly beliefs that it would be productive, increase efficiency, and increase quality of work.

For EIES, the enthusiasts at pre-use were also most likely to be

complete novices at the use of computers.

It is important to note that attitudes and expectations about the specific system and its anticipated impacts are much stronger predictors of expected use than of actual use.

There is an important difference evident among the systems. On INTMAIL, the more frequently (rather than less frequently) prospective users had previously communicated with other members of the group, the more they expected to use the system. This makes sense, given the organizational and task context. The conferencing systems in this study were being used mainly for inter-organizational communication. By contrast, the internal mail system was being used to support intra-organizational communication, and would be most useful in that context in providing a connection to whose with whom one had to communicate in order to complete assignments.

Table 3-6
Correlates of Expected Use
(Dependent Variable= Expected Hours Online Per Week at Pre-Use)

VARIABLE	ALL	EIES	COM	PUBLICON	INTMAIL
PRE-USE FACTORS					
DULL	**-.11	-.04	-.13	**-.18	**-.34
HINDER	-.01	.06	-.02	.07	-.05
DIFFICULT	.03	.04	.02	-.08	*-.21
LIKEGRP	-.09	0	*-.34	-.12	-.01
COMPETE	-.08	-.13	-.14	-.09	.06
CHANGE	*.09	.07	.11	-.01	.12
COMFRUS	**-.20	*-.15	-.16	**-.20	*-.21
OTHER VARIABLES					
PREVEXP	**-.21	**-.20	-.08	-.13	-.07
HARD	-.06	-.04	0	.08	*.24
IMPER	.05	..07	.14	*.14	-.03
FRUS	**0.11	*-.12	-.02	.03	**.42
WASTE	.05	.06	.15	.05	**.37
UNPRO	**.19	*.15	*.19	**.20	**.40
INCEFF	**-.23	**-.18	**-.37	**-.23	**-.30
INCQUAL	**-.23	*-.14	**-.54	**-.25	*-.23
USEFULEX	**-.23	**-.18	**-.44	**-.23	**-.40
MOTIV	**.19	**.19	*.23	.09	**.34
INCENT	**-.13	**-.20	-.09	-.05	-.02
KNOW	.02	-.02	**.44	.08	-.02
FRIENDS	.06	**-.16	**.36	**.34	0
NUMGROUP	.06	.03	-.01	.26	.18
HOWIMP	**-.30	**-.24	**-.36	**-.35	**-.41
OFFICE	**-.24	**-.32	*-.20	-.02	*-.21
HOME	**-.29	**-.39	-.08	0	-.05
IMPORT	**-.37	**-.37	**-.46	**-.37	**-.51
ENJOY	**-.28	**-.30	**-.41	*-.16	**-.38
FREQCOM	**.28	**.28	-.05	-.29	**-.53
HOWSAT	**-.17	**-.23	*-.33	-.21	-.22
LIKE	*-.14	-.02	*-.31	-.10	0
TRUST	.05	**.18	-.25	-.26	.03
SEX	-.03	-.07	-.02	-.08	-.11
AGE	**.19	*.15	.06	.13	-.15
EDUC	**.11	*.15	-.03	-.12	-.09
POSITION	*-.08	-.07	.02	-.04	.05
TYPING	.04	-.02	.10	.09	.03
READING	*-.08	-.11	-.06	-.02	-.08
HOURSWK	**.21	**.18	.01	.13	-.03
WKHOME	**.20	*.14	.04	.10	-.08

*Significant at .05 level
**Significant at .01 level

What combinations of variables best enable us to predict time online for users? Stepwise multiple regression equations were used to answer this question. A number of different combinations were tried, putting in and taking out various candidate variables. The more useful equations for predicting all users (all systems) are shown in Table 3-7.

The number of cases in the analysis, and the resulting coefficients in the equation, and the best combinations of variables, change as we add and subtract candidate variables. One reason is that as we add variables, those cases with missing data on a variable result in a decrease in degrees of freedom. Another reason is the mathematical logic of the stepwise procedure itself. This procedure first finds the candidate variable which explains the most variance; when that variable is selected for the equation, then only the remaining variance is examined in selecting the next variable for the equation at step 2, and so forth. This means that if two variables are highly interrelated, once the first variable is in the equation, then the second (which mainly explained the "same" variance) will not improve the prediction much and will not be selected. So, we get a somewhat different view of determinants of time online depending on which candidate variables are included.

In looking at the results, the statistical limits that were placed on the analysis must also be known. Unless otherwise specified, the standard .05 probability limits were used, so that no variable was

entered into the equation unless it made a statistically significant improvement in the prediction.

In the first equation in table 3-7, all pre-use variables and factors are included. As we saw in the preceding analysis of single variables, "TIMEX," the expected time online, is by far the best predictor. Once the variance associated with TIMEX is removed, the only other variables which significantly improve the prediction are "FREQCOM" (infrequent previous communication with distantly located group members) and "GPNAME," which includes whether or not a user identified himself or herself as a group member, and what specific group he or she belonged to.

In the second equation, TIMEX is removed to see what variables seemed to underlie it. When that is done, importance of the task and availability of a home terminal also enter the equation.

In the third version of the equation, factors and variables measured at follow-up are also entered, with the exception of "LEADSKIL," which has so few cases that it decreases substantially the degrees of freedom. "TIMEX" is put back into the candidate variables for this analysis. With these candidate variables, inability to express one's feelings in this mode of communication enter the equation after "TIMEX" and "FREQCOM." The end result, however, is that adding the information at follow-up does not improve our predictive power very much over what could be predicted just from the preuse information: for all systems combined, we can explain 42% of the variance in use, vs. 41% with just the preuse variables.

The fourth variation is included to show what happens when LEADSKIL is introduced (the degrees of freedom go down dramatically) and when TIMEX is removed. When this is done, the number of online friends at follow-up as well as the ability to express oneself online enter the equation as adding significantly to the explained variance.

We can explain slightly more of the variance for individual systems (Table 3-8). However, the number of cases for individual systems shrinks, and we end up in the position of explaining more and more of the variance for fewer and fewer cases, as we add variables. The same four sets of stepwise multiple regression equations as are displayed in Table 3-7 were repeated for individual systems; results for versions two and three of the analyses did not seem particularly useful and are not displayed.

For the three conferencing systems, the same two predictors, TIMEX and FREQCOM, enter the equation in steps one and two. By adding one more predictor for PUBLICON, we seem to explain just about all of the variance; but there are so few cases in the analysis that this result is just about meaningless in terms of generalizability. The important thing is that the same two predictors are the best combination for all three conferencing systems.

No equation is shown for INTMAIL. This is because we could not find any statistically significant combination of variables that predicts use any better than the single best predictor (HARD) does for this system.

Equation 4 indicates that we can push explained variance for EIES up

to 51% if we add information from the follow-up variables and factors. When the leadership skill factor is included as a candidate, it does enter the equation, but only on the seventh and last step. Thus, while it pushes up explained variance by 4%, most of the variance in online time is explained by other factors. As in the previous study of EIES scientific communities, for these mostly business users, the number of new people met online is strongly related to time spent online by the end of several months.

Table 3-7
EQUATIONS FOR DETERMINANTS OF AMOUNT OF SYSTEM USE
ALL SYSTEMS
Stepwise Multiple Regression
Dependent Variable= LogTime for Users

1. All Significant Pre-Use Predictors Included (df =201)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	TIMEX	.56	.31	.21	.47
2	FREQCOM	.63	.40	.08	.34
3	GPNAME	.64	.41	.04	.14
	(CONSTANT)			-.16	
	2. TIMEX Removed (df =201)				
1	FREQCOM	.43	.19	.11	.44
2	GPNAME	.49	.24	.06	.22
3	TASK IMPORT	.52	.27	-.06	-.19
4	HOME TERM	.56	.31	-.22	-.19
	(CONSTANT)			.79	

NOTES:

LOGTIME: Log of number of hours online at approximately four months, users with zero hours excluded from analysis

TIMEX: Expected weekly time online, at pre-use: 1= <30 minutes 6=10 hours or more

FREQCOM: Frequency of previous communication with others who would be online; 1= Daily 8= Never

GPNAME: Name of Group, for those who named a group membership on pre-use questionnaire

TASK IMPORT: pre use assessment of relative importance of online task; 1= very important 7= very unimportant

HOME TERM: Availability of a terminal at home: 1=yes 2= no

Variables not in the equation: COMFRUS, PREVEXP, MOTIV, INCENT, HOWIMP, ENJOY, TRUST, OFFICE, HOURSWK

3. Follow-Up Factors and Variables Added
TIMEX in, LEADSKIL excluded
(df= 111)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	TIMEX	.56	.31	.21	.45
2	FREQCOM	.63	.40	.06	-.26
3	UNEXPR	.65	.42	-.12	-.17
	CONSTANT			.01	

NOTE: ADDITIONAL VARIABLES NOT IN THE EQUATION: SYSSAT, MODEPROB, TERMS, DOC, PHONE, PACKET, COSTREACH, COSTUSE, BADEXP, TYPDIF, PREFPHONE, NOTLIKE, COMPLI, POORDES, NOONE, NOTINT, OTHERAC, NOTWORTH, LEADSHIP, JUSTTRY, POSITION, TYPING, NUMOTHS, FRIENDS2, GETKNOW, NUMOTHS.

4. TIMEX removed, LEADSKIL added (df= 75)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	FREQCOM	.43	.19	.09	.36
2	FRIENDS2	.50	.25	.02	.21
3	UNEXPR	.54	.29	-.15	-.21
	CONSTANT			.36	

Table 3-8
EQUATIONS FOR DETERMINANTS OF AMOUNT OF SYSTEM USE
INDIVIDUAL SYSTEMS
Stepwise Multiple Regression
Dependent Variable= LogTime for Users

1. All Significant Pre-Use Predictors Included

EIES (df= 126)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	TIMEX	.59	.35	.23	.51
2	FREQCOM	.61	.38	.05	.19
3	COMFRUS	.63	.40	-.1	-.15
	(CONSTANT)			.11	

QZCOM (df= 24)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	TIMEX	.54	.29	.32	.56
2	FREQCOM	.65	.43	.10	.37
	(CONSTANT)			.-.51	

PUBLICON (df= 14)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	TIMEX	.51	.26	.30	.73
2	FREQCOM	.79	.63	.24	.93
3	MOTIV	.87	.76	.49	.46
	(CONSTANT)			.-1.74	

Note: <1.0% E-30 variance remaining unexplained by this equation

4. TIMEX removed, all follow-up variables added

EIES (df= 63)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	GETKNOW	.45	.20	.01	.25
2	FREQCOM	.53	.28	.07	.28
3	NUMOTHS	.60	.35	.02	.26
4	IMPORT	.63	.40	-.07	.22
5	GPNAME	.67	.44	.07	.22
6	UNEXPR	-.69	.48	-.18	-.23
7	LEADSKIL	.72	.51	-.13	-.23
	(CONSTANT)			.25	

NOTE: See Table 3-7 for a list of candidate variables for Equations 1 and 4.

Equations for Predictors of TIMEX

Initially, the same variables as for the prediction of time online as were used in equation 1 of table 3-8 were entered for TIMEX as

dependent variable. Task importance seems to be the primary determinant of estimated time online at pre-use; convenient access to a terminal (at home or in the office) is also important (Table 3-9).

Since attitudes and expectations about the system had moderate to strong correlations with TIMEX when considered individually, these were added as candidate variables in a second version of the equations. For the most part, the main result was just to reduce the N. However, for COM, these variables did produce a multivariate equation that improves the prediction over that for any single variable. An expectation that the system will increase quality of work emerges as the best predictor of TIMEX for that conferencing system, accompanied by the number of people already known.

Table 3-9
REGRESSION EQUATIONS FOR EXPECTED TIME ONLINE ("TIMEX")

Equation 1
All Systems (df= 201)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	IMPORT	.37	.14	-.21	-.29
2	HOME TERM	.47	.22	-.62	-.26
3	FREQCOM	.52	.27	.12	.22
4	HOWIMP	.57	.32	-.14	-.23
5	PREVEXP	.59	.34	-.17	-.15
	(CONSTANT)			4.64	

EIES (df= 126)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	HOME	.39	.15	-.71	-.31
2	IMPORT	.50	.25	-.18	-.24
3	GPNAME	.55	.31	.15	.21
4	PREVEXP	.59	.35	-.25	-.23
5	TRUST	.62	.38	.26	.23
6	ENJOY	.64	.41	-.18	-.21
	(CONSTANT)			4.73	

*INTMAIL (df= 23)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	FREQCOM	.53	.28	-.26	-.45
2	IMPORT	.62	.38	-.17	-.32
3	OFFICE	.68	.46	-.24	-.29
	(CONSTANT)			3.99	

NOTES:

Additional variables not selected in the equations: DULL, UNRELI, DIFFICULT, LIKEGP, COMPETE, COMFRUS, MOTIV, INCENT, KNOW, FRIENDS, NUMGROUP, SEX, AGE

*PIN limit reset to .10

Equation 2: System Pre-Use Expectations Added

COM (df= 24)

1	INCQUAL	.54	.29	-.31	-.48
2	KNOW	.65	.42	.03	.36
	(constant)			2.72	

SUMMARY AND DISCUSSION

In explaining amount of use of CMCS, "dropouts" are first segregated out from users. Group membership is the strongest determinant. Membership in any online group decreases the liklihood of dropping out. Among those with group memberships, those in larger groups (16 or more members online) are less likely to drop out. Dropout rates vary from 0 and 1% for two groups on EIES, to a high of 61% for one of the groups. Bound up in group membership are a number of variables, including whether there is a task and its importance and enjoyability; previous sociometric ties among members; and online leadership skills of the group moderator. The group context is clearly the most important determinant of whether a prospective user will in fact become a regular user of CMCS. Other significant pre-use correlates of dropping out include perception of lack of human help online, lack of a home terminal or micro, and rating of the online task as not enjoyable. Frequency of previous communication with the online group has a counter-intuitive relationship. Those who had little or no previous communication with people online were least likely to become dropouts.

The composite picture which emerges from these statistics is that people are most likely to use CMCS when it represents an opportunity to communicate with a large number of of colleagues or co-workers who were not previously available on a daily basis, to work together on an enjoyable and important task. Having convenient access to a terminal and available human help online when difficulties occur then plays an important part in encouraging prospective users to make use

of this new communication channel.

These conclusions are reinforced by data from the follow-up questionnaire, where respondents indicated items from a checklist that they considered "very important" in limiting their use of the systems. Reasons related to motivations to communicate with others online and to access barriers appear in a different form in these items. Those who had problems with terminal access and with the packet-switched networks used to reach the systems were significantly more likely to become dropouts. So were those who felt there was "no one" with whom they really wanted to communicate online, or who were "just trying" the system rather than having a specific task to accomplish. A new type of explanation also appears in these items, however. Those who do not like CMCS as a form of communication and/or who prefer the phone for communication with distant colleagues are more likely to become dropouts.

An experimental intervention was attempted on EIES to see if special training and support facilities could prevent dropouts and increase system useage. New users were randomly assigned to receive a personal follow-up telephone call and/or to take an interactive online tutorial, in a 2 by 2 factorial design. The results indicate that the interactive online tutorial was effective in increasing usage, but the telephone call was not.

In explaining amount of usage, those with no use are excluded, and the log of total hours online at the end of four months is used as the dependent variable, because it is not severely skewed towards the upper ranges, as is raw number of hours. For the three conferencing

systems, the best predictor of total usage at four months is the user's own prediction or expectation of amount of time that would be spent online (TIMEX), made at pre-use. We expected this, based on a previous study (Hiltz, 1984). For all systems combined, we can explain 34% of the variance in TIMEX with five variables. TIMEX increases with the perceived importance of the task and availablility of a home terminal. It is higher for those with less frequent previous communication with the prospective online group (for the three conferencing systems only, again). This relationship is reversed for the internal mail system. It is also higher for those who felt it very important to communicate with their prospective group, and for those with less previous experience using computers.

"TIMEX" thus subsumes such pre-use variables as task importance and enjoyability and terminal access, as well as pre-use expectations about the specific system to be used. When it is used in a stepwise multiple regression to predict total time online, the only other pre-use variables which significantly add to the explained variance are low previous communication with the online group and group membership. If we add information available at follow-up, then the subjective satisfaction factor, UNEXPRessive, plays a significant part in predicting cumulative time online. Those who feel that this mode of communication does not adequately allow for social-emotional expressiveness spend less time online.

EIES is the only system for which we have enough responses to the LEADership SKILL factor items to permit statistically significant results if the factor is added to a multivariate equation. For EIES, good leadership skills, as perceived by the members, do appear to

significantly increase time online by members, but it is the seventh and last variable to enter the stepwise equation. Thus, the data from this analysis do not give leadership skill as important a role in affecting time that group members spend online as we anticipated. Getting to know new people online is the most important predictor for EIES, but it does not enter the prediction equations for the other systems.

The data on determinants of system use also underscore the very different functions of electronic mail systems and conferencing systems. INTMAIL has a much smaller proportion of moderate to heavy users (10+ hours accumulated by the end of four months) than any of the conferencing systems. The more frequently INTMAIL users had communicated with others online before they used the system, the more they used it; this is the opposite of the findings for the three conferencing systems. For the conferencing systems, frustration with other modes of communication is associated with more time online, but not for INTMAIL. In fact, whereas we can explain a good proportion of the variance in system use for the conferencing systems, we cannot from the data we have available for INTMAIL. For instance, whereas the correlation coefficient between TIMEX and cumulative time at four months is over .5 for each of the conferencing systems, the relationship is not even statistically significant for INTMAIL. The only thing that is strongly related for INTMAIL is a pre-use expectation that the system will be hard to use; in which case, a prospective user was not likely to become a user. Problems with documentation are also more highly related for INTMAIL than for the conferencing systems.

Why can't we do very well at predicting INTMAIL use from the available data? Possibly it has a lot to do with the chance that a telephone is busy. Whereas the conferencing systems are used for group discussions with large numbers of others who cannot easily be reached by any other communication mode, electronic mail systems are one-to-one or one-to-a-few emulations of an internal memorandum. They most generally connect poeple to others in the organization whom they already know, and whom they could alternatively call on the phone or send a traditional memo. Thus, INTMAIL is much more likely to be used as a substitute or fallback mode of communication, when someone cannot be reached by telephone, there is no time to wait for regular U.S. mail, and the item is not critical enough to demand an express carrier. Such circumstances are somewhat random.

CHAPTER 4

IMPACTS OF SYSTEM USE ON PRODUCTIVITY

MEASURING AND IDENTIFYING PRODUCTIVITY IMPACT FACTORS

The post-use questionnaire included a number of questions which were designed to measure impacts of system use on productivity, or "payoffs" of system use. These cluster into two factors (see Table 4-1).

PRODUCT (short for productive) is composed of items relating to whether system use increased the quantity of work completed (efficiency), the quality of work completed, how useful the system was "overall," and whether the system made it easier to reach people with whom the user needed to communicate. High scores indicate a lack of perceived productivity improvements of this nature. "CAREER" is related most strongly to the items on long-term and short-term contributions to career advancement, whether the system provided leads or other useful information, or increased the "stock of ideas." High scores indicate a perception that the system did not have any of these desirable impacts.

Table 4-1
PRODUCTIVITY IMPACT FACTORS
FACTOR NAMES AND LOADINGS

	PRODUCT	CAREER
Quan2	.85	.24
Qual2	.82	.34
Useful2	.81	.33
Reach2	.64	.31
Shorterm	.27	.80
Longterm	.25	.91
Leads	.47	.61
Stock	.33	.52

Note: See Appendix, post-use questionnaire section on "Impacts of System Use" for complete question wording for these Likert-type and semantic differential items:

Quan2: System increased quantity of work (1= definitely yes, 7= definitely not)

Qual2: System increased quality of work (1= definitely yes, 7= definitely not)

Useful2: "How useful have you found the system to be for your work?" (1= very useful, 7= not useful at all)

Reach2: Easier to reach people (1= strongly agree, 5= strongly disagree)

Shorterm: Contributed to short-term career advancement (1= strongly agree, 5= strongly disagree)

Longterm: Contributed to long-term career advancement (1= strongly agree, 5= strongly disagree)

Leads: Provided leads, references, other useful information (1= strongly agree, 5= strongly disagree)

Stock: Increased stock of ideas (1= strongly agree, 5= strongly disagree)

Table 4-2 shows that there are some statistically significant differences in the productivity related impacts reported by users of the four systems. When no other variables are controlled, PUBLICON clearly is perceived as the least productive, and INTMAIL, as the most productive. By contrast, individual career advancement is perceived to have been most likely as a result of EIES use and least likely for INTMAIL. However, though the differences are statistically significant, they do not account for a large proportion of the variance (eta squared). We will return to the relative importance of software design factors after first looking at the other correlates of the PRODUCTivity and CAREER factors.

DETERMINANTS OF THE PRODUCTIVITY FACTOR

Attitudes do persist. The strongest correlates of perceived productivity improvements after four months of system use are expectations about these same variables at pre-use (Table 4-3). MOTIVation for using the system, in the form of having a specific project rather than being "just curious about how such systems work," is also related for all four systems. Other strong correlates are the importance of communicating with those online, the importance of the online task, frustration with alternative communication modes, and leadership skills. The relationship between leadership skills and perceived productivity improvements held for all systems, though it was not statistically significant for two of them. The third most strongly related set of variables has to do with how many communication partners a user had online, and the strength of ties

that had emerged. This is indicated by the fact that the most strongly related variable on the checklist of reasons for low use is "NO ONE" with whom the user "wished to communicate a great deal," and the correlations for "GETKNOW" and "FRIENDS2." It is notable that the correlations for "FRIENDS2," the number of people online at four months who are considered personal friends at that time, replicates as statistically significant for all systems except QZCOM.

The coefficients for the subjective satisfaction factors demand special examination. There is an extremely high correlation between the "PROD" and the "PRODUCT" factors for all systems. PROD was composed of items from the section of the follow-up questionnaire dealing with reactions and feelings while using the system. "PRODUCT" was derived from the section on overall impacts of system use. However, as was pointed out in chapter 2, there is in fact a great deal of overlap, at least in the respondents' minds apparently, between feeling productive during the process of using the system, and believing that the overall impact of using the system over a period of time is to increase productivity. Therefore, this PROD factor will not be used in subsequent analyses; it appears to be measuring essentially the same thing. thing.

The other subjective satisfaction factors have only weak or inconsistent relationships to perceived PRODUCTivity, but may play a role within specific systems.

It is also worth noting variables that are NOT very strongly related to perceived productivity impacts, even though one might expect them to be. Total hours online is positively related, but the correlation

is a relatively weak .17 for the combined sample, and is not significant for all four individual systems. TYPING is not even listed in the table, because there was not a single coefficient significant at even the .10 level. Whereas documentation was strongly related to many of the subjective satisfaction factors, it is only weakly related to PRODUCTivity.

Table 4-2
Perceived Productivity-Related Impacts
Mean Factor Scores by System
Analysis of Variance

SYSTEM	PRODUCT	CAREER
EIES	.01	-.22
COM	-.23	-.05
PUBLICON	.31	.14
INTMAIL	-.42	.35
F	9.4	6.7
P	.001	.001
Eta	.28	.24
Eta Sq	.08	.06

Note- Factor Descriptions

PRODUCT- productivity impacts of system use, including increases in quantity and quality of work. High scores are NEGATIVE; such impacts are not perceived.

CAREER- High scores indicate that the system is NOT perceived as contributing to long term or short term career advancement.

Table 4-3
Correlates of PRODUCT factor

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
		PRE-USE FACTORS			
DULL		*.20		*-.19	.24
UNRELI					.21
DIFFICUL					
LIKEGP	**.22	**.33		*.48	
COMPETE	.13		-.47	.40	**.64
CHANGE	-.09	*-.15		**-.24	.22
COMFRUS	**.32	**.20		**.39	**.37
		OTHER PRE-USE VARIABLES			
TIMEX	**-.16		*-.36	**-.42	-.24
MOTIV	**-.35	-.15	-.30	**-.42	*-.35
HARD	*-.10				*-.27
IMPER	-.09				*-.28
FRUS	**-.20	-.13		*-.22	-.25
WASTE	**-.33		*-.32	**-.31	**-.49
UNPRO	**-.33	*-.18		**-.40	**-.46
INCEFF	**.47	**.39	**.66	**.34	**.74
INCQUAL	**.49	**.40	**.49	**.53	**.68
USEFULEX	**.51	**.29	**.61	**.51	**.79
INCENT			*.39	*.18	**-.42
KNOW	**-.20			**-.26	
FRIENDS	**-.17			**-.30	
HOWIMP	**.37	.12	**.65	**.39	**.56
IMPORT	**.37	**.23	**.56	**.36	**.61
ENJOY	**.19	**.29		*.17	**.47
NUMGRPR		-.16			
GP	**-.13		**-.43	-.15	.25
GPNAMR	**-.16		**-.49		
FREQCOM	*.16				*.36
HOWSAT	**.25	**.32	**.70		
HOURSWK	*-.10			**-.28	
SEX			*-.31	*.18	*.26
AGE	*-.10			*-.22	*.28
POSITION					
HOWENT	**-.15				

Correlates of PRODUCT factor con't.

FOLLOW UP REASONS NAMED FOR LIMITED USE

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
TERMS	*.12		-.24	**.25	
DOC	*-.11	**-.20			
COSTUSE	*-.11		*-.32		
PREFPH	**-.16	**-.35		**.31	**-.49
NOTLIKE	**-.17	**-.29		*.16	**-.37
COMPLI	**-.14	*-.15			
POORDES	**-.18	*-.14		-.13	-.18
NOONE	**-.27	**-.33	**-.53	**-.24	-.16
NOTINT	**-.18	*-.18		*-.21	
OTHERAC	**-.18	**-.20			**-.33
NOTWORTH	**-.27	*-.18	*-.37	**-.23	**-.36
LEADSHIP	*-.12	*-.18		.13	
JUSTTRY	**-.17	*-.16	*-.41		
		OTHER POST-USE QUESTIONS			
LEADSKIL	**.33	**.33		*.50	
NUMOTHS	**-.14	**-.22	**-.55	-.14	**-.45
FRIENDS2	**-.23	**-.23		**-.32	-.23
GETKNOW	**-.20	**-.43		**-.23	
TIME4R	**.17	*.14		**.26	
SYSSAT	**-.17			-.14	*-.25
PROD	**-.58	**-.48	**-.69	**-.55	-.63
UNEXPR	*.10	**.21		.14	*.25
MODEPROB	**-.21	**-.20			

NOTE

Correlations listed only if p<.10

* Significant at .05

** Significant at .01

See Table 2-7 for N of cases.

In any stepwise multiple regression, what your results are depends upon the specific set of variables which you enter as candidates; this is particularly true for finding the best multi-variate equation to predict whether use of the system will be seen as increasing productivity. When the group variables, particularly leadership, are included as candidates, they are selected as among the most powerful determinants. However, their inclusion, given the many missing answers for people who did not belong to groups, so decreases the degrees of freedom that the resultant equations reach their limits for statistical significance in many fewer steps, and not as much total variance is explained as before the group variables were included.

It is a little bit like running a horse race. If there are only a few horses in the race, it is not very interesting. If you start out with the best horse in the field and a small field, then when you add some more horses, the winner will probably stay the same, but "place" and "show" may change. Eventually, if you add too many horses, you run out of room on the track. When we add candidate variables with many missing variables, particularly when looking at single systems, we end up either explaining more and more of the variance on the equivalent of fewer and fewer cases, or running out of degrees of freedom to continue the analysis.

We tried about a dozen versions of stepwise equations, seeing what happened to degrees of freedom and total explained variance as we put

in or took out different types of variables. In one, not shown in Table 4-4, we allowed "PROD" to be a candidate; its very high correlation with PRODUCTivity pushed total explained variance after seven steps to a multiple R of .73. However, as explained previously, feeling that the system is PRODuctive to use is a bit of a ringer in this race; it is too closely related to the dependent variable itself, the perceived impacts of use on PRODUCTivity. We eventually settled on the three versions shown in Table 4-4.

In the first equation for the PRODUCT factor, with none of the group variables entered, we are able to explain over a third of the variance with just three variables. Two are pre-use expectations (how useful the system would be, and whether it would increase quality of work), and the third, NOTWORTH, is the perceived value of the communications received online after about four months. By adding information about pre-use MOTIVation for using the system (trying it with a specific project in mind, rather than being "just curious"), we explain another 3% of the variance. SYSTEM enters the equation at this point, and pushes R squared (explained variance) up another 3%. Only then does total time online enter the equation, followed by having MODEPROBs (the subjective satisfaction factor related to problems with this mode of communication). The final variable to enter before we reach the limits of statistically significant additions with the available degrees of freedom is KNOW, how many people online were known before system use. With the combination of these eight variables, we explain a total of 46% of the variance in perceived PRODUCTivity for all systems combined.

In the second version of the equation, the group level variables are

added as candidates. One of these HOWSAT, how satisfied group members were with previous modes of communication with their group, enters the equation third. With fewer degrees of freedom because of the missing data for people who were not group members, the two variables that were at the bottom of the previous list get squeezed out. The procedure reaches its statistical limits after seven steps, with exactly the same proportion of variance explained as previously, 46%.

In the third version, LEADSKIL is also allowed to enter as a candidate factor. Since the majority of the sample either did not belong to groups or did not have a leader or answer the question about leadership skills if they belonged to a group, there are not many degrees of freedom to be used up before the procedure must stop. USEFULEX stays in first place, as it has all along. At step two, however, LEADSKIL enters, indicating that it plays a very important part in determining whether system use led to productivity gains. The previously second place variable, NOTWORTH, then enters, and a total of 36% of the variance has been explained in three steps. However, the procedure then encounters the limits of the missing data and can go no farther. We are worse off in terms of explained variance than before using LEADSKIL as a predictor, except for knowing that it is important, and coming to the conclusion that we sure wish we had more cases with for the LEADSKIL factor so that its relative importance could be better evaluated.

Table 4-4
REGRESSION EQUATIONS FOR PRODUCT (ALL SYSTEMS)

Equation 1 (df= 249)
Group Variables Omitted (df= 233)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	USEFULEX	.51	.26	.12	.20
2	NOTWORTH	.56	.32	-.30	-.20
3	INCQUAL	.59	.35	.17	.27
4	MOTIV	.61	.38	-.35	-.19
5	SYSTEM	.64	.41	-.14	-.16
6	TIME4R	.66	.43	-.003	-.18
7	MODEPROB	.67	.45	-.15	-.13
8	KNOW	.68	.46	-.01	-.11
	(CONSTANT)			.71	

Variables not in the equation: SYSTEM, PREVEXP, DULL, UNRELI, DIFFICUL, COMFRUS, TIMEX, MOTIV, HARD, IMPER, FRUS, WASTE, UNPRO, INCEFF, NUMOTHS, FRIENDS2, GETKNOW, SYSSAT, UNEXPR, HOWIMP, IMPORT, ENJOY, GPNAME, SEX, AGE, TYPING, DOC, NOONE

Equation 2:GROUP VARIABLES EXCEPT LEADSKIL ADDED (df= 118)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	USEFULEX	.51	.26	.12	.19
2	NOTWORTH	.56	.32	-.36	-.25
3	HOWSAT	.59	.35	.12	.18
4	INCQUAL	.62	.38	.16	.25
5	MOTIV	.64	.41	-.43	
6	SYSTEM	.66	.44	-.15	-.18
7	TIME4	.68	.46	-.004	-.14
	(CONSTANT)			.63	

Additional variables not in the equation: FREQCOM, LIKEGP, COMPETE

Equation 3: LEADSKIL added (df=75)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	USEFULEX	.51	.26	.27	.45
2	LEADSKIL	.53	.32	.21	.21
3	NOTWORTH	.60	.36	-.31	-.21
	(CONSTANT)			-.14	

Table 4-5
REGRESSION EQUATIONS FOR PRODUCT (SEPARATE SYSTEMS)

EIES (Equation 1, df= 89)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	GETKNOW	.43	.18	-.03	-.29
2	INCQUAL	.52	.27	-.04	-.35
3	NOONE	.59	.35	-.38	-.27
4	MODEPROB	.62	.38	-.22	-.
	(CONSTANT)			.35	

QZCOM Equation 1 (df=20)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	INCEFF	.66	.44	.37	.74
2	HOWIMP	.81	.66	.23	.48
3	UNPRO	.91	.83	.31	.47
	(CONSTANT)			-4.01	

PUBLICON Equation 1 (df=78)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	INCQUAL	.53	.28	.31	.60
2	MOTIV	.62	.38	-.57	-.29
3	TIME.68	.46	-.25	-.35	
4	DULL	.71	.50	-.25	-.23
5	INCEFF	.73	.54	-.20	-.37
6	NOTWORTH	.76	.58	-.29	-.21
7	DIFFICULT	.78	.61	-.28	-.23
8	WASTE	.80	.64	-.15	-.21
9	SEX	.82	.67	.49	.16
	(CONSTANT)			1.63	

INTMAIL Equation 2 (DF= 18)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	USEFULEX	.79	.62		
2	COMPETE	.85	.72	.79	.70
3	SEX	.90	.81	.48	.23
4	ENJOY	.93	.86	.16	.25
5	INCEFF	.95	.90	.23	.39
		(Step 6, USEFULEX removed)			
7	TIME4	.97	.93	-.02	-.24
8	NO ONE	.99	.98	-.29	-.24
	(CONSTANT)			-1.5	

NOTE: See Table 4-4 for lists of variables in equations 1 and 2.

DETERMINANTS OF THE CAREER ADVANCEMENT FACTOR

The correlates of this component of impacts of the system on users' work are generally somewhat weaker and different than those for PRODUCTivity (see Table 4-6). Pre-use expectations, particularly in the form of total time expected online and overall expected usefulness of the system, again predict reported impacts four months later. Frustration with previous modes of communication and importance and enjoyability of the task stand out. Those who had infrequent previous communication have lower scores; remembering that low scores on the CAREER factor mean positive perceived impacts, this means that becoming connected to new people online is the factor that enhances career advancement. Those who did not enter text themselves did not perceive such impacts. Unlike the PRODUCTivity factor, which is more related to the specific task being undertaken online than to general career impacts, LEADership SKILL is not related.

Among the factors measuring dimensions of subjective satisfaction while communicating online, the UNEXPRressive factor has exceptionally strong and consistent relationships across systems. Those who felt unable to express their feelings and include social-emotional content in their CMCS communications were unlikely to perceive any
career advancement effects. This points to another dimension of the expanding network phenomenon. In order to establish an enhanced professional network that may aid in career advancement, one has to be able to establish personal ties online. If a user feels unable to communicate in an informal, expressive, personal way on a CMCS, it is

not going to be seen as an appropriate channel to use for enlarging professional networks.

Table 4- 6
Correlates of CAREER factor

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
		PRE-USE FACTORS			
DULL			*.38		
UNRELI					
DIFFICUL			*-.34		.21
LIKEGP	.14	.14			
COMPETE					
CHANGE	-.09		.32	*-.17	
COMFRUS	**.26	.14		**.44	
		OTHER PRE-USE VARIABLES			
PREVEXP			.31	*-.21	
TIMEX	**-.30	**-.33	**-.43	*-.17	
MOTIV	*-.11		*.33	*-.20	
HARD					
IMPER	**-.16	-.12	-.25	*-.19	
FRUS					
WASTE	**-.15	-.13		*-.21	
UNPRO	**-.20	**-.21		**-.27	
INCEFF	**.22	*.18		**.40	
INCQUAL	**.26	**.25		**.38	
USEFULEX	**.28	**.22		**.42	
INCENT	.08				*.29
KNOW					
FRIENDS		.14		*-.18	
HOWIMP	**.21	*.20		.20	
IMPORT	**.21	**.24		**.23	
ENJOY	**.18	**.22		**.23	
NUMGRPR					
GP	*-.10		**.47		
GPNAMR	*-.11		*.41		*-.29
FREQCOM	**-.20		-.36	-.47	
HOWSAT		*.23			
HOURSWK			.29		
SEX	*.09		*.31	*.22	
AGE					.22
POSITION	.08			*.19	
TYPING		-.13			
HOWENT	*.10	*.23		**-.32	

Correlates of CAREER factor con't.

FOLLOW UP REASONS NAMED FOR LIMITED USE

VARIABLE	ALL	EIES	QZCOM	PUBLICON	INTMAIL
TERMS DOC					
PHONE				*-.16	
PACKET	COSTREAC	COSTUSE	BADEXP	TYPDIF	PREFPH
NOTLIKE			*-.30	-.14	
COMPLI		.12		*-.17	
POORDES	**-.17			**-.28	**-.28
NOONE	**-.20			**-.40	
NOTINT	**-.15			**-.29	
OTHERAC					
NOTWORTH	**-.13		*-.36	*-.18	
LEADSHIP	*-.09	-.13		-.14	
JUSTTRY					

OTHER POST-USE QUESTIONS

NUMOTHS				-.13	
FRIENDS2	**-.15			**-.26	
GETKNOW	**-.13			*-.17	-.19
TIME4R	**.17	*.14		**.26	
SYSSAT	**-.16		*-.31	**-.27	
UNPROD	**-.21	-.12	*-.35	**-.40	
UNEXPR	**.31	*.19	*.34	**.28	**.33
MODEPROB	**-.21	*.18			

NOTE

Correlations listed only if p<.10

* Significant at .05

** Significant at .01

MULTIPLE REGRESSION

Table 4-7 includes the stepwise multiple regression equation for all systems, and two examples for specific systems. Alternative versions with group variables included did not improve the equations. The strongest determinant of CAREER advancements when follow-up factors are considered is the feeling that the communication mode could carry expressive content. Next, two pre-use expectation measures enter the equation. The fourth most important variable is the specific system used. The fifth and last is age; those who were younger were more likely to perceive CAREER advancement. This makes sense, since it is the younger, "up and coming" professionals or managers who can most benefit from expanded professional networks. Older professionals near the end of their careers are not as likely to want or need to expand their professional networks.

We still have not explained the majority of the variance in CAREER, however, and this is partially because the specific pattern of correlates does vary by system. Two examples of the analyses for a single system are included, for PUBLICON and COM. The three specific variables that get pulled into the equation for PUBLICON are completely different than those for the all-systems-combined data. They are COMFRUS (frustration with previous modes of communication), whether or not there are people on the system with whom the user "wants to communicate a great deal," and a different subjective satisfaction factor, SYSSAT, which was satisfaction with the interface. We can do better in explaining the variance in CAREER for

this one system, and for other single systems, than when all the data are combined.

In the second example, we end up with a Multiple R of .95 for COM by including four variables that are completely different than the ones selected for PUBLICON. They are expected time online at pre-use, whether or not the user belongs to a group and if so which group (GPNAME), previous experience with computers (those with less experience perceived more career advancement advantage), and the subjective satisfaction factor, UNPRODuctive feelings while using the system. However, the response rate on the follow-up questionnaire was so low for COM that the generalizability of this equation to all COM users is questionable.

Table 4-7
REGRESSION EQUATIONS FOR CAREER

ALL SYSTEMS (df= 253)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	UNEXPR	.31	.09	.24	.21
2	USEFULEX	.39	.15	.12	.20
3	TIMEX	.43	.19	-.16	-.20
4	SYSTEM	.45	.20	.15	.17
5	AGE	.47	.23	.01	.16
	(CONSTANT)			-.85	

Variables not in the equation: SYSTEM, PREVEXP, DULL, UNRELI, DIFFICUL, COMFRUS, TIME4, MOTIV, HARD, IMPER, FRUS, WASTE, UNPRO, INCEFF, INCQUAL, NUMOTHS, FRIENDS2, GETKNOW, SYSSAT, UNPROD, MODEPROB, KNOW, HOWIMP, IMPORT, ENJOY, GPNAME, SEX, TYPING, DOC, NOONE, NOTWORTH

PUBLICON (df=78)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	COMFRUS	.44	.19	.45	.37
2	NOONE	.56	.31	-.54	-.38
3	SYSSAT	.62	.38	-.26	-.26
	(CONSTANT)			1.33	

QZCOM (df= 20)

STEP	VARIABLE	MULT R	R SQ	b	BETA
1	TIMEX	.43	.19	-.46	-.50
2	GPNAME	.66	.43	.27	.77
3	PREVEXP	.77	.59	.74	.86
4	UNPROD	.95	.91	-.66	-.82
	(CONSTANT)			-2.88	

SUMMARY AND DISCUSSION

Two factors comprising productivity impacts were identified. "PRODUCTive" is comprised primarily of improvements in the quantity and quality of work, the overall usefulness of the system, and improvements in the ease of reaching people. "CAREER" encompasses contributions to long-term and short-term career advancement, and the provision of information and ideas.

It is PRODUCTivity increases which are the ultimate payoff of CMCS for groups, organizations, and society as a whole. Career advancement is an individual level payoff. Fortunately for our study, we are able to explain a great deal of the variance in PRODUCTivity. Variations in perceived career advancement impacts are much more problematical, in the sense that we are unable to explain much of the variance in outcome with our available data.

Non-findings are almost as important as the observed strong correlations in understanding the nature of determinants of perceived PRODUCTivity improvements. Time online is not very strongly related. More surprisingly, for the two out of four systems that do show a significant univariate relationship (EIES and PUBLICON), it is negative when no other variables are controlled. Nor is PRODUCTive very strongly related to subjective satisfaction, except for the partially redundant "UNPROD" factor. Productivity improvements thus are clearly quite distinct from our other dependent variables.

The strongest correlates of PRODUCTivity improvements, for all four

systems, are pre-use expectations about whether the system would increase productivity. The second strongest determinant appears to be the perceived leadership skill of the group moderator or leader. Another group-level variable, the level of satisfaction with previous channels of communication with one another, also significantly adds to predictions of productivity increases as a result of system use.

Four process variables play an important part in determining positive productivity outcomes. One is the perceived value of the items contributed by the other group members. Another is time spent online, which is positively related to perceived productivity impacts, once pre-use expectations and motivations have been taken into account. A third is whether or not there were "mode problems" encountered, and the fourth , how many new people users came to know online.

"SYSTEM" software differences do appear to make a significant impact on whether or not there will be productivity increases; but system enters the stepwise regressions in only fifth or sixth place, or not at all, depending on the combination of candidate variables entered.

The best equations for predicting productivity increases are markedly different for the four systems. This is the main impact of software differences: given four basically well designed but quite different CMCS, the social context and software differences will interact to affect the most productive way to use the system. For instance, for the internal mail system, those who felt in competition with other group members did not experience productivity improvements from it use; this key role for lack of competitiveness in the user groups

does not show up in the equations for the three conferencing systems, though it is also helpful there if there is trust and liking among members. Getting to know new people online is fundamental to perceived productivity increases for the EIES users, but not for the other systems. For PUBLICON, initial "MOTIVation" in the form of serious intent rather than "just trying the system" is crucial.

The best overall predictor of whether CMCS use will be seen to lead to CAREER advancement is whether the user was able to adequately express social-emotional content in communications in this mode (the UNEXPRessive factor.) For individual systems, the specific variables and factors which are included in the best stepwise multiple regression equation to explain variations in CAREER vary markedly from one system to another, but all the equations include a subjective satisfaction factor in the selected variables. Career advancement depends to a large extent on strengthening and widening personal relationships with a network of peers and hoped-for peers. Thus, it is reasonable that this process was most likely to occur for those users who felt most comfortable and satisfied with the system as a communication mode. Only then is a user likely to go beyond the immediate task-oriented online activities and engage in the kinds of information exchanges and relationship-strengthening exchanges that may be related to general career advancement rather than just the efficient completion of a specific task at hand.

REFERENCES

Adriansson, L. (1980). Group Communication through Computer: Social Psychological Studies of Attitudes to and Experience with the Effects of COM System on the Work Environment, Department of Psychology, University of Gothenburg, Sweden.

Adler, R.P. and Lipinski, H.M. (1981). "HUB: A Computer-Based Communication System." In Studies of Computer-Mediated Communication: A Synthesis of Findings (S.R. Hiltz and E.B. Kerr), Final Report to the National Science Foundation.

Bair, J.H. (1974). Evaluation and Analysis of an Augmented Knowledge Workshop: Final Report for Phase I, Rome Air Development Center, RADC-TR-74,79, Griffiss Air Force Base, New York.

Bregenzer, J. and Martino, J.P. (1980). "Futures Research Group Experience with Computerized Conferencing." In Electronic Communication: Technology and Impacts (M.M. Henderson and M.J. MacNaughton, eds.), AAAS Selected Symposium 52, pp. 65-70. Westview Press, Boulder, Colorado.

Edwards, G.C. (1977). An Analysis of Usage and Related Perceptions of NLS--A Computer Based Text Processing and Communications System, Bell Canada H.Q. Business Development, Montreal, Canada.

Guillaume, J. (1980). "Computer Conferencing and the Development of an Electronic Journal." Canadian Journal of Information Science, pp. 21-29.

Hiltz, S.R. (1983). Viewing computing systems within a social context. In Mason, R.E.A., ed., Information Processing '83: Proceedings of the IFIP 9th World Computer Congress, Paris, Sept. 19-23: 647-655. Amsterdam: North Holland.

Hiltz, S. R. (1984). Online Communities: A Case Study of the Office of the Future. Norwood, NJ: Ablex Press.

Hiltz, S.R., Johnson, K., and Turoff, M. ~The Effects of Formal Human Leadership and Computer-Mediated Decision Aids on Group Problem Solving via Computer: A Controlled Experiment. Newark, N.J.: NJIT- CCCC Research Report No. 18.

Hiltz, S.R., and Kerr, E.B. (1981). Studies of Computer-Mediated Communications Systems: A Synthesis of the Findings, Final Report to the National Science Foundation.

Hiltz, S.R. and Turoff, M. (1985). Structuring computer-mediated communication systems to avoid information overload. Communications of the ACM, 28,7 (July): 680-689.

Hiltz, S.R., Turoff, M., and Johnson, K. Mode of communication and the "Risky Shift:" A Controlled Experiment with Computerized

Conferencing and Anonimity in a Large Corportation. Newark, N.J.: NJIT-CCCC Research Report No. 21.

Johnson-Lenz, P. and Johnson-Lenz, T. (1980). JEDEC/EIES Project: Standardization in Minicomputer/LSI Products Via Electronic Information Exchange, Final Report to the National Science Foundation.

-------(1981). The Evolution of a Tailored Communications Structure: The Topics System, Research Report No. 14, Computerized Conferencing and Communications Center, Newark, New Jersey.

Kerr, E.B. (1980). "Conferencing Via Computer: Evaluation of Computer-Assisted Planning and Management for the White House Conference on Library and Information Services." In Information for the 1980s: A Final Report of the White House Conference on Library and Information Services, 1979, pp. 767-805. U.S. Government Printing Office, Washington, D.C.

Kerr, E.B. (1984). Moderating Online Conferences. Newark, N.J.: Computerized Conferencing and Communications Center, Research Report 20.

Kerr, E.B. and Hiltz, S.R. (1982). Computer-Mediated Communication Systems: Status and Evaluation. New York: Academic Press.

Kling, R. (1980). Social analyses of computing: Theoretical perspectives in recent empirical research. Computing Surveys, 12,1 (March): 61-110.

Lamont, V.C. (1980). "Computer Conferencing: The Legitech Experience." in Teleconferencing and Interactive Media (L.A. Parker and C.H. Olgren, eds.), pp. 457-461. Extention Center for Interactive Programs, University of Wisconsin, Madison, Wisconsin.

Lapierre, R.T. (1934). Attitudes versus action. Social Forces, 13: 230-237.

Lipinski, H., Spang, S., and Tydeman, J. (1980). "Supporting Task-Focussed Communication." In Communicating Information: Proceedings of the 43rd ASIS Annual Meeting (A.R. Benenfeld and E.J. Kazlauskas, eds.), pp. 158-160. Knowledge Industry Publications, White Plains, New York.

McCarroll, J.H. (1980). "EIES for a Community Involved in R&D for the Disabled." In Electronic Communication: Technology and Impacts (M.M. Henderson and M.J. MacNaughton, eds.), pp. 71-76. AAAS Selected Symposium 52, Westview Press, Boulder, Colorado.

Martino, J.P. and Bregenzer, J.M. (1981). "A Trial of Computerized Conferencing among a Group of Futures Researchers." In Studies of Computer-Mediated Communication: A Synthesis of Findings (S.R. Hiltz and E.B. Kerr), Final Report to the National Science Foundation.

Miller, J.G. Living systems: The organization. Behavioral Science, 17: 1-182.

Norusis, M. J. (1984). SPSS/PC. Chicago, Ill.: SPSS Inc.

Parsons, T. (1951). The Social System. New York: The Free Press.

Rice, R.E. (1985). Applying the human relations perspective to the study of new media. Paper presented to the Human Communication Technology Interest Group at the International Communications Association, Hawaii, May.

Rogers, E.M. and Rogers, R.A. (1976). Communication in Organizations. New York: The Free Press.

Schuman, H. and Johnson, P.(1976). Attitudes and behavior. Annual Review of Sociology, 2: 161-207.

Siegel, E.R. (1980). "Use of Computer Conferencing to Validate and Update NLM's Hepatitis Data Base." In Electronic Communications: Technology and Impacts (M.M. Henderson and M.J. MacNaughton, eds.), pp. 87-95. AAAS Selected Symposium 52, Westview Press, Boulder, Colorado.

Stevens, C.H. (1980). "Many-to-Many Communication through Inquiry Netorking." World Future Society Bulletin, Vol. 14, pp. 31-35.

Tapscott, D. (1980). "Investigating the Office of the Future." Telesis, forthcoming.

Uhlig, R.P., Farber, D.J., and Bair, J.H. (1979). The Office of the Future: Communication and Computers, North Holland Publishing, Amsterdam, Holland.

Umpleby, S.A. (1980). "Computer Conferencing on General Systems Theory: One Year's Experience." In Electronic Communication: Technology and Impacts (M.M. Henderson and M.J. MacNaughton, eds.), pp. 55-64, AAAS Selected Symposium 52, Westview Press, Boulder, Colorado.

APPENDIX 1
STUDY OF ACCEPTANCE OF COMPUTER-MEDIATED COMMUNICATION SYSTEMS QUESTIONNAIRE, MARGINALS AND VARIABLE NAMES

ALL SYSTEMS COMBINED

PRE-USE QUESTIONNAIRE

A. YOUR PREVIOUS EXPERIENCE WITH COMPUTERS

PREVEXP
Which of the following best describes your previous experience with computer systems?

(1) 20% I am a novice; this will be my FIRST USE of a computer system
(2) 29 I have OCCASIONALLY used computer terminals and systems before
(3) 23 I have FREQUENTLY used computer systems
(4) 29 Use of computers is central to my PROFESSIONAL work
(N=513)

For each of the following pairs of words, please circle the response that is closest to your feelings about COMPUTER SYSTEMS IN GENERAL. For instance, for the first pair of words, if you feel computer systems are completely "stimulating" to use and not at all "dull," circle "1"; "4" means that you are undecided or neutral or think they are equally likely to be stimulating or dull; "3" means you feel that they are slightly more stimulating than dull, etc.

STIM								
Stimulating	1	2	3	4	5	6	7	Dull
	31%	43	18	6	1	1	-	(N=508)
FUN								
Fun	1	2	3	4	5	6	7	Dreary
	11%	41	24	9	2	1	1	(N=510)
EASY								
Easy	1	2	3	4	5	6	7	Difficult
	6%	20	28	25	13	6	2	(N=468)
PERS								
Personal	1	2	3	4	5	6	7	Impersonal
	3	8	18	30	18	15	9	(N=508)
HINDER								
Hindering	1	2	3	4	5	6	7	Helpful
	1%	4	3	8	15	42	26	(N=466)
THREAT								
Threatening	1	2	3	4	5	6	7	Unthreatening
	1%	2	4	11	12	26	44	(N=508)
EFFI								
Efficient	1	2	3	4	5	6	7	Inefficient
	20%	35	22	13	4	4	1	(N=466)

DEMAND

Demanding	1	2	3	4	5	6	7	Obliging
	7%	15	18	33	14	11	2	(N=506)

RELIABLE

Reliable	1	2	3	4	5	6	7	Unreliable
	16%	38	23	14	7	2	1	(N=465)

DESIR

Desirable	1	2	3	4	5	6	7	Undesirable
	44%	38	12	6	1	1	-	(N=508)

B. EXPECTATIONS ABOUT THE SYSTEM

EVERUSE
Have you ever utilized a computerized messaging system, tele-conferencing or computerized conferencing system before?

(1) 71% No
(2) 29 Yes (Which systems have you used?)
(N=517)

THISSYS
Have you ever used THIS system before?

(1) 84% No
(2) 16 Yes Please describe the extent of your previous use of this system.
(N=460)

EXTENT
46% Just a little bit
26 Casual
28 Extensive
(N=82)

SOURCE
How did you first hear about the System? What person or document was your source of information? Did you feel positively or negatively about using the System yourself as a result, and why?

37% Person
22 Official system document
6 Paper, mass media, or book
31 Organization
3 Other
2 Multiple sources
(N=513)

INITIAL
80% Positive
13 Mixed
6 Negative
(N=307)

MOTIV
Which of the following best describes your motivation to use the System?

(1) 43% I was just curious about how such systems work, and wanted to try one
(2) 57 I intend to use it on a specific project
(N=471)

ANYONE
As far as you know, is there anyone available to help you if you have questions while you are learning to use the System?

(1) 11% No
(2) 17 Yes, on line
(3) 16 Yes, off line
(4) 56 Yes, both on line and off line
(N=516)

Please indicate your expectations and feelings about how it will be to use this system.

HARD

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
2%	8	15	16	22	26	11	(N=517)
Hard to learn						Easy to learn	

IMPER

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
3%	6	12	27	26	20	5	(N=514)
Impersonal						Friendly	

FRUS

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
3%	7	14	22	22	24	7	(N=517)
Frustrating						Not frustrating	

WASTE

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
2%	4	9	31	20	24	9	(N=512)
Time wasting						Time saving	

UNPROD

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
1%	2	4	18	30	32	12	(N=515)
Unproductive						Productive	

INCEFF
Do you expect that use of the System will increase the efficiency of your work (the quantity of work that you can complete in a given time)?

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
10%	17	17	34	10	6	6	(N=512)
Definitely yes			Unsure			Definitely not	

INCQUAL
Do you expect that use of the System will increase the quality of your work?

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
8%	17	23	32	7	7	4	(N=513)
Definitely yes			Unsure			Definitely not	

USEFULEX
Overall, how useful do you expect the System to be for your work?

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
11%	21	28	20	8	7	4	(N=512)
Very Useful						Not useful at all	

INCENT
Which statement best describes your incentive for using the System?

(1) 9% I am required to use it
(2) 25 I have been requested to use it
(3) 66 I am free to use it as I wish
(N=513)

HOWPAY
How do you expect to pay your system usage charges?

(1) 61% My organization
(2) 7 A grant
(3) 23 From my own pocket
(2) 6 Other (Please explain)
3 Combination
(N=512)

KNOWR
Of all the people with whom you can communicate on the System, about how many do you already know, in the sense that you have communicated or worked with them previously? _____

37% None
16 1-2
19 3-5
29 6 or more
(N=472)

FRIENDSR
Of all the users of the System whom you know, how many do you consider to be personal friends? _____

58% None
20 1-2
14 3-5
8 6 or more
(N=477)

HOWIMP
How important is it for you to communicate with the people whom you expect to be on line?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :
20%	18	18	15	8	12	9 (N=507)
Very Important						Not Important

HOWENT Do you anticipate entering the material into the System YOURSELF or having someone else do it for you?

(1) 82% Type it myself
(2) 2 Have it typed
(3) 16 Both will occur
(N=514)

TIMEX
How much time in the average week do you foresee yourself using the System?

(1) 21% Less than 30 minutes
(2) 25 30 minutes to 1 hour
(3) 34 1 - 3 hours
(4) 15 4 - 6 hours
(5) 2 7 - 9 hours
(6) 2 10 hours or more
(N=513)

SIGNON
How often do you foresee yourself signing on the System to send or receive messages or discussion comments?

(1) 5% Once a month or less
(2) 9 2 - 3 times a month
(3) 20 Once a week
(4) 36 Two or three times a week
(6) 25 Daily
(6) 4 Several times a day
(N=511)

HOWCHANG
How do you think use of the System will change your communications or work patterns? (Please be specific. What current activities would it replace?)

34% Reduce phone or mails
8 Networking
6 Replace meetings or travel
14 Speed or efficate communication
12 Add work or reduce leisure
26 No change
(N=330)

C. ACCESS TO TERMINALS

OFFICE
Please describe your access to a computer terminal at your office or place of work.

(1) 12% No terminal
(2) 56 Have my own terminal
(3) 14 Share a terminal, located where I can see it from my desk
(4) 2 Share a terminal, located nearby
(5) 16 Share a terminal, which takes ____ minutes to reach
(N=511)

Minutes to reach:

61% 1 or less
29 2-5
10 7-10
(N=31)

TERMINAL
What kind of terminal do you usually use? (Check all that apply)

26% CRT (video display)
11 Hard copy (printer terminal)
63 Both
(N=492)

74% Microprocessor (N=369)
80% With hard copy (N=272)
92% With disk storage (N=271)

At what baud rate or speed do you normally operate?
59% 30 characters per second
27 120 characters per second
6 Faster
6 Mixed
1 Other
(N=430)

Do you have a terminal which you keep at home?
(1) 55% Yes
(2) 45 No
(N=513)

(If no): Is there a terminal available to you that you can take home?

(1) 42% Yes
(2) 59 No

D. YOUR ON-LINE TASK

TASK
Please describe in a sentence or two the primary type of task or activity that you expect to be doing on line.

```
 7%  Education
  3  Standards development
 29  Information exchange
 36  Project team or task force
  10 Entertainment
  3  Evaluating medium
  10  Exploratory
 (N=318)
```

IMPORT
Compared with the other tasks that now compete for your time, how important to you is this on-line task?

```
 :   1   :   2   :   3   :   4   :   5   :   6   :   7   :
     6%      15      22      17      15      18       6  (N=506)
   Very                                              Very
 Important                                       Unimportant
```

ENJOY
Compared with the other tasks that now compete for your time, how much do you enjoy working on this on-line task?

```
 :   1   :   2   :   3   :   4   :   5   :   6   :   7   :
    15%      28      32      18       3       3       2  (N=503)
  Very                        Neutral                Very
  much                                              little
```

E. YOUR ON-LINE GROUP

You may be obtaining an account on the System to communicate with a specific group of people for a specific task or function. Such a "group" might consist of an organizational unit, a task force within or between organizations, an on-line educational course, etc. Or you may have obtained an account strictly as an individual, without any specific group activity in mind.

GRP Are you joining the system as a member of a "group"?

```
(1) 51%  No  (Skip to Section F)
(2) 49   Yes
 (N=515)
```

GPNAME
Please give a name and one-line description of the on-line group to which you will belong.

NUMGROUP
How many people are in this on-line group? _____

32% 15 or less
23 16 - 24
41 25 or more
(N=207)

LEADER
Does this group, to your knowledge, have an official leader, manager, or moderator?

(1) 15% No
(2) 86 Yes Please give leader's name _____
(N=242)

FREQCOM
Before using the System, how frequently did you communicate with those in your group who are distantly located?

(1) 6% Daily
(2) 13 Several times a week
(3) 11 About once a week
(4) 8 About twice a month
(5) 10 About once a month
(6) 8 About once every 3 months
(7) 30 Less than once every 3 months
(8) 15 Never
(N=232)

HOWSAT
How satisfied are you with these communications with distant colleagues?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
9%	24	21	29	11	5	1	(N=222)
Very Satisfied			Neutral			Very Dissatisfied	

Please describe your impressions of your on-line group:

COOP
Degree of cooperation and cohesion:

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
8%	20	28	26	10	7	2	(N=231)
Very strong						Non-existent	

COMPET
Degree of competition:

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
1%	5	15	29	14	20	17	(N=224)
Very Intense						Non-existent	

Please describe your feelings about the members of your on-line group:

COMPETEN

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
28%	44	16	12	.5	.5	-	(N=231)
Competent						Incompetent	

LIKE

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
23%	41	20	16	-	-	-	(N=230)
Like them						Dislike them	

TRUST

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
14%	35	25	24	.5	-	.5	(N=232)
Trust Completely						Not at all	

F. SOME BACKGROUND QUESTIONS

SEX

(1) 17% Female
(3) 83 Male
(N=798)

AGER
What is your age? _____

41% Less than 35
41 36-49
17 50 or older
(N=516)

EDUC
Please indicate the amount of formal education you have completed:

(1) 1% Grammar school or less
(2) 1 Some high school
(3) 3 High school graduate
(4) 17 Some college
(5) 16 College graduate
(6) 13 Some graduate school
(7) 5 Graduate degree
(8) 25 Master's degree
(9) 20 Doctorate
(N=519)

EMPLOY
Are you employed by:

(1)	52%	Business
(2)	14	Academia
(3)	4	Private research organization
(4)	12	Government
(5)	3	Medical organization
(6)	12	Self
(7)	4	Other (please specify _____)

(N=515)

POSITION
Would you classify your position as primarily:

(1)	32%	Management or administration
(2)	15	Senior executive
(3)	47	Professional or technical
(4)	3	Secretarial/clerical
(5)	3	Other support staff

(N=509)

PROFESS
Please give a one-sentence description of your profession or area of specialty.

10%	Teaching or research
2	Writer
16	Other professional
35	Managerial, supervisory, staff
35	Technical
2	Other

(N=441)

TYPING
How would you describe your typing skills?

(1)	2%	None
(2)	18	Hunt and peck
(3)	40	Casual (rough draft with errors)
(4)	22	Good (can do 25 w.p.m. error free)
(5)	19	Excellent (can do 40 w.p.m. error free)

(N=516)

READING
How would you describe your reading speed?

(1)	23%	Very fast
(2)	59	Fast
(3)	18	Slow
(4)	-	Very slow

(N=511)

HOURSWKR
About how many hours do you work each week, on the average?

30% 1-40
17 41-48
53 50-98
(N=478)

NINETO5
Regardless of the length of your average work week, do you usually work regular "9 to 5" type hours, or do you frequently work nights or weekends?

(1) 7% Always "9 to 5"
(2) 33 Usually "9 to 5"
(3) 37 Frequently work nights or weekends
(4) 23 Regularly work nights or weekends
(N=511)

WKHOME
How often do you work at home?

(1) 12% Never
(2) 44 Occasionally
(3) 32 Frequently
(4) 12 Most of the time
(N=512)

To what extent do you agree with the following statements?

REACH
The System will make it easier for me to reach people with whom I need to communicate

: 1 :	2 :	3 :	4 :	5 :	
29%	31	28	7	5	(N=513)
Strongly Agree		Neutral		Strongly Disagree	

TELWASTE
I waste too much time trying to reach people on the telephone

: 1 :	2 :	3 :	4 :	5 :	
24%	31	22	16	6	(N=514)
Strongly Agree		Neutral		Strongly Disagree	

MEETMUCH
I spend too much time in meetings

: 1 :	2 :	3 :	4 :	5 :	
16%	25	36	15	9	(N=512)
Strongly Agree		Neutral		Strongly Disagree	

MAILFRUS
Using the mails for communication is frustrating

: 1 :	2 :	3 :	4 :	5 :	
23%	31	27	15	4	(N=514)
Strongly Agree		Neutral		Strongly Disagree	

TROUBJOB
The trouble with most jobs is that you just get used to doing things in one way and then they want you to do them differently

: 1 :	2 :	3 :	4 :	5 :	
2%	7	27	31	33	(N=512)
Strongly Agree		Neutral		Strongly Disagree	

PREFSTAY I would prefer to stay with a job that I know I can handle than to change to one where most things would be new to me

: 1 :	2 :	3 :	4 :	5 :	
1%	4	11	35	49	(N=516)
Strongly Agree		Neutral		Strongly Disagree	

DISTURB When I get used to doing things in one way it is disturbing to have to change to a new method

: 1 :	2 :	3 :	4 :	5 :	
1%	7	11	39	42	(N=515)
Strongly Agree		Neutral		Strongly Disagree	

Do you have any other comments to add about your expected use of the System or its impacts on your work?

COMPLETE
About how long did it take you to complete this questionnaire?
____ minutes

____ 3-9 minutes
____ 10
____ 12-15
____ 16-40

THANK YOU VERY MUCH!!!

FOLLOW-UP QUESTIONNAIRE
STUDY OF THE DETERMINANTS OF ACCEPTANCE OF
COMPUTER-MEDIATED COMMUNICATION SYSTEMS

NAME _____

SYSTEM _____

ID or ACCOUNT IDENTIFIER _____

DATE _____

I. USE OF THE SYSTEM

ELSE 1. Does anyone else use the System under your name? If so, please give their name and approximate online time per week.

18% Yes
82 No
(N=294)

TIME2
Time used:
_____ 3-25 minutes
_____ 30-45
_____ 60
_____ 120 or more

2. How did you learn to use the System? (Please check all that apply).

PRINTED
(1) 35% Careful study of the printed user materials (N=382)

SKIM
(2) 47 Skimming the printed user materials (N=382)

ONLINE
(3) 37 Online documentation, tutorials, or automated HELP facility (N=382)

PERSONAL
(4) 22 Personal individual instruction from a human teacher (N=382)

GROUP2
(5) 20 Group instruction from a human teacher (N=382)

HUMAN
(6) 14 Online help from a human teacher (N=382)

TRIAL
(7) 71 Trial and error learning on my own (N=382)

NOTYET
(8) 8 Have not yet learned to use it (N=382)

SATISF
3. How satisfied are you with the materials and assistance available to you for learning to use the System?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
5%	18	28	20	17	10	3	(N=366)
Very Satisfied						Very Dissatisfied	

COMMENTS?

4. Counting your first signon as "zero hour," after how many hours on line were you able to:

HRSBASR
(1) Learn the basic mechanics of sending and receiving items?
_____ hours

56%	1 or less
22	2
5	3-5
14	6-45
3	Not yet
(N=358)	

HRSCOMR
(2) Feel comfortable communicating with others using this medium?
_____ hours

48%	1 or 2
21	3 or 4
19	5 - 9
12	10 +
(N=325)	

HRSADV
(3) Learn the advanced features that you wanted to use?
_____ hours

36%	Less than 6
17	6-10
13	11 or more
33	Not yet

5. Limitations on Your Use

Please use a check mark to indicate whether each of the following factors has been very important, somewhat important, or not important at all in limiting your use of the System. Use the comment space below to explain in more detail how any of these factors have affected you.

	Very Important	Somewhat Important	Not Important
TERMS Inconvenient access to a terminal (N=438)	18%	17	65
DOC Documentation looked inadequate or difficult (N=439)	14%	40	46
PHONE Trouble with telephone connection (N=440)	13%	18	69
PACKET Trouble with packet-switched network (Telenet, Euronet, etc.) (N=430)	9%	21	69
COSTREAC Cost of reaching the System (telephone &/or packet network) (N=440)	13%	15	72
COSTUSE Cost of using the System (N=442)	19%	20	62
BADEXP Had some bad experiences (System crashed or did not seem to work correctly) (N=442)	11%	29	60
PREFPH I prefer to use the phone for communications (N=438)	7%	20	73
NOTLIKE I do not like using a computer system like this (N=434)	3%	9	88

COMPLI The System is too complicated (N=432)	8%	23	70
POORDES The System is poorly designed (N=423)	7%	32	70
NOONE There is no one on this system with whom I wish to communicate a great deal (N=429)	11%	27	62
NOTINT I am not very interested in the subjects being discussed (N=434)	8%	25	67
OTHERAC Other professional activities must take higher priority (N=440)	36%	39	26
NOTWORTH The items I have received do not seem worth reading (N=433)	8%	33	59
LEADSHIP Inadequate leadership of the group (N=417)	11%	24	65
JUSTTRY I was just trying out the System and did not intend to use it much (N=414)	9%	19	72
OTHER Other (please describe_____ _____ (N=22)	73%	14	14

MOSTIMP
Now, please go back and Circle the Single Most Important Factor.
Comments or explanations?

GETDOC
Did you ever receive printed user materials?

(1) 83% Yes
(2) 17 No
(N=351)

IF YES:
Did you find the System documentation (printed user manual or materials):

UNDER

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
13%	27	28	17	9	5	1	(N=310)
Understandable						Not Understandable	

EASYREAD

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
13%	26	27	14	10	7	3	(N=308)
Easy to Read						Not Easy to Read	

WELLORG

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
9%	21	26	18	13	8	4	(N=309)
Well Organized						Not Well Organized	

COMPRE

: 1	: 2	: 3	: 4	: 5	: 6	: 7	:
8%	21	24	19	14	10	5	(N=306)
Comprehensive						Incomplete	

SUGGEST
Do you have any suggestions for improving the documentation?

____ Unclear
____ Total rewrite needed
____ Needs more examples or detail
____ Needs index
____ Other
(N=95)

TYPESELF
7. Currently, do you yourself type material into the System, does someone type it for you, or do both occur?

(1) 85% Type it myself (skip the next question)
(2) 6 Have it typed
(3) 9 Both occur
(N=349)

8. What are the main reasons why you have chosen to have someone else input material for you? (If more than one, please rank order).

DONTKNOW
(1) 10% I don't know how to use the System (N=51)

NOTIME
(2) 46 I don't have time to use the System myself (N=50)

NOTYPE
(3) 32 I do not know how to type (N=50)

NOTPROF
(4) 28 I find using the system directly, i.e., typing at a terminal, incompatible with my professional role or job description (N=50)

DISLIKE
(5) 4 I dislike working on line (describe why in the space below)

OTHER2
(6) ____ Other (please describe) (N=50)

9. Of your total online time, what proportion is:

HOMETIME
(1) ___ At home

36%	None
12	5-50%
18	80-98%
35	All
(N=307)	

OFFTIME
(2) ___ At an office away from home

40%	None
25	1-98%
35	All
(N=306)	

TRAVTIME
(3) ___ While travelling

88%	None
12	2-30%
(N=305)	

II. REACTIONS TO THE SYSTEM

These questions concern your overall reaction to the System as a means of communication and work.

OVERALL
1. Overall, the System is:

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
11%	36	31	14	5	2	1	(N=357)
Extremely Good			Neutral			Extremely Bad	

2. I find using the System to be:

STIM2

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
15%	31	28	19	4	3	1	(N=359)
Stimulat-ing			Neutral			Boring	

3. Do you find the language of the System (system interface):

UNDER2

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
16%	28	26	11	10	6	3	(N=357)
Under-standable						Confusing	

COURTEOU

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
15%	32	26	17	4	4	3	(N=353)

4. Thinking back over your experiences so far with the System, how frequently have you felt:

	Always	Almost always	Some-times	Almost never	Never
DISTRACT Distracted by the mechanics of the System (N=357)	5%	10	54	24	7
CONSTRA Constrained in the types of contributions you could make (N=350)	4%	10	42	29	15
OVERLOAD Overloaded with information (N=351)	5%	17	41	27	11
EXPRESS Able to express your views (N=348)	18%	49	21	9	3

IMPRESS
Able to get an impression of personal contact with other participants 10% 27 40 17 7
(N=349)

5. Please indicate your reactions to using this System:

HARD2

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
6%	9	17	13	22	24	9	(N=358)
Hard to Learn						Easy to Learn	

IMPER2

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
4%	7	15	21	31	17	5	(N=356)
Impersonal						Friendly	

FRUS2

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
4%	9	22	18	20	20	6	(N=356)
Frustrating						Not	

WASTE2

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
2%	7	12	28	25	18	8	(N=350)
Time Wasting						Time Saving	

UNPRO2

: 1	: 2	: 3	: 4	: 5	: 6	: 7 :	
2%	4	9	20	32	23	10	(N=353)
Unproductive						Productive	

6. Are there any particular features of the System you have found to be:

UNIQUE
a) Unique and valuable to this type of system?

7% Networking
11% Speeds or efficates communication
13% Conferences
7% Messages
7% Branching
8% Asynchronocity
18% No
29% Other
(N=150)

USELESS
b) Useless, distracting and/or out of place in this type of system?

44% No
66% Other
(N=106)

GENIMP
c) What general improvements/new features/changes would you like to suggest for the System?

14% Improve editor
8% Improve documentation
8% Make it easier to use
16% None
54% Other
(N=154)

III. COMMUNICATING WITH OTHERS

NUMOTHSR 1. With approximately how many different people are you currently exchanging regular communication on the System? _____

28%	None
12	1 or 2
29	3 - 10
9	11 - 19
1	20 +
(N=343)	

FRIENDS2R
2. Of all the users on the System whom you know, how many do you consider to be personal friends? _____

43%	None
24	1 or 2
20	3 - 5
13	6 +
(N=343)	

GETKNOWR
3. How many people with whom you now communicate have you gotten to know on the System? _____

57%	None
18	1 - 4
9	5 - 9
15	10 +
(N=324)	

4. Your use of the System may be primarily because you belong to a formal "group" on line which has a specific set of activities or tasks. Such a group might consist of an organizational unit, a task force within or between organizations, an online educational course, etc.

If not, please skip to the next section. (If you are not sure whether or not you belong to such a group, please do answer the questions).

Please give a name or short description of your online group.

Please describe your impressions of your online group:

COOP2
Degree of cooperation and cohesion:

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
10%	24	24	19	11	8	4	(N=195)
Very Strong						Non-existent	

COMPET2
Degree of competition:

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
4%	6	18	20	12	22	19	(N=192)
Very Intense						Non-existent	

5. Please describe your feelings about the members of your online group:

COMPTENT

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
25%	36	23	10	4	1	1	(N=193)
Competent						Incompetent	

LIKETHEM

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
25%	38	21	14	2	-	1	(N=194)
Like them						Dislike them	

TRUST2

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
13%	28	27	27	5	-	1	(N=191)
Trust Completely						Not at all	

OUTSIDE
6. What proportion of your use of the System is for communication OUTSIDE of this group?

(1) 40% None
(2) 35 Less than 10%
(3) 11 10% - 24%
(4) 7 25% - 49%
(5) 4 50% - 89%
(6) 3 90% or more
(N=186)

LEADER2 6. The following questions refer to the "leader" of your group (facilitator, moderator, or manager taking responsibility for guiding the group). If your group has no leader check here _____ (and skip to the next section).

71% Leader
29 No leader
(N=189)

What is the name of the leader of your online group?

_____

How would you rate his or her:

TASKSKIL
"Task-oriented" skills - those related to coordinating and motivating the completion of the group's task?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
22%	33	20	12	5	5	3	(N=128)
Excellent						Poor	

SOCSKIL
How would you rate his or her "social" skills - those related to maintaining group cohesiveness?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
26%	30	18	10	8	5	3	(N=129)
Excellent						Poor	

OVERLEAD
How would you rate his or her overall leadership performance?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
18%	34	20	14	5	5	4	(N=129)
Excellent						Poor	

AUTH
Would you say that the leader is self-oriented (authoritarian), group-oriented (egalitarian), or somewhere in between?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
3%	7	13	23	17	30	6	(N=127)
Authoritarian						Egalitarian	

IV. IMPACTS OF SYSTEM USE

REACH2
1. The System has made it easier for me to reach people with whom I need to communicate.

```
:   1   :   2   :   3   :   4   :   5   :
   20%     27      29      13      10   (N=348)
Strongly          Neutral       Strongly
 Agree                          Disagree
```

2. My participation in the System has contributed to my:

SHORTERM
Short-term career advancement

```
:   1   :   2   :   3   :   4   :   5   :
    7%     12      49       8      23   (N=342)
Strongly          Neutral       Strongly
 Agree                          Disagree
```

LONGTERM
Long-term career advancement

```
:   1   :   2   :   3   :   4   :   5   :
    6%     24      42       8      20   (N=345)
Strongly          Neutral       Strongly
 Agree                          Disagree
```

LEADS
3. The System has provided me with leads, references, or other information useful in my work.

```
:   1   :   2   :   3   :   4   :   5   :
   18%     32      23      12      15   (N=353)
Strongly          Neutral       Strongly
 Agree                          Disagree
```

STOCK
4. The System has increased my "stock of ideas."

```
:   1   :   2   :   3   :   4   :   5   :
   16%     38      25      11       9   (N=350)
 Agree                          Disagree
Strongly          Neutral       Strongly
```

QUAN2
5. Have you found that use of the System has increased the efficiency of your work (the quantity of work that you can complete in a given time)?

```
:   1   :   2   :   3   :   4   :   5   :   6   :   7   :
    6%     11      12      26      10      15      20   (N=352)
Definitely                      Unsure          Definitely
    yes                                            not
```

QUAL2
6. Have you found that use of the System has increased the quality of your work?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
5%	10	16	24	11	13	21	(N=351)
Definitely yes			Unsure			Definitely not	

USEFUL2
7. Overall, how useful how you found the System to be for your work?

: 1 :	2 :	3 :	4 :	5 :	6 :	7 :	
8%	14	25	15	8	15	14	(N=352)
Very Useful						Not useful at all	

CHANGES
8. Has use of the System changed your communications or work patterns? (Please be specific. What kinds of activities did it replace or change?)

15%	Reduces phone or mails
3	Networking
9	Speeds or efficates communication
12	Adds work or reduces leisure
2	Use libraries less
58	No change
(N=258)	

OTHIMPS 9. Do you have any other comments to add about your use of the System or its impacts on your work?

3%	Supplements secretary
3	Excellent work tool
2	Found job or got grant
4	Adds work or reduces leisure
3	Generalized negative impacts
2	Able to get unique information
12	Generalized positive impacts
71	No
(N=112)	

10. Are there any questions on this questionnaire that you had difficulty understanding or that you think should be changed in any way?

TIMETAKE
11. About how long did it take you to complete this questionnaire?

31%	10 Minutes or less
29	11 - 16 minutes
26	17 - 29 minutes
14	30 + minutes
(N=315)	

THANK YOU VERY MUCH!!!

APPENDIX TWO
TRANSCRIPTS OF SESSIONS ON THE SYSTEMS

A SAMPLE SESSION ON QZCOM
by Starr Roxanne Hiltz

Below is a transcript of a typical session on COM as reached through the international TELENET gateway. Some things to note which help to make more sense of the transcript:

1. You have to go through a ridiculous rigamarole to get through international gateways. Long addresses of many digits, setting parameters, etc. About half the time, something goes wrong and one does not get through.

2. In this session, I first go to the English-language COM, then to the separate Swedish-language conferencing version, KOM: I use the command KOMENG to indicate that I want an English-language interface to the Swedish-language database.

Even though COM is supposed to be in English and the KOMENG gateway to the Swedish-language system, KOM, gives the interface in English, one is frequently faced with text in Swedish. One wonders if it is anything important! Being a "foreigner" used to a different language than the default language of the host CMCS system will increasingly occur as the world becomes networked.

3. COM has a very interesting interface. It is command-menu combination. That is, at any choice point, a menu of commands is printed. Any unique short abbreviation of the command or response will work. For example, instead of having to type out Starr Roxanne Hiltz as my name, st ro hi will work. The COM promptis an =. A carriage return at choice points will produce the first option listed.

The commands on the menu change order and content. COM tries to guess what you might be most likely to do at any point, and puts that command first on the menu.

4. There are no text formatting commands, so you have to be careful to avoid unsightly wraparounds, because the line length is something like 70, and I tend to type past there.

5. All and all, it is a simple to use and "friendly" system.

I. Part I Getting to COM

PASSWORD =

MMMMMM

******

@C 02405020332

2405 020332 CONNECTED

```
COM

@

TELENET

@SET? 0:33,57:1

PAR0:33,57:1

@CONT

CONNECTING TO HOST SYSTEM.

Oden/QZ Stockholm 7.01A 17:05:45 TTY12, line BALDE23

 II. The COM session

Please LOGIN or KOM

.LOGIN 44,7077

JOB 7 Oden/QZ Stockholm 7.01A TTY12

Password:

TRXFFF

******

Means left: -53878 SEK   Used current month: 2537 SEK

Saturday 83-10-08  17:07        Last login 83-09-05  01:45

830927  Fel F-faktor har g{llt f|r taxa 2 och 3 sedan 1 juli. Se HELP
NEWS.

    --  Senaste nytt med HELP NEWS. Uppdaterad 830927

        Telefonsvarare med felmeddelanden 08/60 82 68

Welcome to COM, version 6(1004),

Please type your name. (Name and organization)

 = ST RO HI

Starr Roxanne Hiltz

Please type your password:

You have 2 unseen letters

You have 9 unseen entries in New Jersey Questionnaire Receivers

You have 9 unseen entries
```

Sven Olofsson QZ is now present in COM.

What do you want to do? (Read) next letter, (Join) next conference, Quit, (Send a) letter (to), Other.

= NE LE

(Read) next letter

(Text 23659) 83-09-14 16.21 Cally Bark QZ

Receiver: Starr Roxanne Hiltz <195> -- Received: 83-10-08 17.09

Receiver: Cally Bark QZ <37> -- Received: 83-09-14 16.21

Subject: Qestionnaires

I have now sent out 75 questionnaires. It i o.k.?

(Text 23659)----------

What do you want to do? (Read) next letter, (Join) next conference, Quit, Comment (on entry), (Send a) letter (to), Personal (answer), Other.

= COM

Comment (on entry)

Receiver: Starr Roxanne Hiltz

Receiver: Cally Bark QZ

Comment on: Text 23659 (by Cally Bark QZ)

Subject: Qestionnaires

THANK YOU VERY MUCH Cally. That should be enough, now.

We seem to be getting good returns now, by the way.

Enter (it)

17.13 Letter (Text 25926) sent to:

Starr Roxanne Hiltz

Cally Bark QZ

What do you want to do? (Read) next letter, (Join) next conference,

Quit, Read (the) rest, Comment (on entry), (Send a) letter (to), Personal (answer), Other.

= ne let

(Read) next letter

(Text 25474) 83-10-03 14.04 Conference Organiser TAC

Receiver: Starr Roxanne Hiltz <196> -- Received: 83-10-08 17.13

Receiver: Conference Organiser TAC <15> -- Received: 83-10-03 14.04

Subject: The Atlantic.

I am seeking an experimental two-way gateway to
bridge the above, and over which to transmit edifying materials.

As a bridge-builder yourself, does this prospect hold any interest?
If not, could you suggest someone else on your 'side' who
I might contact with the same question?

(the end-result COULD become habit-forming)

(Text 25474)----------

What do you want to do? (Join) next conference, Quit, Comment (on entry), (Send a) letter (to), Personal (answer), Other.

(NOTE: Carriage return here produces default)

The title of the activity is: New Jersey Questionnaire Receivers

You have 9 unseen entries Saturday 17.14

(Text 21936) 83-08-31 11.36 laszlo fuchs kth (more receivers)

Inst. f|r Gasdynamik, KTH, 100 44 STOCKHOLM

(Text 21936)----------

What do you want to do? (Read) next notice, Quit, Comment (on entry), (Send a) letter (to), Personal (answer), Other.

- all news

(Read) all news

(Text 21940) 83-08-31 11.42 Bengt Edvardsson Astronomiska Observatoriet i Upp

sala (more receivers)

Astronomiska Observatoriet, BOX 515, 751 20 UPPSALA

[etc]

You have seen all 79 entries in New Jersey Questionnaire Receivers

What do you want to do? (Get) daytime, Quit, Join (conference), (Write new) notice, Comment (on entry), (Send a) letter (to), Personal (answer), Other.

- quit

Quit

You are now leaving COM. ---------- Goodbye!

.R kom:komeng

Welcome to KOM, ver 6(777),

Please type your name. (Name and organization)

= st ro hi

Starr Roxanne Hiltz

Please type your password:

Thank you.

You have 2 unseen letters

2 other persons are currently present in COM.

P} grund av problem med databasen, har KOM k|rts med en annan databas idag, tisdag 13 sept, p} f|rmiddagen. Vi har nu }terg}tt till den gamla databasen, som nu {r lagad. Inl{gg som har skrivits mellan 9.00 och 12.45 idag finns allts} inte med h{r, men f|rhoppningsvis

ska dessa inl{gg |verf|ras fr}n reservdatabasen.

What do you want to do? (Read) next letter, Quit, Join (conference),
(Send a) letter (to), Other.
 = ne let
(Read) next letter
(Text 127767) 83-09-16 14.35 Tomas Ohlin
Receiver: Starr Roxanne Hiltz <18> -- Received: 83-10-08 17.19
Comment to: (Text 123803) by Starr Roxanne Hiltz <1>
[rende: IFIP83

Thanks for your good spirit,
Roxanne. The way you use this medium
is beautiful.
About grants I shall have a last
try with IFIP this afternoon.
Really looking frward to seeing
you both in Paris,
la belle Paris,les restaurants,
les jeunne filles, les bonnes vins...
(Text 127767)----------
What do you want to do? (Read) next letter, Quit, Join (conference),
Comment (on entry), (Send a) letter (to), Personal (answer),
Other.
(Please press return key)

 = ne let
(Read) next letter
(Text 135540) 83-10-08 12.11 Jacob Palme QZ
[etc]
What do you want to do? (Get) daytime, Quit, Join (conference),
Comment (on entry), (Send a) letter (to), Personal (answer),

```
Other.
 = quit
Quit
You are now leaving COM. ------------------------------ Goodbye!
.LOGOUT
Job 7  User HILTZ R <44,7077>
Logged-off TTY12  at 17:22:17  on  8-Oct-83
Runtime: 0:00:04, KCS:191, Connect time: 0:15:25
Disk Reads:2276, Writes:251, Blocks saved:80
Session cost: 9,31 SEK, Academic rate (2)
.@
TELENET
@id
 ?
@id
ID CLEARED
@d
2405 020332 DISCONNECTED
```

TRANSCRIPT OF A SESSION ON PUBLICON
by Starr Roxanne Hiltz

NOTES:

I had not been on in some time, with that result the this session is quite a pot-pourri. Given the structure of the system, if you want to be aware of any new "branches" (conferences), you receive announcements of many more than you would be interested in. But it does give a flavor of the sorts of activities going on there and of the interface.

The name of the system has been concealed by substituting "(SYSTEM)" wherever it appeared in the transcript. The name of the host network, when it appeared, has been changed to "(NETWORK)." Real names of individuals have been changed to "(NAME)."

The prompt is a "DISPOSITION>" and a carriage return produces the first or default choice presented by the prompt.

This system has a branching structure for conferences, whereby any user can start a new sub-conference off of an existing conference.

Note that many of the conferences do not have many "items" or entries-- somebody tried to start that branch off of an existing conference, but few were interested in following it.

The Session

TERMINAL=DD11

@HHAALLFF

@C (censored)

(Address) CONNECTED

Connected to THE (NETWORK)

Password?

PS0019 (user 19) logged in Tuesday, 30 Aug 83 18:51:00.

Welcome, you are connected to THE (NETWORK)

Last login Monday, 29 Aug 83 21:28:08.

(C) COPYRIGHT 1983.

An End to an Era Nears in Israel

With Begins Resignation Assured.

See BULLETIN for latest details.

Enter your (System) name: Roxanne

[(SYSTEM) version 3.2A]

Enter your password:

Welcome to (SYSTEM NAME), ROXANNE!

432 waiting notes.

Read, Scan, Other? other

Other options include: Hold, Batch, and Cancel. (You don't have to type OTHER first).

Read, Scan, Other? read

DISPOSITION-> for "(SYSTEM)": Next, Write, Other?

"PERSONAL INDEX" Conference 82.6658 GEORGE, organizer, about "THE KEEP, READ INDEX, AND DISCARD FUNCTIONS -- A TUTORIAL" (answers: 8) MON, 12/20 13:30 (310 characters)

Answer 1 to this branch conference is a tutorial on use of the heretofor undocumented and unpublished personal indexing functions: KEEP, READ INDEX, and DISCARD. Any questions about the functions can be posted in this conference, and I'll try to answer them here for everyone to see who is interested.

Join to receive future answers? n

DISPOSITION-> for "PERSONAL INDEX": Next, Write, Other? [NOTE: I entered a carriage return here, the default option.]

DISPOSITION-> for "(SYSTEM)": Next, Write, Other?

*** *Branching off of "(SYSTEM)" 82.1 as Answer 374 (of 714)

Conference 82.6737 QUANTUM1, about "HARDWARE, SOFTWARE & METHODS FOR CONCURRENT COMPUTER VOICE CONFERENCING."

(answers: 29) WED, 12/22 12:56 (898 characters)

"CONCURRENT COMPUTER VOICE CONFERENCING"

The need to use both computer and voice "ON-LINE", "one to one" and "many to many" to achieve an order of magnitude improved

communications, especially where transfer of both values and facts are involved, becomes obvious to anyone trying to establish meaningful group projects on (SYSTEM). (This is not meant to belittle the great contributions and potential of (SYSTEM), as it stands). The point is that an "on-line" concurrent computer voice capabilities, combined with the latest communication's methodologies, can be more effective than normal "face to face" meetings. This new conference will attempt to explore the present state of the "LOW COST" art for accomplishing this, and encourage dialog on relevant conferencing concepts and experiences.

Join here and read 1 to start this conference going.

.CON

Join to receive future answers?

DISPOSITION-> for 82.6737: Next, Write, Other?

DISPOSITION-> for "(SYSTEM)": Next, Write, Other?

"GREETINGS" Conference 82.6757 (NAME), about "BEST WISHES FOR THE HOLIDAYS" (answers: 7) WED, 12/22 21:16 (194 characters)

To avoid overload (as has been known to happen electronically in delivering holiday greetings), why not share here your good wishes to folks (SYSTEM)-ing.

For example, READ 1 at Disposition.

Join to receive future answers? n

DISPOSITION-> for "GREETINGS": Next, Write, Other?

DISPOSITION-> for "(SYSTEM)": Next, Write, Other?

DISPOSITION-> for "(SYSTEM)": Next, Write, Other?

"DEFINE CONFERENCE" Conference 82.6988 (NAME), about "HOW DO YOU DEFINE COMPUTER CONFERENCING" (answers: 14)

TUE, 12/28 01:59 (1136 characters)

I find that I have two problems in tyring to talk to people about computer conferencing. The first is that it seems to be very hard to DEFINE computer conferencing. If you are talking to someone who knows about electrionic mail or micororo computer bulletin boards, you can say that computer conferencing is sort of LIKE those other things. If you are talking to someone who is innocent of such computer systems, you reallly have a lot of explaining to do. The second problem is that, once you have at least established more or less what you are talking about, it may be less than easy to explain exactly what is so great about computer conferencing. In fact, I would venture to observe that, from the apparently small proportion of (NETWORK) users who are active in (SYSTEM), it's a bit hard even for people with hands-on experience of computerized communication to get into conferencing.

Have others had similar experience? Any contradictory observations? Perhaps even, has someone found a sure-fire way to define/describe computer conferencing so that even non computer people see the appeal of the medium?

Join to receive future answers? n

DISPOSITION-> for "DEFINE CONFERENCE": Next, Write, Other?

":NETWORLD" Conference 83.7 NEXUS, organizer, about ">>> NETWORLD <<<
A UNIVERSE OF NETWORKS AND NETWORKERS!"

(answers: 14) SAT, 01/01 22:46 (188 characters)

>>>> WELCOME TO >>>>

N E T W O R L D

Please [P]rofile [C]ontents and [R]ead ":NETINFO" for an overview and introduction to this Conference.

Join to receive future answers? n

DISPOSITION-> for ":NETWORLD": Next, Write, Other?

Message 83.159 FUTURETRENDS DAVE, about "ANNOUNCEMENT OF EXPERIMENTAL CONFERENCE : CHECK THIS OUT" WED, 01/05 02:39

(1642 characters)

EARLY ANNOUNCEMENT OF UPCOMING INTEREST...

As a next phase in the evolution of (SYSTEM) and electure and as the first project in FUTURETRENDS FOUNDATION's program to enroll important thinkers into the developing electronic reality.. (drum roll, drum roll, drum roll) It thrills me to let you know that

Dr. John Lilly -- of human/dolphin communication fame,

Dr. Tim Leary -- yes, that Tim Leary,

and Durk Pearson and Sandy Shaw -- authors of the block buster best

seller LIFE EXTENSION are soon to join with Futuretrends here on (SYSTEM) to conference on topics of interest, interact with us, and generally explore what's possible with in the technology for communication available to us here.

How to join in will be announced ASAP.

(NETWORK) has no part in producing this experiment so far.

DISPOSITION-> for 83.159: Next, Write, Other?

"SMALL BUSINESS" Conference 83.187 (NAME), about "SELF-HELP CONFERENCE TO DISCUSS ASPECTS OF CREATING SMALL SERVICE BUSINESSES" (answers: 56) THU, 01/06 08:51 (842 characters)

How to Start a Small Service Business

(For Fun & Profit!)

As was suggested by the excellent responses I received (after only a few hours past my entering a message for help) I am hereby initiating this conference.

It will deal with all (underline that) aspects of starting a small service business, whether it be part-time, full-time or whatever. What would be a good idea for starters would be for all those who participate to enter a list of ideas they have had as to strating up such an enterprise.

Then, we can all discuss the merits of such ventures. I will leave a description of my plans as answer #1.

Also, if you ever hear of any good articles or books on the subject, please share the info. This will definitely be a 'self-help' conference if there ever was one.

Join to receive future answers? n

DISPOSITION-> for "SMALL BUSINESS": Next, Write, Other?

"NETWORK PROBLEM LOG" Conference 83.200 FUTURETRENDS DAVE, about "DOCUMENTING SYSTEM PROBLEMS" (answers: 227) THU, 01/06 10:59 (874 characters)

Ever had system problems while working on (NETWORK)?

In an effort to make the Quantity and QUALITY of these problems clear to (NETWORK) management----

Please record in a VERY brief note on this conference: * WHAT problem you are experiencing

* your USER ID

* what EFFECT, if any, this has had on you getting done what you are trying to get done.

Please make an entry if at all possible into this log EVERl TIME you experience a problem with (NETWORK).

This log will be made available to (NETWORK) management and magazines and publications in the industry.

Please note that entries to the log DO NOT replace notifications to (NETWORK) Service, TCA088, (NETWORK) management (direct), or Helper.

This is meant only to be a log documenting the kind and number of incidents of system malfunction or unworkability.

THANKYOU

FUTURETRENDS DAVE

Join to receive future answers? n

DISPOSITION-> for "NETWORK PROBLEM LOG": Next, Write, Other?

Message 83.205 (NAME), about "CONFERENCES YOU MIGHT BE INTERESTED IN!" THU, 01/06 13:40 (1422 characters)

Conferences You Might Want to See!

The following are a few conferences that you might just want to take a peek at. They cover a wide variety of topics, so there should be something there for you!

1. "GRAPHICS/ANIMATION" Conference 82.4355, about "HOW TO GET THAT LITTLE BLOB ACROSS THE SCREEN FAST ENOUGH AND CLEAN ENOUGH!"

2. "EQUIPMENT USE" Conference 82.4381, about "WHO USES WHAT AND WHAT FOR"

3. "RECIPE EXCHANGE" Conference 82.5997, about "PLACE WHERE BUDDING CHEFS CAN SHARE THEIR CULINARY SECRETS"

4. "TEACHING MICRO USE" Conference 82.5998, about "ELECTURE ON THE JOYS AND FRUSTRATIONS OF TEACHING THE USE OF MICROCOMPUTERS"

5. "ONLINE RETRIEVAL" Conference 82.6275, about "FORUM TO DISCUSS THE NEW ONLINE SYSTEMS AVAILABLE"

6. "GARDENING NOTEBOOK" Conference 82.6462, about "OBSERVATIONS AND EXPERIENCES CONCERNING (SYSTEM)CIPANTS

HORTICULTURAL ACTIVITIES"

7. "SMALL BUSINESS" Conference 83.187, about "SELF-HELP CONFERENCE TO DISCUSS ASPECTS OF CREATING SMALL SERVICE BUSINESSES"

To see any of these conferences, all you need do is enter

READ YY.####

at the action prompt (YY.#### is the message number following the conference name). After you have read the conference message, you can join the conference by entering J(oin) at the disposition prompt. To see other answers enter

READ 1-999

after joining.

It's that simple!

DISPOSITION-> for 83.205: Next, Write, Other?

Message 83.240 FUTURETRENDS DAVE, about "FOR THOSE WHO MISSED IT -- "NETWORK PROBLEM LOG"" FRI, 01/07 11:49 (470 characters)

Russ and any other who missed it --

the conference acting as a log to document the facts re all system problems and screwups is titled : "NETWORK PROBLEM LOG".

the idea is to make a BRIEF note entry to cronicle EVERY TIME YOU EXPERIENCE ANY MALFUNCTION ON NETWORK. This info will be laid on (NETWORK) and made available as public to any press who care to read it, in the hope of serving the honest function of motivating sysop to raise the standards.

FT DAVE

DISPOSITION-> for 83.240: Next, Write, Other?

"LOGO AND THE IBM PC" Conference 83.336 (NAME) INTEREST IN LOGO AND TURTLE GRAPHICS
BY IBM PC USERS" (answers: 9) SUN, 01/09 18:33 (520 characters)
Seymour Papert's book "Mindstorms" and Hal Abelson's "Turtle Geometry" as well as numerous articles in the computer magazines have stirred up interest in the programming language LOGO. Although LOGO interpreters are available for the Apple and TI computers, none has yet appeared for the IBM PC. (Turtle graphics, however, is available for one implementation of Pascal on the IBM PC.)

This conference will provide a vehicle for users of the IBM PC to discuss their interests in LOGO and Turtle Graphics.
Join to receive future answers? n
DISPOSITION-> for "LOGO AND THE IBM PC": Next, Write, Other?
"LAN" Conference 83.374 (NAME) about "KNOWLEDGE BASE FOR LOCAL AREA NETWORKS" (answers: 115) MON, 01/10 19:08
(370 characters)
********** L A N **********

Local Area Network Conference is a place to build a reference and contact base for information on the design, use, and implementation of a LAN.

Anyone interested in this new and exciting industry is requested to join and share their ideas, views, knowledge, and questions here.
Join to receive future answers? n
DISPOSITION-> for "LAN": Next, Write, Other?
"APPLE CLASS HELP" Conference 83.573 LOUIS, about "SUGGESTIONS FOR

APPLE DOS SOFTWARE TO BE USED IN MY INTRO TO
COMPUTING CLASS" (answers: 4) FRI, 01/14 10:13 (480 characters)
Starting ASAP I'm teaching a college intro to microcomputer applications with 12 plain vanilla, 48K, one-disk Apple II's. Your suggestions for user software running under Apple DOS would be a great help. I have an Apple myself, but use CP/M for 95% of my work; so I need input from those of you who are running your applications with Apple DOS. Please Join this conference and read answer 1 for details on the kinds of programs needed. Thanks to all... Louis
Join to receive future answers? n
DISPOSITION-> for "APPLE CLASS HELP": Next, Write, Other?
"BLIZZARD" Conference 83.633 (NAME), about "THE FIRST NORTHEAST BLIZZARD OF '83" (answers: 29) SAT, 01/15 15:19
(340 characters)
As we brace here in the Northeast for what might be a BIG blizzard, what are you doing to keep warm, interested, and fed?

We've bought a case of wine, a bottle of cognac, and food for three days of good eating. Lots of firewood to keep a nice, toasty fire in the fireplace, friends, family and computer terminal for diversion.

Join to receive future answers? n
DISPOSITION-> for "BLIZZARD": Next, Write, Other?

(And so on.....)

Trace of a Session on INTMAIL
By Elaine Kerr

NOTES:
The system is very easy to use.
The prompt is "Command?"
The one message waiting for me was evidently misaddressed.
The transcript has been edited to substitute "INTMAIL" for the real name of the software system.

```
@MAIL
User name?  e.kerr
Password?
Welcome to (SERVICE NAME)MAIL service!
Copyright 1984.
Your last access was Friday, Jul 20, 1984   2:17 PM EDT
Today is Thursday, Aug 23, 1984   7:46 PM EDT

Please check the Intmail bulletin board for Intmail
Customer Support's new local Virginia phone number.


CHECK these bulletin boards:
  INTMAIL
  (CORPORATION NAME)
  SERVICECORP

 No.  Delivered     From                  Subject
  Lines
   1 Jul 20 17:00 MHUNTSMAN/TELENET     RE: Security
      6
                  TNET.INTMAIL/USA

Command?  ?
```

COMMANDS AND TOPICS

When the system issues the Command? prompt, it is waiting for instructions
from you. The system commands are as follows:

ADMINS [OF]	ALTER	ANSWER	BOARDS [OF]
BYE	CANCEL	CHECK	COMPOSE
COPY	DELETE	DIRECTORY	DISPLAY
EDIT	ENCODE	EXIT	FILE
FORWARD	INQUIRE	INSERT	LIST
LISTS [OF]	MEMBERS [OF]	MODIFY	NODES [OF]
NUMBER	PASSKEYS	PURGE	READ
RECOVER	REGISTER	REMOVE	SAVE
SCAN	SCRIPTS [OF]	SEND	SET
STATIONS [OF]	STATUS	SYSTEMS	TALLY
TRANSFER	TRY	UNPURGE	UNREAD
USERS [OF]			

```
Do you wish to see more information on commands and topics? yes
```

Some of the most frequently used commands for basic use of the system are the following:

READ	ANSWER	SCAN	CHECK
FORWARD	FILE	COMPOSE	
PURGE	UNPURGE	DIRECTORY	

The system also provides several features that are described by by the following topics:

BATCH	HOTLINE
BULLETIN.BOARDS	INFORM.SCRIPTS
DIRECT.DELIVERY	INTERCONNECTION
DOCUMENTATION	TELEX
EDITING	TOPICS

Do you wish to see more information about commands and topics?

You can obtain detailed information on any of the above commands and topics by entering a question mark (?) or the word HELP followed by a space and the command or topic name:

```
     Command?  ? SCAN          Command? HELP SCAN
OR
     Action?  ? TELEX          Action? HELP TELEX
```

Always press RETURN after typing a system command.

The following are valid control characters in the system. To use them, hold down the CONTROL key, and press the key you need.

Do you wish to see more information on commands and topics?

```
    CONTROL H - Backspace/deletes characters
    CONTROL X - Deletes the current line
    CONTROL W - Deletes the most recent word in the current line
    CONTROL R - Displays the most recent line
    CONTROL S - Stops the display, until you press CONTROL Q
    CONTROL Q - Restarts the display after CONTROL S

    BREAK KEY - Interrupts the current display and
                returns you to the Command? or Action? prompt
```

Remember that all the system commands can be abbreviated to at least the first three letters (e.g., COM for COMPOSE).

Do you wish to see more information on commands and topics?

To suppress system prompts and messages associated with certain commands, enter the command name followed by an exclamation point (!):

```
     Command? READ!
```

You may instruct the system to perform multiple commands in sequence at a single command? prompt by entering each command separated by a semicolon (;):

```
     Command? SCAN SINCE JANUARY 15;READ


Command?  read 1

Posted: Fri  Jul 20, 1984   4:34 PM EDT
Msg:    AGIE-1627-2430/TNET.INTMAIL/USA
From:   [MHUNTSMAN/TELENET] TNET.INTMAIL/USA
To:     E.KERR/(CORPORATION)
Subj:   RE: Security
Tom,

Looks like the message finally came through!!  I will be in touch, on
Monday, as soon as I receive word from France.

Marci

Action?   ?

There are 9 system commands that can be used in response to the
Action? prompt, to take action on the message just received:

ANSWER              Create a reply to the SENDER

FORWARD             Send a copy to other recipients with or
                    without your own comments

READ                Redisplay the message

PURGE               Delete the message from your catalog

UNPURGE             Restore the message you just purged

FILE                Store the message under a file name

REMO*QX*ROM         Disassociate the message from the file name
<file name>

EXIT                Return to the Command? prompt

Do you wish to see more information about Action? prompt? (YES)

SAVE MSG AS         Store only the text of the message under
<workspace name>    your specified workspace name

In addition, there are 10 topics that can be explained while
at the Action? prompt:

BATCH               Enable you to create messages offline for
                    later transmission

BULLETIN.BOARDS     Contain messages that can be read by a group
                    of users

DIRECT.DELIVERY     Enable you to send messages to a terminal
                    station
```

```
DOCUMENTATION       Contain a list of documents that are available
                    to you

EDITING             Enable you to alter a previously saved message
                    or workspace as well as a message or workspace
                    you are creating

Do you wish to see more information about Action? prompt? (YES)

HOTLINE             Enable you to send messages directly to
                    Intmail Customer Service

INFORM.SCRIPT       Created by the user, an "electronic" form that
                    prompts for user input, validates that input,
                    formats message layout, and generates envelope
                    information

INTERCONNECTION     Enable you to send messages to users who are
                    registered on a different messaging system

TELEX               Enable you to send an "outbound" message to
                    any registered domestic or international telex
                    device

TOPICS              Enable you to obtain information on BATCH,
                    BULLETIN.BOARDS, DIRECT.DELIVERY, DOCUMENTATION,
                    EDITING, HOTLINE, INFORM.SCRIPTS, INTERCONNECTION,
                    and TELEX


Action?   check mail

  Invalid 'Action?' command.

Action?   check gte

  Invalid 'Action?' command.

Action?

Command?  check mail

  Board catalog.

Command?  scan

  Bulletin Board contains:

 No.  Delivered     From                  Subject
  Lines
   1 May 11 10:12 ADMIN                 New Software Announcement
     87
   2 Jul 16  8:30 CUST.SVC              TELEX DIRECT DELIVERY
     59
   3 Aug 23 15:45 CUST.SVC              New Customer Support Phone
Numbe    26

Command?  r 3
```

Posted: Thu Aug 23, 1984 3:42 PM EDT Msg: MGIE-1883-6257
From: CUST.SVC/NETWORKAPPL/TELENET
To: Intmail
CC: Cust.svc
Subj: New Customer Support Phone Number

On Monday, August 27, 1984, the Customer Support staff for all NA&T services will be moving to our new location in Reston, Virginia. This move has required us to change our Virginia phone number. Starting August 27th our new local Virginia number will be (703) 689-6056. Our 800 number, 800-368-3407, will remain the same.

Should an interruption in phone service extend into our normal hours of operation, our support staff will be available for assistance at the following numbers:

800-336-0437 or In Virginia call 800-572-0408

However, we do expect to have the process of moving our phones completed by August 27, 1984. Please do not not hesitate to contact us if we may be of assistance at one of the following numbers:

800-368-3407

or

In Virginia call - (703) 689-6056

Customer Support

Command? bye

This mail session is now complete.

INTMAIL DISCONNECTED 00 00 00:00:03:49 203 33
?

@disc

Sign on. Each user has a number and private access code.

Identifies user by nickname and number; date and time.

Users active at this time, identified by sign-on time, name, nickname and number.

Pending communications: here, two receipts and two messages.

Text of message.

```
W...ML
NAME OR #:194
CODE?[redacted]
NJIT ELECTRONIC INFORMATION EXCHANGE SYSTEM (060981)

MARK HEIMERDINGER (MARK,194) ON AT   7/ 8/81   2:20 PM EDT ON LINE 3

LAST ACTIVE:  7/ 7/81   9:13 PM
You have   5 Reminders.

SEN: 7/ 6/81   4:20 PM (MARK,194) : RECEIVED BY TOM REILLY (257)
LIST THOSE NOW ON-LINE(Y/N)?y
 0:  12:52 PM  RON GAUTREAU (947)
 1:   2:18 PM  JIM WHITESCARVER (JAMES,982)
 2:   2:16 PM  SANJIT CHINAI (JERRY,977)
 3:   2:20 PM  MARK HEIMERDINGER (MARK,194)
 4:  11:48 AM  CLAUDI DAUERMAN (CL,927)
13:   1:02 PM  CHARLTON PRICE (CHARLTON,116)
14:   2:17 PM  M LACHOWSKI AWAY TIL AUG (LAC,970)
17:   1:33 PM  ELAINE KERR (ELAINE,114)
WAITING:
2 CONFIRMATIONS
3 PRIVATE MESSAGES

ACCEPT ABOVE COMMUNICATIONS (Y/N/#)?y
PENDING:  M 14818  M 14825  M 14919

M 14800 RECEIVED BY MIRIAM MILLS (CASSIE, 960)  7/ 7/81 8:03 PM

M 14811 RECEIVED BY MICHAEL D. HILL (TELCO,685)  7/ 8/81 12:17 AM


M 14818 MIRIAM MILLS (CASSIE,960)  7/ 7/81  8:57 PM L:4
KEYS:/ADMINISTRATION ON AGING/RFP/

The Administration on Aging is sending out an FRP on training and technology.
It would seem that we could be quite competitive in a response to this.
With a combination of people from OSS and CCCC, we would have a handsome
group of experts.  Let me know what you think.


M 14825 WILLIAM SAVIN (BILL,203)  7/ 7/81 10:59 PM  L:5
KEYS:/PIXE/COSTS/

TO:  Mark, Toronto9

The particle-induced X-ray emission technique cannot be implemented commercially
to analyze abandoned barrels of unknown chemicals.  The costs are too great,
and the equipment is not really affordable by most places.
```

- EIES, Annotated -

Basic system options. Primary communication modes are messages, conferences and notebooks (file area).

Members of conference; also indicates number of items read by each member.

```
M 14919  PAUL RENFRO (TORONTO9,793)  7/ 7/81  11:55 PM L:5

TO:  Bill, Mark

I jsut read Bill's message about PIXE.  We have some people working on
cutting the costs here and hope to have some results by December which
will impact this area.

What is the lowest atomic weight you can detect with your equipment?
INITIAL CHOICE?

ACCESS TO:
  MESSAGES      (1)
  CONFERENCES   (2)
  NOTEBOOKS     (3)
  BULLETINS
  DIRECTORY     (5)
  EXPLANATIONS  (6)
  REVIEWS       (7)
  COMPOSITION   (8)
  MONITORING    (9)
INITIAL CHOICE?2

PRIVATE CONVERENCE:  FUTURE OF TELECOMMUNICATIONS (685)
YOU ARE THE ONLY MEMBER ACTIVE>
MEMBER STATUS (Y/N/A/O)?y
UP TO 461: MURRAY TUROFF (MURRAY,103)
UP TO 461: JACK AWAY 'TIL 8 JULY (JACK,112)
UP TO 461: ELAINE KERR (ELAINE,114)
UP TO 461: RICHARD E. STERN (RICHARD,115)
UP TO 459: CHARLTON PRICE (CHARLTON,116)
UP TO 461: ROXANNE HILTZ (ROX        <BREAK>
```

463 ITEMS. CC463 WRITTEN ON 6/28/81 10:33 PM

2 NEW TEXT ITEMS.
ACCEPT ABOVE ITEMS (Y/N/#)?y

KEYS:/ELECTRONIC NEWSPAPER/TIFFIN/

Is anyone familiar with the "electronic newspaper" which is to be established by the Tiffin (Ohio) ADVERTISER-TRIBUNE within the next few months? According to the only newspaper account I have seen, subscribers will be charged $5/month. It will offer a broader range of news than does the newspaper itself, and will be updated continuously. News will be available on-line 24 hours per day. Subscribers can use a Tandy Videotex terminal. People who already have home computers can buy an add-on box for $30 which will allow them to receive the newspaper. Apparently the newspaper will use a Viewdata format, with a hierarchical arrangement of indexes. Presentr will use Viewdata format, with a hierarchical arrangement of indexes. Present plans for offerings include stocks, late news and sports. Possibilities mentioned by the paper's officials include school lunch menus, meetings, local events, classified and retail advertising. It sounds promising. I'd appreciate more details if anyone has them.

C685 CC463 RICHARD E. STERN (RICHARD,115) 6/19/81 11:14 PM L:6
KEYS:/ELECTRONIC NEWSPAPER/
A: 462

MIS Week (6/17/81, p.15) carries a story on the electronic version of the Tiffin, Ohio Advertiser Tribune. Most details duplicate those reported in CC462. One additional point: current circulation for the six day a week paper is 11,500. The publisher projects that 600 users are needed to make the project economically viable.

ITEMS(#/#-#)?--

MARK HEIMERDINGER (MARK,194) OFF AT 7/ 9/81 10:25 AM

USED:	$0.00
PERIOD TOTAL:	$15.03
TIME USED:	1: 9
CUMULATIVE:	412: 2

Conference comments. Here, an enquiry about "electronic newspapers" and a response.

Signoff.

Data showing dollar amount for the billing period; time used for this use; time used since user ID was established.