The Computer Conference

An Altered State of Communication?

BY JACQUES VALLEE, ROBERT JOHANSEN, AND KATHLEEN SPANGLER

Using ordinary telephone lines, people can now join an invisible network and attend a conference that runs continuously, 24 hours a day, for as long as the participants want. After analyzing some 5,000 hours of such computer conferences, researchers at the Institute for the Future in California believe that this unique medium can create an altered communication state. By enabling people to escape the normal bounds of time and space, computers may thus provide an opportunity to create and explore new patterns of human expression.

The authors of this article are researchers at this Institute for the Future, in Menlo Park, California. The Institute is dedicated to systematic and comprehensive studies of the long-range future. We plan to publish more articles on the Institute's work, particularly in the area of computer conferencing.

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Most of us communicate intuitively. We greet each other every morning without any thought of the contracting muscles of our vocal cords, the atmospheric support of sound vibrations, or the semantic intricacies of our language—all of which are necessary for our natural, face-to-face communication process. Suppose, however, that we had to explain face-to-face communication to someone who had never experienced it. How would we explain, for example, the necessity to be within vocal and visual range of other people? What about the possibilities for "body language," for interpreting all of the subtle visual cues which accompany the vocal symbols of face-to-face communication? And how would you introduce vocal symbols to a person who has never depended on them to communicate? How do the social demand for immediate responses and our limited ability to remember words which vanish in the air define the nature of our communication?

Clearly, the task of explaining a communication process is staggering. Yet this is the task which we face in exploring the computer conference. Most of our intuitions about face-to-face interaction simply do not apply to this new and unusual form of communication. In computer conferencing, time

and distance are dissolved. Visual cues no longer exist. Each person's "memory" of what has been said is accurate and complete. And everyone may speak at once or listen at leisure. With such features, it is not surprising that computer conferencing might actually establish an altered state of communication in which the realities of face-to-face communication are distorted and entirely new patterns of interaction emerge. Our research team at the Institute for the Future in Menlo Park, California, has often experienced this altered state of timeless, placeless, remote communication during the past two years, as we developed and experimented with a family of conferencing programs. Our computerized communication system, known as FORUM, functions as an interpersonal medium for a variety of activities, including planning and forecasting, group conferencing, joint writing projects, electronic notepads (in which messages are stored in a computer instead of on paper), social simulations, and questionnaires. The system allows geographically separated people to communicate either simultaneously or on a delayed basis. We call these two basic usage modes "synchronous" and "asynchronous" conferencing. Participants do not need any technical expertise or even

previous experience with computers, though they use a standard computer terminal. All of these characteristics combine to create social conditions that differ from face-to-face communication in at least three important ways: (1) the physical environment; (2) fewer time and space limits; and (3) the various communication structures which are allowed.
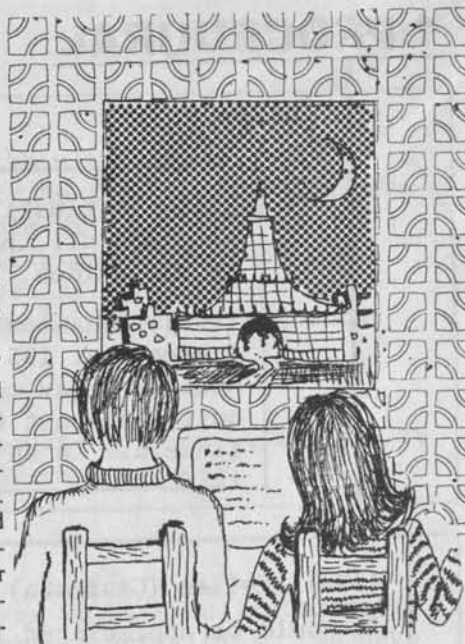
An Altered Physical Environment

Unlike face-to-face gatherings, FORUM gatherings are characterized by physical isolation of each participant. Alone with his terminal, each computer conferee depends on an unseen computer to communicate with his colleagues. All "conversation" must be typed on a computer terminal with a standard typewriter keyboard. As a result, accessibility and reliability of terminals, typing skills, and writing skills—factors which are not even considered in face-to-face meetings—all influence communication in a computer conference. For example, a slow or uncertain typist will probably become more selective in the questions he answers and in making his own contributions. On the other hand, many users have found that typing allows them to "give more consideration and focus" to their statements. Expressing ideas through a keyboard is not always a negative factor: Ernest Hemingway reportedly preferred a typewriter for developing dialogues even though he returned to longhand for narratives and descriptions.

The remote keyboard situation hints at some interesting changes in the ritual of "meeting" people. In a computer-based conference, there are no gestures, facial expressions, or vocal cues like pitch, intonation, pauses, or stress. In face-to-face communication, these cues often regulate the flow of a discussion; they also convey emotional feelings and attitudes toward other participants. FORUM greatly narrows this field of information, and many emotional messages simply seem to disappear.

When the sole context for "meeting" someone is through an impersonal keyboard and an equally impersonal printout, the person at the other end might seem inaccessible—a mere extension of the machine. Fortunately, this is not entirely true. Many of the messages ordinarily expressed in body movement or voice tones are translated into written form, either implicitly or explicitly. One conferee reported that "relationships were established easily, personalities came across, conversations could be established." In short, people can become recognizable personalities, even when their only means of expression is the printout of a computer terminal.

The computer itself is invisible in the communication process, but it may intrude upon the discussion in a couple of ways. First, a heavily loaded computer network may transmit messages irregularly. The resultant delay can be frustrating and confusing, since satisfactory communication usually depends on rapid feedback. This frustration is minimal, however, compared to the experience of a system "crash," when the computer stops and the terminal automatically prints out a message such as "DRUM FULL" or "HOST DEAD." (The "HOST DEAD" message created considerable shock among many of our users who attended computer conferences for the first time. A British researcher pointed out to us that a more gentle announcement, such as "HOST PASSED AWAY," might be less traumatic.) Unfortunately, we have had no control over network access or reliability.

Computer system failures are always annoying, but a failure in the middle of a conference dealing with intellectual and emotion-charged issues is devastating. Each person is suddenly and totally isolated in midstream; frustration is intense. A comparable situation in face-to-face communication might be the violent disruption of an assembly by armed bandits, or a sudden collapse of the building.

Alterations of Time and Space

When people in widely separated locations can interact at any time of day or night, their "real world" concepts of time and space are drastically altered. Most people have already had their sense of distance altered by the telephone, but FORUM further reduces the consciousness of distance since it typically costs no more to "talk" across thousands of miles than across ten feet.

Even more striking is the unique "suspended time" of a computerized conference. Participants may enter and leave the discussion at will, without risk of losing touch with the meeting. Time zones disappear since discussion can proceed without regard to the fact that one user is about to eat his supper in London, while a California user has just arrived at his office. If the London
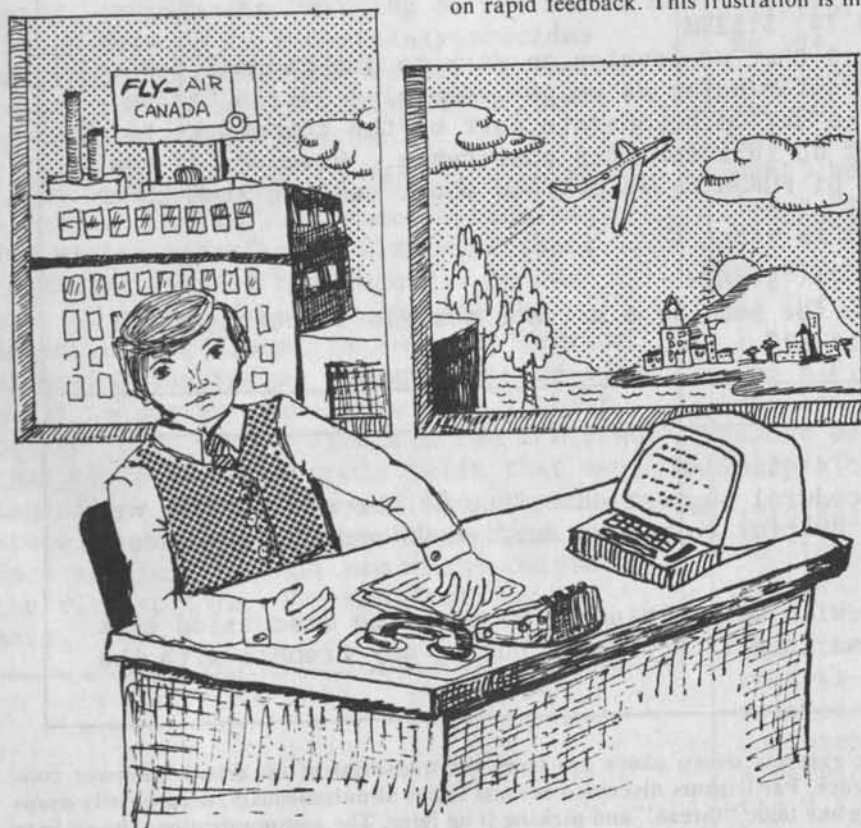
1. PROCEDURAL

2. SOCIAL

(195) Lipinski FRI 1 FEB 74 1:47 PM
Good bye all, have a nice weekend. I am going to do some work
in the garden.

(196) Johansen FRI 1 FEB 74 2:24PM
I hope that 195 does not mean that this will be taken as a 9-5,
Monday-Friday conference. Actually, the machine is usually
quite pleasant to use on weekends, and everyone is free to con-
tinue use in an asynchronous fashion as we have been doing.

(198) Kollen (Chairman) FRI 1 FEB 74 2:43PM

It would be appreciated if participants who are logging into the system
would be so kind as to offer comments concerning the agenda of this confer-
ence (the five points set down for discussion) and remarks about the discus-
sion of the present point 1. Thank you!

(199) Johansen FRI 1 FEB 74 2:57PM
I am not sure what was meant by 198, Jim. Does this mean you don't think we
are sticking to the topic, or does it mean you wish more people would make
comments?

(201) Johansen FRI 1 FEB 74 5:32PM
Several people have suggested that we develop an easy to use channel for col-
lecting responses to FORUM conferencing as we go--something like a "gripe
Mode." At present we need to set up a separate part of the conference to do
this, and I would rather not do this for this conference. However, if you
do have comments/criticisms of FORUM as we go, how about sending them to me
in the form of private messages?

(202) Johansen FRI 1 FEB 74 5:38PM
As a reminder, the procedure for sending a private message is contained in
entry 41, or you can just hit a ?.

(206) Johansen SAT 2 FEB 74 11:29AM
If I could make another procedural suggestion: since we are now working with
a basic agenda, it might be helpful to review entries 93 and 62, which de-
scribe that agenda.

        I am sure our chairman will keep reminding us when the discussion gets
off the track. Please let me know if anyone is having any trouble with the
review process in FORUM.

The excerpts shown above are from the transcript of an actual computer con-
ference. Participants discussed several topics simultaneously, occasionally drop-
ping one topic "thread" and picking it up later. The communications shown here
can be classified as procedural, social, or substantive.

3. SUBSTANTIVE

(192) Lipinski FRI 1 FEB 74 1:20PM
There is a danger of confusing the richest with the ultimate (see 189). In
fact, the end of the richness scale would probably be face to face with com-
plete visual and aural record, a very uncomfortable situation in some cir-
cumstances. Thus, for different transactions, different degrees of rich-
ness may be appropriate, and too much may be as bad as too little. Unless
one considers what kind of meeting one runs, there is a danger that data
will be collected across the scale of "richness"

(194) Lipinski FRI 1 FEB 74 1:39PM
There must have been reasons surely, beyond inadequate publicity, why the TV
conferencing was not a roaring success (in view of the savings).

(197) Kollen (Chairman) FRI 1 FEB 74 2:33PM
The answer to Mr. Lipinski's question in 192 is yes we have collected data
on how business trips are distributed across corporate activities. We have
10,000 questionnaires which have data on the following: (etc.)

(203) Johansen FRI 1 FEB 74 5:50 PM
To get back to the "spectrums of rich-
ness" question (I am afraid there are lots
of different threads to this medium),
wouldn't one end of the spectrum be tele-
pathy, or complete "merging of the minds"?
Though face to face certainly provides
multiple imputs simultaneously, I see no
reason to assume that this is the limit
of communication richness.

(204) Lipinski FRI L FEB 74 6:00 PM
I agree. In fact, science fiction has
3-d vision established firmly as their
communications of the future. In one
book of Asimov, the heroine and the
detective eat dinner in 3-d, the barrier
bisecting the table. However, there is
still no common space, now that I think
of it. Pity Gordon Thompson can't attend
this conference! I would think that merg-
ing of the minds is beyond the present
state of implementation; hence face to
fact remains, for all practical reasons,
the richest form of communications we
have.

(217)Kollen (Chairman) MON 4 FEB 7:09AM
Re 194. The Bell Canada Conference TV
Trial was just that, a trial. It was not,
and still is not, a market offering. It
was conceived and conducted as an experi-
ment; hence the comment about it not be-
ing a "roaring success" is not applica-
ble as far as I can see.

(218) Lipinski MON 4 FEB 74 7:42AM
Re 194. I think you are too defensive.
I hear (maybe Williams can comment) that
the B.P.O. teleconference is not a great
success either. Perhaps this is be-
cause we don't quite know why and how
people communicate.

(219)Kollen (Chairman) MON 4 FEB 8:06AM
Re 218. Andy, I think that you may be
right. Perhaps I overreacted to the
words "roaring success" because I felt
that there was no basis in E. Frohloff's
remarks which warranted that particular
criticism. Frohloff indicated that
Conference TV was an experiment and not
a service offering (as confravision in
the U.K.)

colleague unexpectedly joins the discussion while our Californian is busily entering his ideas, this "presence" suddenly adds a dimension of intimacy which restores the awareness of space and time.

Freedom from the constraints of time and distance can naturally reduce the obligation to communicate. No one is physically present, demanding a response. No ringing telephone demands an answer. There is only the knowledge that a conference is in progress and is available, at will, through the terminal. There are, of course, a number of motivations for joining: a need for information, the need to solve a problem, a professional sense of duty, or simply the desire to "be in touch."

Clearly, there are both advantages and disadvantages to such "self-activated" communication. A participant who is asked a question feels less pressure to respond immediately than he would in face-to-face discussion. He can take time to consult a library, review his own thinking, and present a well-prepared response. Still, this same lack of pressure may be an annoyance for someone who is eager to pursue a topic with an indifferent or preoccupied colleague; however, we have found that direct questions through FORUM have generally received prompt replies. And conference growth curves, which measure the number of entries, show that the majority of conferences have constantly or positively accelerated growth rates—an indication that the momentum of the conference can generate pressure to communicate. Nevertheless, the balance between motivation and lack of demand is strikingly different from face-to-face interaction. Thus, the communication might also evolve quite differently.

Altered Structures in Communication

Computer-based conferencing allows a great deal of control of communication structures. For example, users may send *public* messages, which are entered into the transcript and available to all, or *private* messages, which are sent to specific individuals and seen only by them. Functionally, the private message enables colleagues to "whisper" in the midst of a discussion without any breach of etiquette. In content, the public messages tend to be more formal than private messages, and more closely related to the discussion topic, while private messages include more personal interaction, sometimes quite unrelated to the main topic of group discussion.

Anonymous messages permit participants to state their views without divulging their identities—a possibility which does not exist in face-to-face meetings. Conferees have used this feature to express unpopular opinions, voice grievances, or make jokes in a way which is usually not possible.

A FORUM conference can vary from an open-ended discussion in which the topic is simply introduced and the discussion evolves without prescribed direction to a carefully preorganized discussion. In these more structured conferences, the FORUM program becomes a many-roomed meeting hall, dividing the conference into activities according to topic. For still more structured needs, FORUM will administer questionnaires or secret ballots and report the results.

In some ways, even the most unstructured computer-based conferences are more structured than face-to-face communication. FORUM discussions have been characterized by what appears to be a narrower range of topics, less diversion. from the subject, and more explicit decision-making than in face-to-face conferencing. On the other hand, it is difficult to compel a FORUM user to direct his comments. It is impossible to shout down or interrupt any other person in the "meeting." All participants may "talk" at the same time; the computer simply records the entries according to the time at which the user began typing.

Mapping the Altered State

We have now begun to "map" the altered state of communications that arises from the special characteristics of a computer conference—physical isolation, dependence on the computer, suspension of time and space, reduced obligation to communicate, and a new set of communication structures. Each communication medium is a unique instrument with characteristics all its own. Because we are most familiar with face-to-face voice communication, we tend to make it a standard by which to measure other media. But we must be careful not to overlook the innovative patterns and opportunities of a new medium by clinging to our preconceptions of what communication really is. Just as it would be unfair to judge a piano by the narrow range of the human voice, it is misleading to evaluate computer conferencing as a simple substitute for face-to-face communication.
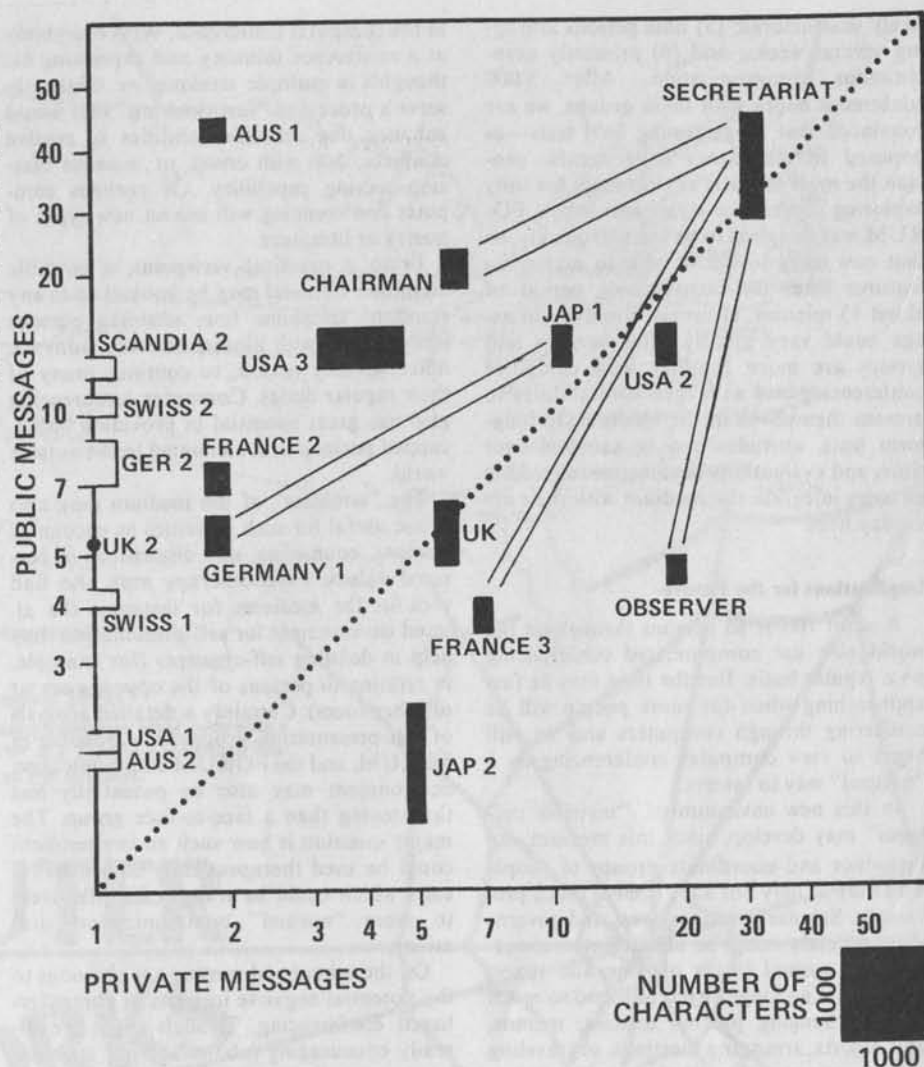
The social aspects of communications media have rarely been evaluated, and starting points are not easy to find. Perhaps as many as 50 researchers in the world are doing work on the social effects of different media in at least ten different locations. The theoretical basis for this work is rich, but scattered. The computer conferencing medium itself provides two powerful analytic tools for evaluating its social characteristics: (1) an up-to-date machine-readable transcript of every computer meeting is always available and (2) the computer can unobtrusively map interpersonal interactions to reveal patterns of communication among individuals, groups, and subgroups. Each of these points deserve elaboration.

1. A complete transcript of every computer conference is always available, current, and machine-readable. This transcript is automatically recorded exactly as it is typed, and members can review the record by subject, author, and date—during and after the conference. The possibilities for analyzing the content of the discussion are thus greatly improved over most other media. Using one analytic technique, we have classified entries by content, identifying them as regulatory comments dealing with the group process, comments on the substantive topics in the conference, humor, novel ideas, and similar classifications. In this way, we can evaluate a group's ability to focus on a particular task, and we can also determine where the time actually went.
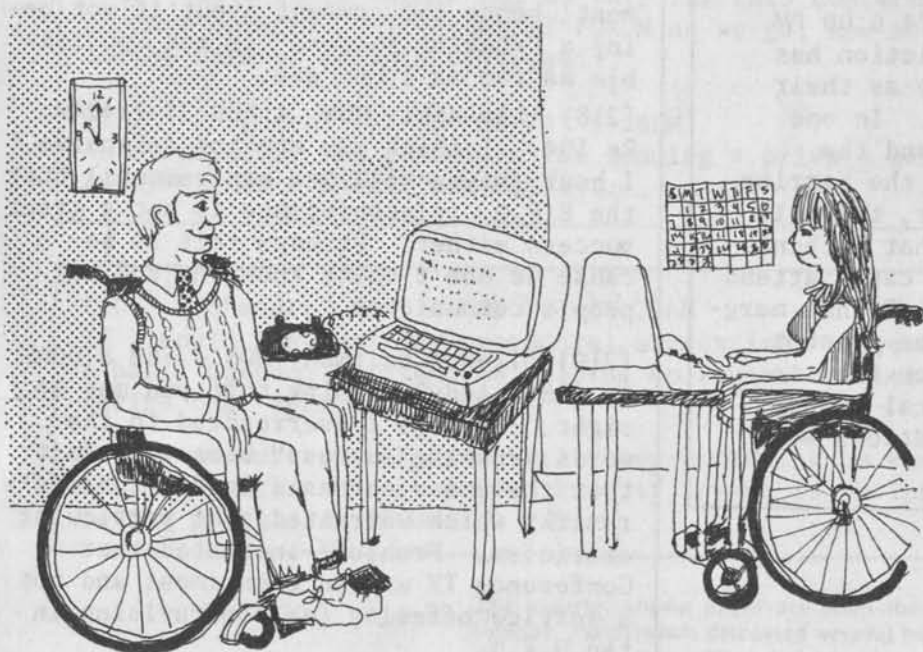
PARTICIPATION MAP FOR A SIMULATED COMPUTER CONFERENCE

This sample participation map was constructed with statistics *gathered directly* in a simulation of a computer-based international conference. In this test, the work of an International Telephone and Telegraph Consultative Committee Study Group was simulated by 18 graduate students at San Jose State University, assisted by several technical experts. The students played the roles of eight national delegations from which previous position papers were available. An analysis of user behavior with respect to negotiation and information exchange was then conducted. Rectangles represent each participant, indicating the number of private messages and public messages each has sent. The sides of the rectangles are proportional to the verbosity, defined here by the average length (in characters) of messages in private and public mode. This type of map can help define roles of participants; it also enables us to observe coalitions and subgroups and to track individual participation characteristics from one conference to another.

PUBLIC MESSAGES

50 — AUS 1

40 —

30 —

SECRETARIAT

20 — CHAIRMAN

SCANDIA 2   USA 3   JAP 1

USA 2

10 — SWISS 2

GER 2   FRANCE 2

7 —

UK 2   GERMANY 1   UK

5 —

4 — SWISS 1   OBSERVER

FRANCE 3

3 —

USA 1
AUS 2   JAP 2

PRIVATE MESSAGES

1   2   3   4   5   7   10   20   30   40   50

NUMBER OF CHARACTERS

1000

1000

The transcript also makes it possible to track specific discussion topics over time. We have thus identified a strong tendency for "threads" or "chains of thought" to occur in the conference transcript. These topic threads are frequently labeled ("re comment 13,"), but the tie is sometimes only implicit, requiring readers to review the earlier proceedings to find out what has been said on a particular topic. The review process is supported by the FORUM program: a participant can, for example, request the computer to search for any entries which mention a particular word, such as "energy." In general, our analysis of the topic threads shows that it is possible to discuss several topics at the same time, occasionally dropping one thread and then picking it up again later.

In addition to tracking the content of discussions, topic threads enable us to analyze the role that the different participants play. We find that some persons tend to introduce many new ideas, while others are best at developing them; still others function as synthesizers. The roles can vary greatly among persons and conferences, but we have noticed an apparent tendency for the "provocative" and "synthesizing" roles to be mutually exclusive. The provoker seems to push

the discussion forward into new areas of thought, while the synthesizer ties the loose strands together. By examining the patterns of a FORUM conference, one can easily identify both key persons and key ideas.

2. The computer itself can unobtrusively map many dimensions of the interaction that may or may not be evident from the transcript. The ability to map these interaction patterns within a conference may be the most powerful analytic tool inherent in any communications medium. This capability of the FORUM program means that the detailed coding and painstaking observation of interpersonal communication that social psychologists must typically carry out in analyzing small groups can be done automatically here, without disturbing the normal communication process. Comparative participation rates, growth curves, daily activity, and other related indicators create new dimensions for assessing group interaction. Private message statistics, for example, may indicate the formation of subgroups, cliques, or coalitions. Such statistics even allow us to trace individual participation characteristics from one conference to another, perhaps as a function of topic and task.

In addition to individual characteristics of participation, we can also evaluate group characteristics with growth curves. When plotted for the content categories, for example, these curves can indicate if and when the conference has made a transition from the procedural questions inherent in any meeting to the solution of substantive issues.

It is difficult to think of another medium in which an analysis of group interaction can be automatically and unobtrusively generated with this level of detail. At the same time, the privacy of the conference is not violated. The statistics about interaction can be compiled independently of the content of the conference; conferees must grant their permission before we can make any comparison of personal interaction and content.

We have evaluated over 25 conferences using these and more traditional analytic techniques (including interviews and questionnaires). In general, our user groups have had the following characteristics: (1) little familiarity with computer systems; (2) a genuine need to communicate with each other; (3) group sizes ranging from 3-20, but averaging about 5; (4) tasks which were rela-

tively unstructured; (5) time periods averaging several weeks; and (6) primarily asynchronous communication. After 5,000 conference hours with these groups, we are convinced that long-running field tests—as opposed to laboratory experiments—provide the most realistic environment for fully exploring conference styles and usage. FORUM was designed to be learned quickly, so that new users would be able to master its features after an introductory period of about 15 minutes. However, the styles of usage could vary greatly after persons and groups are more familiar with computer conferencing and with their own abilities to present themselves in the medium. In long-term tests, attitudes can be sampled over time, and evaluations become more credible as users integrate the medium with their everyday lives.

Implications for the Future

A scant 100 or so persons throughout the world now use computerized conferencing on a regular basis. But the time may be fast approaching when far more people will be conferring through computers and we will begin to view computer conferencing as a "natural" way to interact.

In this new environment, "invisible colleges" may develop, since this medium can introduce and coordinate groups of people who may or may not have been in touch previously. Scholars, businessmen, and government officials would be able to interact outside the normal limits of time and space; they would no longer need to spend so much time exchanging journal articles, memos, and reports, arranging meetings, or traveling to conventions in distant places.

Perhaps we can enhance group creativity through a new communications style, forged

in the computer conference. With everybody at a conference thinking and expressing his thoughts in multiple streams, we might observe a process of "fast thinking" that would enhance our collective abilities to resolve conflicts, deal with crises, or improve decision-making capability. Or perhaps computer conferencing will spawn new types of poetry or literature.

From a practical viewpoint, a portable computer terminal may be hooked up to any standard telephone line, enabling persons immobilized with illness, or away from the office for any reason, to continue many of their regular duties. Computer conferencing also has great potential in providing handicapped persons with a channel to the outside world.

The "coolness" of the medium may also prove useful for such activities as encounter sessions, counseling, and discussions of personal values. Psychotherapy may also find uses for the medium: for instance, the altered environment for self-presentation may help in defining self-concepts (for example, in relating to persons of the opposite sex or of other races). Certainly a detailed analysis of self-presentation processes is possible in FORUM, and the FORUM communication environment may also be potentially less threatening than a face-to-face group. The major question is how such an environment could be used therapeutically to obtain results which could be transferred effectively to more "normal" communication situations.

On the other hand, we are not oblivious to the potential negative impacts of computer-based conferencing. Though costs are already encouraging (about $15 per terminal hour on a commercial computer network, with further cost reductions anticipated), computer conferencing is not yet a medium

for the masses. And a type of electronic elitism is certainly a possibility as long as terminals and network access remain the privilege of a few.

Could computer communications replace much—or all—face-to-face contact? At present, "human contact" usually means being together "in person." For some people, the mere thought of a communication medium in which human bodies (or even voices) are irrelevant is frightening. Isaac Asimov, in his novel *The Naked Sun*, and E. M. Forster, in his 1929 story *The Machine Stops*, offer- nightmarish projections of a future in which electronic communication replaces human contact as we now know it. Our research team has examined computer-based conferencing as a supplement to face-to-face communication, not as a replacement, but long-term negative possibilities deserve attention, if only so they can be avoided.

Our studies to date indicate that computer conferencing has unique potential for enhancing the exchange of ideas among people. In current field tests, we are exploring its usefulness in bargaining and negotiation, conflict resolution, crisis management, and some educational applications. However, as should be clear from this article, our work should only be viewed as a foot placed in an interesting door. We are convinced that this medium will change quickly and that it should not be evaluated by narrow criteria. We believe as well that the potential of computer-based communication remains largely unexplored.

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