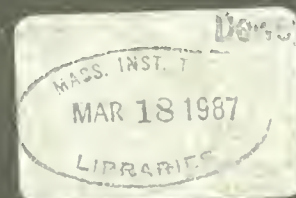


BASEMENT



HD28
.M414
no.1794-
86
1986b



**Electronic Organization
and Expert Networks:
Beyond Electronic Mail
and Computer Conferencing**

Chandler Harrison Stevens,
Visiting Fellow
MIT

90s: 86-021

Working Paper

Management in the 1990s



Massachusetts Institute of Technology
Sloan School of Management



**Electronic Organization
and Expert Networks:
Beyond Electronic Mail
and Computer Conferencing**

Chandler Harrison Stevens,
Visiting Fellow
MIT

90s: 86-021

May 1986

Sloan WP #1794-86

©Chandler Harrison Stevens, 1986

Management in the 1990s
Sloan School of Management
Massachusetts Institute of Technology

Management in the 1990s is an industry and governmental agency-supported research program. Its aim is to develop a better understanding of the managerial issues of the 1990s and how to deal most effectively with them, particularly as these issues revolve around anticipated advances in Information Technology.

Assisting the work of the Sloan School scholars with financial support and as working partners in research are:

American Express Travel Related Services Company
Arthur Young and Company
British Petroleum Company, p.l.c.
BellSouth Corporation
Digital Equipment Corporation
Eastman Kodak Company
General Motors Corporation
International Computers, Ltd.
MCI Communications Corporation
United States Internal Revenue Service

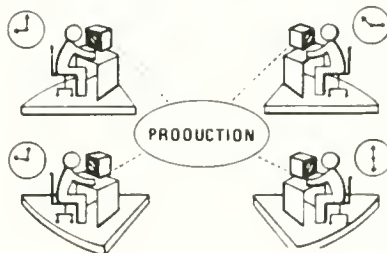
ELECTRONIC ORGANIZATION & EXPERT NETWORKS

Beyond Electronic Mail and Computer Conferencing

Chandler Harrison Stevens, Ph.D.
Vice Chairman, Network Technologies International, Inc.,
315 West Huron, Ann Arbor, MI 48103
Visiting Fellow, MIT Sloan School, Management in the 1990s, 617/253-0585

Note 1
JOE, AUGUST 1 9 00
We're having a problem in
production

(Harry reads discussion
but does not comment)



Note 2
MARY, AUGUST 1, 11 15
Delivery of a part has been
delayed by our supplier

Note 3
JIM, AUGUST 2 6 00
I have a lead on another
supplier—I'll check them
out

Horseless Conferencing

We are at the horseless carriage stage in the development of Computer Aided Communication (CAC). Familiar terms of pre-computer communication such as "mail" and "meetings" are used to describe forms of CAC. Those terms are misleading. Words such as "organization" and "networking" do not conjure up as clear images, yet those terms come closer to describing the real power of this medium. No terms borrowed from the past can fully define CAC. Nevertheless, the main purpose of this paper is to explain why electronic organization and expert networks are more powerful than familiar CAC forms, such as electronic mail and computer conferencing.

The essence of this new medium is unlike any previous form of communication. Although mainly textual, CAC is less formal than most other writing and in fact seems more like talking. That is partly due to the fact that computer storage makes it unnecessary to set the context for any contribution to a continuing group dialogue. The comments before and after any single comment establish an easily referenced context.

This medium is more interrogative than declarative. Interacting more than expounding becomes the norm. Questions are often asked. The best answers frequently come from surprising sources. An unknown peer with a relevant experience can sometimes provide better help than a more famous expert, who may be less accessible or less articulate.

Interactive CAC requires norms that differ from both written and oral norms of the past. Though seeming more like talking than writing, CAC lacks visual cues such as body language. Those most skilled in using this new medium are developing new signals. For example, Lisa

Carlson, founder of the Electronic Networking Association, sprinkles her text with signals like "<grin>" in order to compensate for lack of eye contact and voice inflection.

Personal habits and cultural norms only change if the payoff seems high enough to motivate making such changes. The greatest payoff may be the collective wisdom that can be derived from this medium. The closest off-line analogy may be found in the religious Meetings held by the Society of Friends. The thread of comments made by Quakers, having the benefit of silent meditation between comments, can yield greater wisdom than is typically found in any sermon by an individual preacher. The store-and-forward nature of most forms of CAC allows for a similar type of mulling over that is not possible in more traditional types of synchronous, face-to-face interaction.

Yet, online interaction, even when not contemporaneous, is more time-effective because of the convenience of not having to coordinate individual schedules in order to communicate. There is no wasted time of the sort experienced in telephone tag (on the average, five business calls are attempted for every one that is completed), in traveling long distances to meetings, or in having to repeat what is conveniently retained online.

The dominant electronic metaphors for some years to come may continue to be "mail" and "conferences" in order to attract the uninitiated to CAC as a substitute for those more familiar forms of communication. However, once online, their new experiences can better be characterized by less familiar-sounding phrases. They will most likely use electronic organization more than electronic mail, and expert networks should prove to be more useful than computer conferences.

Levels of Computer Aided Communication

If you were to tell me that you use CAC, I would want to know how deeply you have gotten into using that medium. Are you a CHAT user? Do you use e-mail? Do you access electronic bulletin boards or take part in computer conferences? I would be surprised if you have experienced many-to-many communication, electronic organization, or expert networks, even though such systems now exist.

You would need definitions of these CAC system levels before you could readily say how deeply you would want to go into this online world. And the deeper you go, the more like a world it seems to be.

In order to emphasize key CAC features, the following list of eight system types are represented as increasingly deeper levels, which subsume whatever features are introduced at previous levels. Each successive level is characterized by having a key feature that previous levels lacked.

1. Chat Systems Have Distance Independence

The simplest construct on the continuum is the chat system. Participants can be geographically dispersed. As long as they are tied into the same computer and the same software they can chat. Chat systems tend to be confined to trivial communications since the participants are restricted to short textual messages typed in while the other party waits online for a response.

2. Electronic Mail Has Time Independence

As the requirement for contemporaneous interaction is relaxed, one moves to electronic mail. Now time (like distance previously) is removed as a constraint in getting notes communicated, mostly on a one-to-one basis. Notes can be more thoughtful in that they can be longer, and composed and sent at the leisure of the sender. They can also be absorbed better by being read at the convenience of the receiver.

3. Bulletin Boards Have Shared Topic Files

There are now more local electronic bulletin board systems in the United States than there are daily newspapers. This next

step on the continuum adds the ability to store notes under various topic headings. These shared topic files facilitate broadcasting of notes on a one-to-many basis.

4. Computer Conferencing Has Topic Joining That Forms User Records Marking Notes Read

Computer conferencing differs from bulletin boards by allowing users to join topics. This topic joining action establishes a user record that keeps track of what notes a user has seen in any topic joined. Each time a user accepts new notes in that topic, his note marker is advanced so that, in future online sessions, only new notes will be delivered to the user. Conferencing systems differ as to whether delivery is automatic or not and whether joining is forced or not, but all conferencing systems include note markers.

5. Many-to-Many Communication Has Topic Branching That Forms Groups Easily

Many-to-many communication systems have topic branching as a key feature not found in earlier conferencing systems. These systems allow participants to form special interest groups spontaneously as subsets of larger groups. Groups of any size quickly convene from among the many. They see short notes signaling the opening of topics that relate to other topics they previously had joined. They choose to join those new topics or not. No delays from system operator intervention are required, as is the case for conferencing systems that support relatively fixed groups.

6. Electronic Organization Has Access Controls

Organization is determined by how information is channeled among organization members. Electronic organization becomes possible when flexible and powerful access controls are superimposed on a many-to-many communication system. The introduction of electronic mail systems often have had unpredictable effects on the structure and operations of organizations. Desired organizational effects can be planned and obtained when using more advanced electronic organization systems. Users do not think of these systems as generic Computer Aided Communication systems but rather as molded to more specific organizational purposes, such as project coordination, sales management, or customer service.

7. Expert Networks Have Knowledgebase Editing

Not all economic, political, and social activity is carried on through formal organizations. More and more work is being done by less organization-dependent professionals. They earn their pay based upon their expertise, which has to be renewed mainly through networking with their peers. By simply adding knowledgebase editing tools to an electronic organization system, we get the basis for developing and supporting expert networks in any number of professions. Expert networks include tools for purging or archiving the least referenced notes, tools for moving subtopics so that they are better indexed under standard topic categories, tools for modifying topic openers to summarize notes that follow, and tools for keyword search.

8. Participation Systems Have Integrated Decision Tools Into CAC

Decision support systems for financial analysis and business planning ushered in the era of online computer end-users about two decades ago. The earlier wave of computer users, the programmers, when compared to this second end-user wave, was small. Similarly now the third wave of computer users, the communicators, will make those decision support end-users look small in number. The most powerful CAC systems of all will have integrated into them easy access to tools used by the earlier two waves of computer users. Polling, modeling, interactive graphics and links to voice and video inputs and outputs will characterize these participation systems.

I have been among those working toward the development of such systems throughout the seventies and the eighties. I do not expect such participation systems to emerge fully until the nineties. In the meantime, while we wait for fully integrated participation systems to be developed, there is much to be gained now by applying electronic organization and expert networks to support businesses and professions.

Participation Systems Incorporated as an Example of Electronic Organization

Participation Systems Incorporated (PSI), now part of Network Technologies International, Inc. (NETI), electronically coordinated its business using the organization system which

it developed and markets to other businesses. Some industry observers who do not make the distinctions among system levels as discussed in the previous section of this paper refer to this system as computer conferencing. Others view it as enhanced electronic mail.

The system known as PARTICIPATE (R) incorporates powerful electronic organization features. About twenty access control switches can be set for any participant for any topic. There are a half dozen standard combinations of these switch settings, even though thousands of access switch combinations are possible to help shape highly specialized applications. Most PARTICIPATE users are participants whose actions consist of reading and writing notes in topics that they join. Approximately 10% of those participants eventually initiate topics. Less than half of those take advantage of PARTICIPATE's access controls to become more full-fledged topic organizers. As topic organizers they create branching topic structures and set access controls for the topics within those structures.

Consider, on the first computer screen shown on the next page, the notes in my PARTICIPATE Inbox as they appeared on October 10, 1985. During that particular online session, I had 31 new notes waiting to be read. All but the three personal notes addressed to me by name fell within 13 topics among hundreds I previously had joined. These topics happened to have come from several levels of a topic structure which began as:

"PSI"
"ADMINISTRATION AND FINANCE"
"SYSTEMS DEVELOPMENT"
"MARKETING AND SUPPORT"
"ONLINE SERVICES"

Only PSI's president could open new "PSI" subtopics, which in effect would reorganize the company. However, all PSI employees could write notes in the "PSI" topic, when what they wanted to say did not fit into existing corporate divisions (i.e., "PSI" subtopics) or into lower-level topics within those divisions. They could also open new topics within their own divisions of PSI.

In my Inbox as shown below, there are three new notes in the "SYSTEMS DEVELOPMENT" division and one new note waiting within the "MARKETING AND SUPPORT" division of PSI. There are no new notes in dozens of topics not shown, including "ADMINISTRATION AND FINANCE" and "ONLINE SERVICES" at the PSI division level.

Copyright (c) Participation Systems Inc. (PSI), 1985.
ALL RIGHTS RESERVED
"PARTICIPATE" and "PARTI" are trademarks of PSI, Winchester, Massachusetts.

SEGMENT NAME (# OF NOTES)

- 1 Urgent Notes (8)
- 2 Personal Notes (3)
- 3 "SYSTEMS DEVELOPMENT" (3)
- 4 "MARKETING AND SUPPORT" (1)
- 5 "CUSTOMERS" (1)
- 6 "PRIORITIES" (8)
- 7 "POTS MANAGEMENT" (1)
- 8 "VM" (1)
- 9 "KODAK" (1)
- 10 "DEC INTERNAL" (1)
- 11 "JAPAN" (2)
- 12 "FEEDBACK" (1)
- 13 "WANG" (3)
- 14 "AMIGA" (4)
- 15 "TELL THE BOARD" (1)

ACTION on 31 Inbox Notes==> (Read) 11 █

"JAPAN" by MIKE, Aug. 5, 1985 at 13:57 Eastern (8 notes)

==== Branching off of "JAPAN" as note 7 of 8 ====

"KANJI VMS" by MIKE, Oct. 9, 1985 at 11:28 Eastern (145 characters & 1 note)

this is for the discussion of translation of PARTI to Kanji-VMS. Pls see note number one which an explanation of where we stand with DEC-Japan.

ACTION on "KANJI VMS" 8 (of 1)==> (Join) no

==== Branching off of "JAPAN" as note 8 of 8 ====

"KANJI UNIX" by MIKE, Oct. 9, 1985 at 11:33 Eastern (144 characters & 8 notes)

This conference will be for discussing and coordinating any efforts to build and market a Kanji UNIX version of PARTI with Japanese partner(s).

ACTION on "KANJI UNIX" 8 (of 8)==> (Join) n

ACTION on "JAPAN" 8 (of 8)==> (Next) 5-6 █

5 (of 8) KEN Sep. 6, 1985 at 16:39 Eastern (461 characters)

George, I too read Mike's material on conversion to Japanese and other oriental languages, and I agree with your conclusion that a full-screen interface dependent upon cursor positioning and field fill-in is the way to go. While line-mode Kanji (I think the preferred transliteration) seems possible, it would probably be so user-unfriendly that it would be unusable.

We probably would have a fair amount of reprogramming to allow Kanji topic and user names.

ACTION on "JAPAN" 5 (of 8):: (Next)

6 (of 8) GEORGE Sep. 9, 1985 at 11:18 Eastern (482 characters)

I don't think topic and user names per se would be any problem, once we work out the techniques to get them to and from a terminal. After all, we're just talking byte-stream, and (in terms of number of bytes) they're in fact much likely to be shorter than our current maximums. Since a character is represented by two bytes, and represents a whole word, not too many names will exceed 8 or 18 bytes.

ACTION on "JAPAN" 6 (of 8):: (Next) █

A prior note under "MARKETING AND SUPPORT" had opened the "CUSTOMERS" topic, where this Inbox now shows still another note to be waiting. By typing 11, I skip down to the 11th segment of my Inbox to see what is waiting for me in the "JAPAN" topic. If I had accepted the default READ action that was showing before I typed 11, then I would have simply read all of my waiting Inbox notes in the order listed in the Inbox menu. PARTICIPATE is sometimes referred to as the one-button system, because newcomers may choose always to press the ENTER or RETURN key and thereby take whatever action is suggested at each prompt.

Upon entering the "JAPAN" topic, we see by its topic header that it was started two months ago by MIKE, PSI's Vice President Michael Keehan. (His role in PSI would be shown if we were to type PROFILE MIKE). On this particular day, MIKE is in Japan and has just opened two new subtopics shown on this second screen. His topic openers are kept brief. He noted that further information can be seen about his talks with Digital Equipment Corporation (DEC) to translate PARTICIPATE (which is here referred to by its nickname, PARTI) into Japanese to run on DEC's VMS operating system. If I had typed READ 1 or R 1 or simply 1 at ACTION on "KANJI VMS", I would have seen the note 1 which Mike mentioned as containing further information.

If I had pressed the ENTER or RETURN key, I would have accepted the default or suggested action to JOIN "KANJI VMS" in order to receive future notes in my Inbox under this topic. Instead I type "no" in response to the suggested JOIN action. Then I type "n" for "no" again when prompted to JOIN another new "JAPAN" subtopic called "KANJI UNIX". Finally, as shown on the second screen in this example, I decide to type 5-6 to look back at the previous two notes that had preceded the "KANJI VMS" and "KANJI UNIX" subtopics that I just saw as appearing as branching notes 7 and 8 in the "JAPAN" topic.

The third screen shows that it has been a full month since any new notes had appeared in the "JAPAN" topic. In notes 5 and 6, I am reminded that KEN and GEORGE had resolved a programming issue that may face them in converting PARTICIPATE from English to Japanese.

George Reinhart works mostly in his home in Allentown, Pennsylvania, while Ken Freeman, who reports to George, is based at corporate headquarters now in Ann Arbor, Michigan. Their dialogue, as shown on screen three of this example, is typical of how PSI coordinated work — in this case with Mike being halfway around the world and Ken and George being their usual several hundred miles apart.

CAC = Costs Down & Revenues Up

What motivates the introduction of Computer Aided Communication are not the features as described thus far. Generic systems ranging from electronic mail to electronic organization are only well received if they produce desired results. Since mostly corporations pay the bills for the hardware, software, and personnel needed to support such systems, the results that count most for businesses are results that improve their bottom lines — profits — and their top lines — revenues. Therefore, it is to be expected that, ten years from now, it will not be generic systems for e-mail or e-organization that will be seen to have succeeded. That supply-push or technology-fix view will get displaced by the demand-pull view that will emphasize cost-cutting and revenue-generating.

The demand-pull applications that participants will use more and more will leave e-mail and computer conferencing in the dust. These generic systems are already evolving into specific tools for such purposes as:

- I. Project Coordination for increasing
- II. Sales Management productivity &
- III. Customer Service cutting costs

- IV. Online Marketplaces for generating
- V. Interactive Journalism new revenues &
- VI. Distributed Education new businesses

- VII. Organization Building at both the core
 (e.g., Information Centers) and the
 periphery (e.g., Quality Circles)

In what follows, we consider what each of the above seven solutions entail. These solution descriptions are based largely upon PSI's experience with nearly three dozen installations of its PARTICIPATE software and upon solutions design work that has been done with other prospective PARTICIPATE licensees.

I. Project Coordination

A corporation's Vice President for Research and Development or Product Planning and Development might send a topic called "R AND D" to his project managers to aid in coordinating their projects. Branching off that topic would be subtopics, each relating to a different current project. The topic opener for any particular project would be sent by that project manager not only to "R AND D" but also to the individuals assigned to perform key

roles in carrying out that project. These project participants do not have access to the higher-level "R AND D" topic addressed only to project managers.

The V.P. of R and D might stay informed about the status of each of his division's projects simply by reviewing the project topic openers. Project managers might be required to update their topics each week to reflect the latest summary of interaction. In each project topic, the V.P. could be given read-only access so that (a) he would not get drawn into project discussion details and (b) he could easily monitor project progress. The V.P. could discuss with project managers such progress either through private messages or in the "R AND D" topic whenever other project managers should know what he is suggesting or directing one or more of them to do. Such access controls may vary depending upon the management style of the V.P. or overall corporate policy about how project coordination is to be done. In less hierarchical firms, matrix management may preclude the V.P. from monitoring details.

Under the parent topic for any particular project would usually be a "SPECIFICATIONS" subtopic that key project participants would be able to read but not write into. Task subtopics would normally be such that key participants could write as well as read notes aimed at coordinating their respective efforts in completing such tasks.

Outside consultants may be addressed in just those topics where their expertise is needed. Ordinarily, they will not be given access to other topics where proprietary discussions among corporate insiders take place.

Project participants need not wait for infrequent meetings in order to coordinate their project actions with those of other team members. Assignments are given and adjusted easily by the project manager online. Information overload is avoided by joining just that combination of topics that relates to responsibilities for achieving project objectives. Newcomers to any ongoing project get up to speed quickly by reviewing the project's history as detailed online.

II. Sales Management

Depending upon how large a corporation is and how it is organized, electronically and otherwise, sales management may be part of a topic structure that also includes marketing and/or customer service. In any case, major

subtopics under "SALES MANAGEMENT" are likely to relate to "PROMOTION," "LEADS," "PROSPECTS," "CUSTOMERS," and "COMPETITION."

The "PROMOTION" topic may have as its subtopics the major sources for generating sales leads such as "ADVERTISING," "PUBLIC RELATIONS," and "TRADE SHOWS."

The "LEADS" topic may be organized geographically to aid branch offices or headquarters-based sales staff in making follow-up visits to qualified leads.

The "PROSPECTS" topic most likely would have subtopics with topic names of the organizations which are the best potential customers. Notes under "PROSPECTS" subtopics would track progress towards closing sales and, in particular, help avoid redundant or conflicting efforts by headquarters staff who manage national accounts and by field staff who sell to subdivisions of national organizations. Valuable sales tips emerge from within these topics. The time usually required to bring a new product to market may be considerably reduced through networking among salespeople about what they are learning in the field when they first try selling such a new product.

Once prospects become customers, then their particular topics can be detached from "PROSPECTS" and placed under "CUSTOMERS." In that way, customer service staff has the advantage of knowing the history of pre-sales work that may indicate what the customer expects in the way of post-sales service.

"COMPETITION" tracking can often be done better by field sales and service staff than by any other means. Early warnings about competitive pricing and product changes are especially valuable. So, obviously, the major subtopics under "COMPETITION" are likely to be identified by the names of competitors. These competition topics may be written to by both market research staff and field staff, or subtopics may be set up so that it would be clearer who may be writing only hearsay about competitors and who is writing validated facts.

III. Customer Service

Putting key customers online is one of the most promising solutions, but it also may be one of the most difficult in that it tends to conflict with certain pre-electronic norms that suggest that customers should be buffered well from each other and even from employees other than account managers within the selling organization. Fortunately, electronic

organization systems are sufficiently equipped now with flexible and powerful access controls so that online customer service solutions can be developed to meet whatever access norms are desired.

Customer feedback is perhaps the most valuable, yet most untapped, source of market research information that there is for any company wanting to develop products and services that are more responsive to customer needs. Electronically, customer feedback can now be organized so that

customer inquiries are answered more quickly and more completely, without duplication of effort, as found in other systems, such as phone hot-lines

customer complaints are not only answered well but also organized online so that in ombudsman-fashion patterns are recognized to trigger systemic changes

customer suggestions also get organized online so that redundancy is reduced and collective wisdom emerges from the synergy developed among customers

Bolder use of electronic organization for customer service purposes leads not just to greater service productivity and therefore lower costs but also to new sources of revenues. A logical extension of many current businesses would be to offer customers value-added online services to facilitate information exchange among them about product applications, etc.

This approach is most likely to be taken first by companies that already support what they refer to as user groups. For example, one computer company is already using electronic organization to support one of their product-area user groups.

IV. Online Marketplaces

New businesses are being formed to manage online marketplaces (e.g., one specializing in the diamond trade). Major banks, publishers and retail organizations are establishing new online marketplace services (e.g., new joint ventures of Citibank and McGraw-Hill and of IBM, Sears, and CBS). Some so-called videotext marketplaces are not interactive enough to fit within our definition of CAC. The most interactive online marketplaces use the flexible access controls of electronic organization and the topic branching of many-to-many communication to organize

exchanges for particular classifications of markets.

The online marketplaces that are most likely to succeed at first will be for commodities that are expensive and able to be described textually. Potential buyers, potential sellers, dealers, and financiers may all take part in online marketplaces. However, non-repeating buyers or sellers may not be as likely participants as brokers, unless they have sufficient reasons for using the same CAC systems for other purposes as well.

V. Interactive Journalism

A new profession of interactive journalism is emerging. Mike Greenly, who uses PARTICIPATE on The Source to report on trade shows, political conventions, and issues such as the AIDS disease, has been characterized as "planet Earth's first interactive journalist."

Interactive journalism differs enough from standard journalism so that some word other than "journalism" will probably evolve. Some interactive journalists will write stories and reports, but more of them will serve as catalysts for their readers to contribute their own writings to interactive journals on various subjects.

Feedback techniques have been developed in order to involve previously passive audiences. For example, a current issue concerning some area of public policy can be explored by means of an issue ballot. The questions on such a ballot are designed to provoke people to think about the issues just as the philosopher Socrates did when he asked people questions.

Once participants respond to feedback questions posed within an issue ballot, some may be stimulated to express their thoughts in free-form notes they write within whatever topic structure has been prepared by the interactive journalist. Just as the thoughtful comments made by Quakers during their otherwise Silent Meetings tend to be better than sermons, so also may the collective wisdom stimulated by an interactive journalist be better than the expounding of more traditional journalists.

VI. Distributed Education

Degree-granting colleges now offer courses using computer conferencing and more advanced systems designed to support many-to-many communication and expert networks. Less

traditional approaches to distributed education are being taken by new businesses that are created just for this purpose.

This technology allows for educational formats that extend well beyond off-line approaches to learning. Electronic lectures, better known as "electures" are much more interactive than traditional lectures. For example, every few days on The Source over a period of one month, Harvard Sociology Professor Daniel Bell entered about 3 pages of an article he was drafting. Following Dr. Bell's text then were a series of Socratic, dialogue-stimulating questions in an online ballot, to which quick numerical responses could be given and then tallied by the computer. Dialogue among the online lecture attendees was stimulated by Dr. Bell's text, by the feedback questions developed by lecture moderator Dr. Irving Lerch, and by the balloting tallies showing opinion patterns.

Another online educational format is the networkshop, which provides an evolving topic structure within which potential learners may find enough specialization to satisfy their interests. A "WRITERS NETWORKSHOP" organized by Sharon Lerch offers budding authors a chance to learn from experts and peers about "FICTION," "POETRY," "BIOGRAPHIES," "SCIENCE and FICTION," to have their sample writings critiqued online, and to recruit and work with co-authors online.

Online "SUPPORT GROUPS" organized by Dawn Debbe and others help people lose weight, stop smoking, cope with divorce, and understand problem children. The dilemma of pre-electronic norms was seen when an online psychologist decided that professional ethnics would prevent him from starting online problem-solving support groups, because he may not see peer advice before that advice may get acted upon. In face-to-face support groups that he facilitates he can immediately offset any bad advice he hears being exchanged among peers. He then concluded that he could conduct similar online educational sessions as long as the participants were anticipating problems they may later run into rather than discussing their current problems. This suggests a definition for education as being information exchanged at a time not immediately needed for problem solving. In any case, online support groups, whether professionally facilitated or not, have proven to be popular and helpful to participants.

Education and training are today among the fastest growing forms of business. Distributed education removes many educational barriers and

therefore represents even greater marketplace potential.

VII. Organization Building & Community Building

Initial solutions via Computer Aided Communication within corporations are likely to be motivated by specific cost-cutting or revenue-generating purposes, in order to justify costs of introducing such systems. It is equally important, however, that

organization building

be recognized as at least a secondary purpose, whenever CAC is introduced for some primary purpose such as

project coordination, sales management, or customer service to improve productivity and cut costs; or

online marketplaces, interactive journalism or distributed education to provide added value and generate revenues.

While cost-cutting and revenue-generating solutions motivate the introduction of this technology, its more sustained use requires recognition by top management that their organizations will be changed and can be strengthened — only if they personally become involved in its use. The organizational changes that will occur, if not to top management's liking, can doom the sustained use of CAC and otherwise harm the organization.

Top management may not have to go online themselves, although their doing so would make CAC success in their organizations more likely. Print extensions of CAC can and do facilitate involvement. For instance, in one large company, out of over 10,000 computer conferencing users, nearly 80% participate through print extension as so-called batch users, who seldom if ever go online themselves.

Lack of keyboard dexterity is no excuse for non-involvement by top management. When the head of a large bank looked down at a keyboard for the first time, he observed, "The keys aren't even in alphabetical order." He need not worry, since many-to-many communication is not like one-to-one mail where writing is done almost as much as reading. Whether or not he ever touches those keys, he can get what he needs to manage well from CAC.

Electronic mail sounds like something that top management might think should be relegated

to their Mail Room. Electronic organization, by definition, cannot be ignored by executives.

So, when the V.P. of R&D decides he wants to use CAC for purposes of project coordination, sooner or later the Chief Executive Officer (CEO) must be sure his Director of Management Information Systems (MIS) and his Director of Human Resources become involved in organization building by using CAC.

MIS and human Resources are the two corporate-level types of support that are most needed in order to assure the long-term success of CAC, even if introduced at first in some division such as R&D, Sales & Marketing, or some product or service division of a corporation.

Information Centers, which are now seen as important to the future development of most MIS departments, need CAC to succeed. Quality Circles or other approaches to improving employee involvement, similarly, can use CAC to make corporate Human Resources programs more successful. And, the interconnecting of Information Centers at the core of any corporation with Quality Circles on the periphery may prove to be what top management now refers to as a Critical Success Factor. Employee involvement programs quickly lose credibility if the the output from such efforts is not used as input for strategic planning by the CEO and other members of top management. This interconnection between central strategic planning and employee involvement programs can be clearly established through MIS-supported Information Centers.

An Information Center might choose to experiment with electronic organization to support its own Help Desk function before corporate-wide organization building is taken on as a CAC application. Personal computer users throughout any corporation turn to their corporate Information Center for assistance in using software packages and in accessing corporate databases. The Center's Help Desk typically uses phone hot-lines to answer questions from computer users spread through their organization. The Center also typically holds training seminars about hardware, software, and databases. The Customer Service and Distributed Education solutions, discussed previously in this paper, can readily be applied to improving any Information Center's Help Desk operations. Through that experience, an MIS department can prepare for more extensive organization building more generally.

Human Resources and MIS directors need to

work closely together when CAC organization building is introduced corporate-wide. In addition to formal corporate planning topics being introduced online by top management and facilitated by middle management, there need to be informal forums online as well. Interactive corporate newsletters, suggestion topics, and even the equivalent of watercooler or cafeteria discussions need to be encouraged online. In a sense, informal community building needs to precede more formal organization building online.

Although the payoffs from cost-cutting solutions (e.g., project coordination, sales management, and customer service) and revenue-generating solutions (e.g., online marketplaces, interactive journalism, and distributed education) are more obvious, the payoffs from organization and community building solutions are even higher when done well. Doing them well requires the attention of top management.

Expert Networks vs. Expert Systems

Ever since I worked in the 1950's on computer-aided language translation, I have been skeptical about the potential of so-called Artificial Intelligence (AI). Much more promising is another type of AI, Augmented Intelligence. I like to think of expert networks as being a form of Augmented Intelligence, which has more immediate potential than the expert systems that are currently getting much attention within the field of Artificial Intelligence.

Both types of AI certainly have potential. However, I believe the exaggerated view that intelligence can ever become artificial tends to diminish more promising efforts to augment intelligence.

Expert networks represent a new dimension, an electronic societal and organizational dimension, that did not really exist prior to the development of Computer Aided Communication. While expert networks can be used by traditional organizations to strengthen their efforts to produce and provide products and services, expert networks also seem to represent almost a new form of organization.

An older form of organization, namely associations, may be transformed by expert networks. Prior to the development of expert networks, associations have not been as important forms of organizations as, for example, private corporations and public agencies of government. Associations --

whether formed for professional, religious or other reasons -- may be transformed by expert networks into much stronger organizations. The economic opportunity as well as the electronic challenge for associations may be greater than some of them will be able to handle. If so, then some new networking form of organization not identified directly with what we now know as associations may emerge.

An example of expert networks was developed in the late 1970's when science advisors to state legislatures joined together with technical professional societies, federal labs, and public interest research groups to form the Legitech Network. In 1979, approximately 1000 inquiries were initiated online as topics, to which another few thousand notes were then added as responses to those inquiries. These inquiries were on a wide range of legislative issues that had scientific or technical content -- in such areas as energy, health, environment, economics and communications.

For example, one frost-belt state posed the question: "What are alternatives to road salt for dealing with icy highways without polluting water supplies?" Another state, having recently dealt with that problem, responded, as did associations and labs that knew of relevant research on that topic. Other frost-belt states joined the topic to get the benefit of inquiry responses that might help their states as well as the inquiring state.

Sun-belt states did not join and therefore were not subjected to information overload about a topic of no importance in their climate. An important feature of expert networks is this screening to avoid information overload.

There were generally four types of responses for these kinds of inquiries:

- (1) BACKGROUND responses usually provided immediately by inquirers, in order to place their pointed inquiries in broader contexts of (a) what they already knew and (b) the situation that led to the inquiry being made
- (2) SUBSTANTIVE responses from online expert peers or professionals
- (3) LEADS to off-line experts, giving their qualifications and how to contact them
- (4) REFERENCES to published information or even copies of references found online by searching public domain databases

The order of the above types of inquiry responses is consistent with what I have been told is the God Given Rule of Research, "First, ask someone who knows. If that fails, ask someone who knows someone who knows. If that also fails, then look it up."

Actually, the kinds of inquiries that are asked online are sometimes about issues for which there is little or no published information. Yet there may still be much knowledge in the minds of experts who can be reached through an expert network.

I recall that, when the Three-Mile Island Nuclear Power Incident occurred, numerous inquiries arose within the Legitech Network. These ranged from concern about the effects of nuclear radiation to how to de-commission nuclear power plants. Inquiries such as those, for which there may not have been quick answers were nevertheless good indications of what different states were then considering.

Inquiries within expert networks usually have half-lives of about two weeks when they are receiving responses. Occasionally, an inquiry might be fuzzy or interesting enough to become a mini-conference that could be written to for two months or longer. But the half-lives for inquiries and their responses needing to be referenced or read online by latecomers may be two years or longer, depending upon how obsolete that knowledge may become due to later research.

The searching, indexing, archiving, and editing tools incorporated in the software supporting expert networks allow the communications flow of inquiry networking to yield valuable knowledge that remains online. This knowledge is by no means as well organized as the rule-based knowledgebases of expert systems. Yet the by-product knowledgebases of expert networks may serve as bridges to the development of the rule-based knowledgebases of expert systems.

Furthermore, expert networks may be even more promising than those systems that focus upon capturing the expertise of single experts. Expert networks incorporate within them ongoing peer review, a process fundamental to the advancement of knowledge.

Towards Integrated Participation Systems

The main purpose of this paper has been to establish the fact that electronic organization and expert networks are more powerful forms of Computer Aided Communication than are the more

familiar forms of electronic mail and computer conferencing. However, the most interesting aspect of this CAC field is that its development will not stop with electronic organization and expert networks. Beyond these CAC forms will be what MIS researchers generally refer to as group decision support systems. I prefer to characterize these needed systems as integrated participation systems.

The integration of many-to-many communication and decision support systems is inevitable. Many-to-many communication systems include polling tools, while decision support systems are mainly characterized by their modeling tools. Polling can be used to calibrate both the probability and the utility functions used in decision support system models.

Decision support tools can be accessed already from within advanced Computer Aided Communication systems. Their more complete integration is needed, so that the new and largest wave of computer users — the communicators — can have easy access to the end-user and programming tools developed for the earlier waves of computer users. Graphics, video and audio integration with textual CAC systems is also on the horizon.

It is attention to organization, not to technology, that is needed now to reap the waiting benefits of Electronic Organization and Expert Networks.

Date Due

Lib-26-67

6340 547

MIT LIBRARIES



3 9080 005 223 653

Date Due

ASSESSMENT

