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WHAT TO EXPECT FROM TELECONFERENCING

Robert Johansen

Christine Bullen

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**Center for Information Systems Research**

Massachusetts Institute of Technology  
Sloan School of Management  
77 Massachusetts Avenue  
Cambridge, Massachusetts, 02139



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## WHAT TO EXPECT FROM TELECONFERENCING

### ABSTRACT

Teleconferencing can alter one of the basics of a manager's day: the business meeting. It is becoming more available and more attractive, but managers must make specific decisions about what they want from this new form of business communication. Experiences over the past ten years reveal some important clues, but vendors have exaggerated how much teleconferencing has been used, and many users have not reported on their experience with this novel form of business communication. Teleconferencing is a very promising office information system, but one that managers ought to approach with considerable care.



## WHAT TO EXPECT FROM TELECONFERENCING

- Since 1968, Bank of America executives in San Francisco and Los Angeles have held regular business meetings without subjecting themselves to commuter flights. Using handsome conference rooms whose decor is dominated by oil paintings of the founding fathers--not the technology of teleconferencing--the users flip one switch and are immediately connected to their colleagues with a high-quality audio conferencing system.
- Since 1975, IBM has had its own in-house system for still video conferencing. With this system, snapshot-like images are displayed on television monitors, along with audio conferencing. The users are primarily from technical backgrounds and their attention during meetings is typically drawn to charts, viewgraphs, or diagrams. Still video is an excellent medium for such applications, and it allows geographically separated groups to work together productively.
- Since 1978, Procter & Gamble employees have had access to CONFER--their own computer-based conferencing system. They can use the system directly via typewriter-like computer terminals, checking periodically for new messages and typing in their own comments. They can also use the system indirectly through secretaries or the company's internal mail system. These text-based teleconferences are spread across weeks or months and involve participants from most divisions in the company.
- Since 1981, Aetna Life and Casualty Company has used full motion video teleconferencing to link its offices in downtown Hartford and suburban Windsor, Connecticut. The full-color system requires virtually no training, and data processing

personnel in these locations use the system constantly. Aetna is now expanding the capability beyond the Hartford area to sites in other parts of the country.

Such dramatic success stories are sparking the interests of managers around the country. The idea is certainly attractive, whether you are a CEO, a controller, or a harried middle manager with a job to get done. Corporate offices around the world can be linked by some form of teleconferencing for easy--and economical--business communication. It is obvious that the cost of moving people from place-to-place is escalating, as is the discomfort for the people being moved. While travel is still a perk for some, it's a pain for many. Managers are grumbling that there must be a better way. Teleconferencing is an answer to this plea, although it is not an easy answer.

By "teleconferencing," we mean group communication through any electronic medium. Audio and full-motion video are probably the most well-known forms of teleconferencing. However, still video snapshots can be exchanged (often called "slow-scan" or "freeze-frame" teleconferencing), as can keyboarded messages ("computer conferencing" or "electronic mail"), drawings (for example, "electronic blackboard"), or page copies ("fax"). The range and configuration of options are growing rapidly--so fast that it is too early to define rigidly what teleconferencing is or is not. One important difference among various forms of teleconferencing is the time element. If all participants are present at the same time--regardless of location or time zone--the conference is synchronous or "real time." To date all audio and video conferences are synchronous. However, if participants can check into the conference when they wish, it is an asynchronous or "store-and-forward" conference. The use of voice messaging systems approaches the concept of asynchronous audio conferencing and electronic mail is introducing store-and-forward text communication.

Teleconferencing is not yet a developed industry, but it could soon become one. The range of products is increasing, as is their quality. It is becoming easier for a potential teleconference user to find an appropriate system and to purchase or lease it. Still, however, it is an infant industry with many misconceptions to confuse potential users. A few examples follow below.

### MISCONCEPTIONS REGARDING TELECONFERENCING

#### 1. A Tendency to Exaggerate the Current Level of Use

At present, the teleconferencing industry is very busy holding conferences (usually face to face) about teleconferencing. The resulting flurry of brochures, speeches, and demonstrations creates the impression of more activity than actually exists.

In 1978, the most comprehensive survey to date\* of permanently installed audio and video teleconferencing facilities in North America found 14 audio and 11 video systems. Those numbers have grown slowly since then: We estimate there are now about 75 organizations with permanently installed audio systems in North America, 20 full video, and perhaps 100-still video or audio-graphic systems. There are many more semipermanent or portable systems--especially for conference calling. These numbers include private telephone companies and systems vendors that have a built-in interest in the field, however. Also, finding systems in daily use is difficult. There are many experimentors but far fewer solid users--even today. Most of today's users are what Elliot Gold, publisher of a major newsletter on teleconferencing, describes as "tire-kickers."

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\*See Robert Johansen, A Survey of Permanently Installed Teleconferencing Rooms in North America, Menlo Park, CA: Institute for the Future, 1981.

A recent study of full-motion and slow-scan video teleconferencing users further supports this point. The study surveyed U.S. domestic business users who met the following criteria: Their systems were in place for at least six months during 1981, they were used a minimum of 20 hours per month, and their primary use was for business meetings. Also, systems of telephone operating companies were excluded. Even using these rather lenient criteria, only ten systems qualified.\* That number has increased in 1982 and 1983, but not very rapidly.

The newcomer to teleconferencing must sift through a bewildering array of articles, products, case studies, and vendor claims. Ten years have generated a lot of information, along with a lot of noise. The first synthesis of teleconference evaluations found over 200 studies of audio, video, and computer-based teleconferencing in 1979.\*\* There are perhaps twice that number now. About half of the studies have never been published formally or distributed broadly, making it difficult to dig out candid information.

In general, incentives are low for user organizations to publicize their teleconferencing experiences--for either successes or failures. While it is true that companies in some industries (for example, energy, telecommunications) can benefit directly from publicizing their use of teleconferencing, most cannot. Certainly, low-keyed informal exchanges do occur, and a few users accept frequent speaking engagements. Indeed, there is a small supportive network of people involved in various aspects of the field.\*\*\* But important corporate experiences with teleconferencing often go undocumented and disappear completely when key people move on to something else. Most

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\*See Kathleen J. Hansell, David Green, and Lutz Erbing, "Videoconferencing in American Business," *Satellite Business Systems*, May 31, 1982.

\*\*See Robert Johansen, Jacques Vallee, and Kathleen Spangler, Electronic Meetings, Reading, MA: Addison-Wesley, 1979.

\*\*\*The International Teleconferencing Association (McLean, VA) was formed in 1982 as a professional exchange medium.

corporate users turn to teleconferencing because it is useful to them, but they have no clear incentive to share their experiences. And, if they see a competitive advantage in using teleconferencing, they have an incentive not to discuss their experiences.

## 2. Overreliance on Travel Substitution

Travel substitution is still the most common justification for teleconferencing, even though it is mostly a mirage. Unfortunately, new entrants in the field are almost always drawn to this idea. However, ten years of experience yield few convincing examples of direct travel substitution. Indeed, in some cases travel increased along with the introduction of teleconferencing.

These factors do not mean that teleconferencing cannot facilitate a net reduction in travel or eliminate certain types of undesirable travel. However, there is more to it than unlocking the door to the teleconferencing room and adding up the travel savings. Teleconferencing, if it works, will change the way business communication occurs. Travel patterns may change, but probably not predictably, and, almost certainly, teleconferencing will not substitute directly for travel. Travel reduction in a company must be initiated by specific policies and accepted by employees: two distinct steps. Nevertheless, travel statistics are the easiest and the safest quantitative justification for the introduction of teleconferencing. Thus travel substitution will probably continue to exist, if only in figure juggling by those who must search for justification numbers.

## 3. The Assumption that Audio is Easy

One surprise for most new users is that audio presents the most technical difficulties of any component--even in a video conferencing facility--for reasons of acoustical engineering. (However, high-quality audio systems have been used successfully for many tasks that users were convinced would require video.) Furthermore, audio is improving



with the introduction of high-quality microphones that do not require elaborate acoustic treatment (for example, American Bell's Quorum).

The acceptable range in video quality is usually much broader than that of audio. Slightly fuzzy pictures of participants or less crisp letters in viewgraphs will not destroy a meeting. But the inability to clearly hear what is being said will. Unfortunately, new users often learn this the hard way. After investing a great deal in the latest video equipment, many new teleconferencing rooms fail because of poor acoustics. Too often this is perceived as a failure of users to "accept" the new technology.

#### 4. Teleconferencing as a Simulation of Face-to-Face Meetings

Too often, teleconferencing systems are created in the image of face-to-face communication. This sort of horseless carriage thinking is limiting. Face-to-face is the most familiar medium, but it is not always the best medium for business communications. At times an electronic meeting will be better than a face-to-face meeting.

For example, computer conferencing systems, such as the one now used by more than 3,000 people at Procter & Gamble, have shown the major advantages of meetings at which participants are not present simultaneously. Users come and go according to their own schedules, reading entries from others and making their own comments. They remain in their normal work environment, with ready access to resource materials and with time to consider their responses. Thus, the meeting becomes extended over time and (in some cases) time zones. Scheduling a face-to-face meeting among the same participants would be frustrating at best.

Options for electronic meetings are just beginning to be revealed. Imagine a manufacturing assembly line that malfunctions during the night shift. A full-motion



video recording of the malfunctioning line could be taken immediately and sent electronically to engineers in three distant cities, along with a voice interpretation and perhaps some sketches showing what the on-site engineer thinks might be wrong. When the engineers at the three remote sites arrive at work, the stored multimedia messages are waiting for them. After studying them, they will be ready for a synchronous electronic meeting to troubleshoot the problem.

Business meetings make up an incredibly large fraction of many managers' days anywhere from 30% to 70%, according to research findings.\* Teleconferencing implies changes in this critical aspect of doing business. Basic changes in organizations are almost always slow, and it is organizational change that is the main event in a teleconferencing implementation--whether or not this process of change is recognized by the implementors.

Beyond meetings, teleconferencing has the potential to change business communication more generally. Electronic meetings provide new ways to work, beyond what we currently think of as meetings.

The guiding question should be: What might teleconferencing allow us to do that we cannot do now? The companies that take this question seriously will be those that exploit the real promise of teleconferencing. Potential users must determine their requirements, understand their needs, and design a system to suit those needs. So far, the teleconferencing industry has been driven by the technology producers, which is not unusual in an infant industry such as this. But until users begin pressing for capabilities to meet their needs and wants, the industry will remain technology driven and confused about what teleconferencing is and can become.

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\*For a review of research on managers' use of time, see Raymond R. Panko, "Serving Managers and Professionals," in Office Automation Conference Digest, Arlington, VA: AFIPS Press, April 1982.

## CRITICAL SUCCESS FACTORS FOR TELECONFERENCING

The strategic concept of critical success factors (CSFs) is normally used when identifying those "things that must go right" in order for an individual to succeed in his or her job, or a company to succeed in its industry. We think the concept can be applied usefully to examine what is critical for successful teleconferencing. We will discuss five major CSFs.

### 1. A Clear Business Requirement

A teleconferencing system cannot be introduced successfully into a corporate environment as the latest panacea for office productivity. Nor does it work to introduce teleconferencing as an experimental toy. Such approaches lead to faddish interest and use, but systems quickly fall into disuse, becoming expensive failures and leaving users with a less than satisfactory teleconferencing experience. Teleconferencing technology must address a specific task or area of need. Managers must feel they are getting value, that they are being supported in accomplishing an important task, and that they are positively affecting productivity. Otherwise, they will not use the technology.

When NASA introduced teleconferencing in the early days of the Apollo Project, their contractors were scattered all around the country. Coordination was essential, and the deadlines looked impossible. Teleconferencing was the only way to get the job done. And it still is today for many of NASA's project and contractor teams.

When IBM introduced its in-house, still video teleconferencing system, it was because a work group had been divided between Boulder and San Jose. The group still had to work together but across a substantial geographic split. Teleconferencing, again, was a way to get a tough job done.

In each of the above examples, organizations were faced with back-against-the-wall choices, and teleconferencing was a creative solution. The key benefit was in meeting very difficult schedules. These examples show that teleconferencing is not a substitute for another form of communication, or an experiment, or just a nice idea; it must address a major business need.

Some business needs are dramatically obvious, and teleconferencing adds value by answering those needs. In other cases, teleconferencing adds value, but more subtly. Hoffman-LaRoche Laboratories, for example, uses audio teleconferencing with remote slide projection to conduct new product training for its large, geographically scattered sales forces. Teleconferencing improves coordination among the various sales people so that information about new products reaches customers quickly. Other pharmaceutical companies are using teleconferencing to encourage communication among their scientists engaged in upstream R&D activities. Here the value added is even less easy to measure, but may be at least as important.

Often, a company will implement teleconferencing to address one business need, but then find that teleconferencing has brought about unexpected changes in the organizational structure and communication. For example, teleconferencing, particularly computer conferencing, has often opened new channels of communication that tend to flatten--or at least change--corporate hierarchies. The new system provides access for junior staff or staff in remote locations to communicate more directly with those in power. For some companies, this more participative management has proved valuable; others, of course, don't like it. But the changes are potentially profound and are difficult to anticipate.

Identifying a clear business requirement is a critical first step in introducing a teleconferencing system. Equally important, however, is understanding the nature of the work involved.

## 2. Accurate Needs Assessment

Understanding the nature of the work in which teleconferencing would be used is a second critical step. Risking the confusion of a "play within a play" here, we propose that one of the best ways to gain an understanding of a business need is to use the CSF interview technique with the potential users of the teleconferencing system.\* The technique has proved useful as a communication and planning tool in the implementation of technology with managers at all levels. In this situation, CSFs can help clarify the key tasks associated with the business need, and thereby identify elements that can be facilitated by teleconferencing. Because the emphasis in the CSF interview is on critical tasks, it clarifies the support that is required and what form the technological support needs to take.

For example, if the showing of documents or drawings are critical elements (as opposed to seeing participants face-to-face and reading subtle body language) then slow-scan video technology can support the meeting well, and full-motion video is unnecessary.

As another example, a major personal computer vendor found that regional sales representatives had a CSF of immediate access to current product information. They implemented a computer conferencing system to provide this access.

For many companies, needs assessment has meant browsing through vendor brochures or assigning a junior staff person to develop a questionnaire overnight. Clearly, the process is more important than that; it is a key to successful use of teleconferencing.\*\*

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\*For a basic description of this method, see J. F. Rockart, "Chief Executives Define Their Own Needs," Harvard Business Review, March-April, 1979, p. 81. A guide for use of CSF's is contained in C. V. Bullen and J. F. Rockart, "A Primer on Critical Success Factors," Sloan School of Management, MIT, CISR WP No. 69, June, 1981.

\*\*A more detailed discussion of needs assessment techniques can be found in Robert Johansen and Ellen Baker, "Needs Assessment Workshops," Office Technology and People, forthcoming.

### 3. Learning from Experience

Many teleconferencing failures can be traced to an inability to learn from previous experience. It should be obvious by now, for example, that a hard sell of teleconferencing may dazzle early users, but it will not encourage them to become regular users. Experience with teleconferencing has only reinforced what was documented before in the overselling of MIS, data bases, and office automation in general. Also, a failure to anticipate the important issues of organization and people is a sure way to have problems in implementing a new technology. At this point, it should not be difficult to transfer the positive experience and the intelligence gained from successful information systems and office systems projects to teleconferencing. Experience dictates planning for organizational changes, for creative and ongoing education, for system facilitators, and for the establishment of an on-going support group.

One reason why the introduction of these technologies is particularly difficult is that most new users have had no experience with teleconferencing. Just asking people as they file out of a conference room, "Could you have conducted that meeting with slow-scan video plus audio and fax?" does not work. People need to try various teleconferencing options before they know what they need, which often makes planning and introducing teleconferencing an adventuresome process.

### 4. Recognizing the Importance of Culture

A further complication is that each company--or even groups within the company--has a specific culture that sets the tone for business meetings. By culture, we mean the unspoken clues that guide behavior within a group: the shape of the conference room table, the type of chairs, the thickness of the carpeting, the location of the system in relation to other parts of the office building, and so on. Bank of America's executive teleconference room, for example, has a very different cultural tone than does the



Stanford Linear Accelerator's (SLAC) teleconference room for research physicists. B of A executives would not feel at home amid the chalk dust of the SLAC room and vice versa. The culture of a teleconferencing system should be compatible with the culture of its intended users. Unfortunately, many teleconference rooms are more consistent with the culture of the telecommunication departments that built them than with the culture of the intended users.

Of course, the best people at understanding the needs and culture of the users will be the users themselves--or at least, people who are sensitive to the users. At Procter & Gamble, for instance, teleconferencing was introduced by the R&D and engineering divisions. The telecommunications and systems group played an important support and service role, but the momentum came from the users. Many failures in teleconferencing can be traced to situations in which the momentum was never transferred from the system builders to the system users. If the momentum begins with the users in the first place, everyone will benefit ultimately.

One of the world's most successful video teleconferencing systems illustrates the importance of culture in a way that is counter-intuitive for many people. It is a private, four-city system at Ohio Bell, assembled originally from surplus videotape equipment. The system designer, however, was very clever in integrating the scavenged pieces and building new ones when he needed them. It is not a flashy system and therefore is ignored by many telecommunications experts. It looks boring, they would say. Yet it works. Indeed, when frequency of use is taken as the measure of success, it is much more successful than most high-tech systems. It is used constantly. Ohio Bell is successful because the system matches the culture of the user organizations. The arrangement of the room, the table, the chairs, and the colors on the walls all reflect the typical tone of an Ohio Bell work environment and the people who use it feel comfortable. (Also, the alternative to teleconferencing is a very uncomfortable

drive across Ohio.) The clever low-tech appearance illustrated by the Ohio Bell system is much more the state of the art (and has been for several years) than is an elaborate high-tech image, at least in settings where the primary users are nontechnical.

In contrast, consider the example of Digital Equipment Corporation, which has its own private helicopter fleet for transporting employees among the numerous Massachusetts and New Hampshire company sites. Yet, DEC decided to build full-motion color video conferencing rooms in Massachusetts and New Hampshire (about two hours apart by car). One obvious reason why the helicopters are not the perfect answer for getting meeting participants together is that weather problems can prevent them from flying. Another less obvious reason is that a fairly large number of people prefer not to fly in helicopters. The DEC "transporter" rooms have provided useful alternatives. In addition to the clear business need, the DEC culture has contributed to this success because it accepts new technology easily. In addition, the rooms--more high tech than Ohio Bell's--are nicely designed to fit the diverse needs and the culture of the users.

### Preparing for Surprises

There are surprising uses of teleconferencing that most people would never expect. For instance, growing evidence from both laboratory and field studies reveals that lying can be detected more easily over audio than over audio plus full-motion video systems. If so, this fact has major implications for the design and use of teleconferencing.

Another surprising use for teleconferencing is its role in helping handicapped people to interact as fully equal contributors. Less dramatic, but still important, is the potential for some people who lack interpersonal skills to find themselves more effective contributors at electronic meetings.

Perhaps the most important surprises will be the impacts this new technology will have on the way we communicate, work, and think. The potential is clearly evident for massive changes in our current view of what an office is, what good management is, and how we get the job done.

### LIKELY IMPACTS

Teleconferencing has evolved rather independently from other electronic technologies used in offices. It has been viewed more as an extension of the telephone than as a companion to the office computer or word processor. But it is becoming increasingly clear that teleconferencing is indeed an information system. It is one piece of the puzzle that will reveal itself as the office of the future.

Experience with other information systems is similar to that of teleconferencing. Information systems have evolved from the early "data processing" days in which applications developed mainly in the accounting and operations areas. The line manager benefited only indirectly from these information systems, if in fact the printed reports churned out so regularly could be viewed as a benefit. For most managers and virtually all top executives, the information was not timely or critical to their needs.

Within the past few years, information systems have evolved dramatically from narrow accounting-oriented applications to managerial support applications. Managers and executives now have the potential for direct access to timely, critical information, both internal and external to their organizations. The technological developments that provide these capabilities include advances in the computer, communications, and software fields. As more sources of data are integrated through the use of these systems, we are truly moving toward the office the the future.



Teleconferencing should be viewed as a member of the family of office systems technologies. In a very real sense, the ability to access information from people directly--regardless of their physical location--is a critical information system. People often seek information from colleagues before searching written sources. This is true of scientists, managers, secretaries--most people. In this sense, a teleconferencing system is also an information system. It falls into a special category of information systems termed "managerial support systems." Indeed, a better name for teleconferencing might be "a communication support system," emphasizing the role of the system in supporting individuals in the task of business communication.

Some organizations are integrating traditional data and text processing systems with teleconferencing technologies, creating elaborate new systems. It will not be long before we begin to see full-motion video supported by computer access to data and modeling tools that allow real time "what if" questions. The results of these analyses can be presented using computer-generated graphics. Reports on file in text processing systems can be accessed, updated, and transmitted as well. Integrating these technologies for effective support of managers and executives is a key challenge for the present--not just the future.

This "information systems" view of teleconferencing is necessary to anticipate the various ways these new technologies are likely to affect business. Mixing teleconferencing and computing will result in a new set of business opportunities for both saving money and making money. Figure 1 suggests that face-to-face meetings and electronic meetings will become less and less alike as we move beyond the current horseless carriage stage. It will become easier to gather the right people at meetings, to have better preparation before and during meetings, to coordinate better with decentralized sites and to spread human expertise within the company. The tone of the "meetings" will change as the requirements of business communication become the driving

force--rather than the ancient protocols of face-to-face meetings. Of course, some meetings will always need to be face-to-face, but such cases will become much more a matter of choice than they are now.

Teleconferencing, when mixed with computing, will provide the building blocks for new forms of organization. For example, the physical location of employees will become less important in selecting the best person to do a given job. Therefore, companies may not have to sacrifice valuable employees when a spouse's career change requires relocation. Control Data Corporation (CDC) has used variants of teleconferencing to retain such employees, but CDC is one of the rare companies involved in this form of telecommuting--or remote work--at this time. However, its action suggests longer term trends and business opportunities for aggressive companies.

Another positive impact is the potential for cost reductions. Teleconferencing systems, together with changes in corporate policies and user education and support, can result in reductions in travel (especially undesirable travel) and its related costs. Other cost reductions result from avoiding problems. For example, the Boeing Corporation claims that the greatest savings resulting from their teleconferencing system is that engineers at remote locations catch problems that might otherwise have gone unnoticed. Cost reductions can also result from shortening the time it takes to get something done. A pharmaceutical R&D group, for example, can use teleconferencing to coordinate and thus speed up the effort needed to move a new drug from the laboratory to the drug store shelf.

The far reaching impacts of teleconferencing include both opportunities and possible negative side effects. The negative side effects range from a possible employee perception that the central office is always watching to a potential narrowing of an individual's contacts and professional development.

The impacts of teleconferencing cannot be comprehensively catalogued yet, but some of them can be anticipated. Table 1 summarizes our list of likely impacts, but the opportunity for surprises is still great.

### MAKING IT WORK

There is no cookbook recipe for successful teleconferencing, but Table 2 presents a framework for making choices. It is organized around four basic types of functions:

- Inputs--those actions or data the user wants to communicate
- Computer aids--computer-based tools that can support the action taking place
- Transmission--this category includes the number of locations (two-point or multipoint) and the time element
- Outputs--what the participants receive through the system.

Each option is described in terms of its function in order to emphasize the action the user perceives, not the technology involved. However, choosing actions implies the type of equipment needed to perform or support each function. The list can be used like the menu at a Chinese restaurant: select choices from each column.

Use of this figure requires a cycling among the categories. For example, if drawing is a desired input, the next question is what form of output? Graphic documents may be desired, as well as still visuals to display work in progress. Next, the issue of computer aids is raised: Would some form of computer graphics be useful to aid in free-hand drawing? Finally, the transmission question asks whether there would be interaction among participants (for example, a shared drawing space) or a more straightforward

one-way sending. Would all the participants be present simultaneously, or would they want to work in an asynchronous mode? Once such basic choices are made, a key question becomes one of integration: How many of these functions must work together in a single system? What other inputs, outputs, or computer aids should be added? Also, cost factors are bound to play a role. Preferred systems are likely to give way to practical systems. This process will be an iterative one, resulting in one or more teleconferencing configurations described at a functional level.

This choice-making process should, in our opinion, start at the basic "actions" level suggested by Figure 2. Unfortunately, however, most prospective users start by assessing vendor brochures instead of their own needs.

Anyone making choices should bear in mind that teleconferencing is still a young industry--in spite of its ten-year history. A clear view of the benefits or value being sought from the new system will create the sort of perspective needed to make the choices displayed in Table 2.

## CONCLUSION

The manager trying to introduce teleconferencing plays a very delicate--sometimes dangerous--role. He or she is suggesting a change in one of the most basic business activities, indeed the core of corporate life: business communications. This is not a change to take lightly. Teleconferencing can become an important part of the growing array of office information systems. But to take advantage of teleconferencing technologies demands a well-planned and organized effort. Because the potential impacts are so great, the introduction of teleconferencing technologies should be carefully and thoughtfully engineered to take advantage of the opportunities--and to avoid the pitfalls.

Figure 1

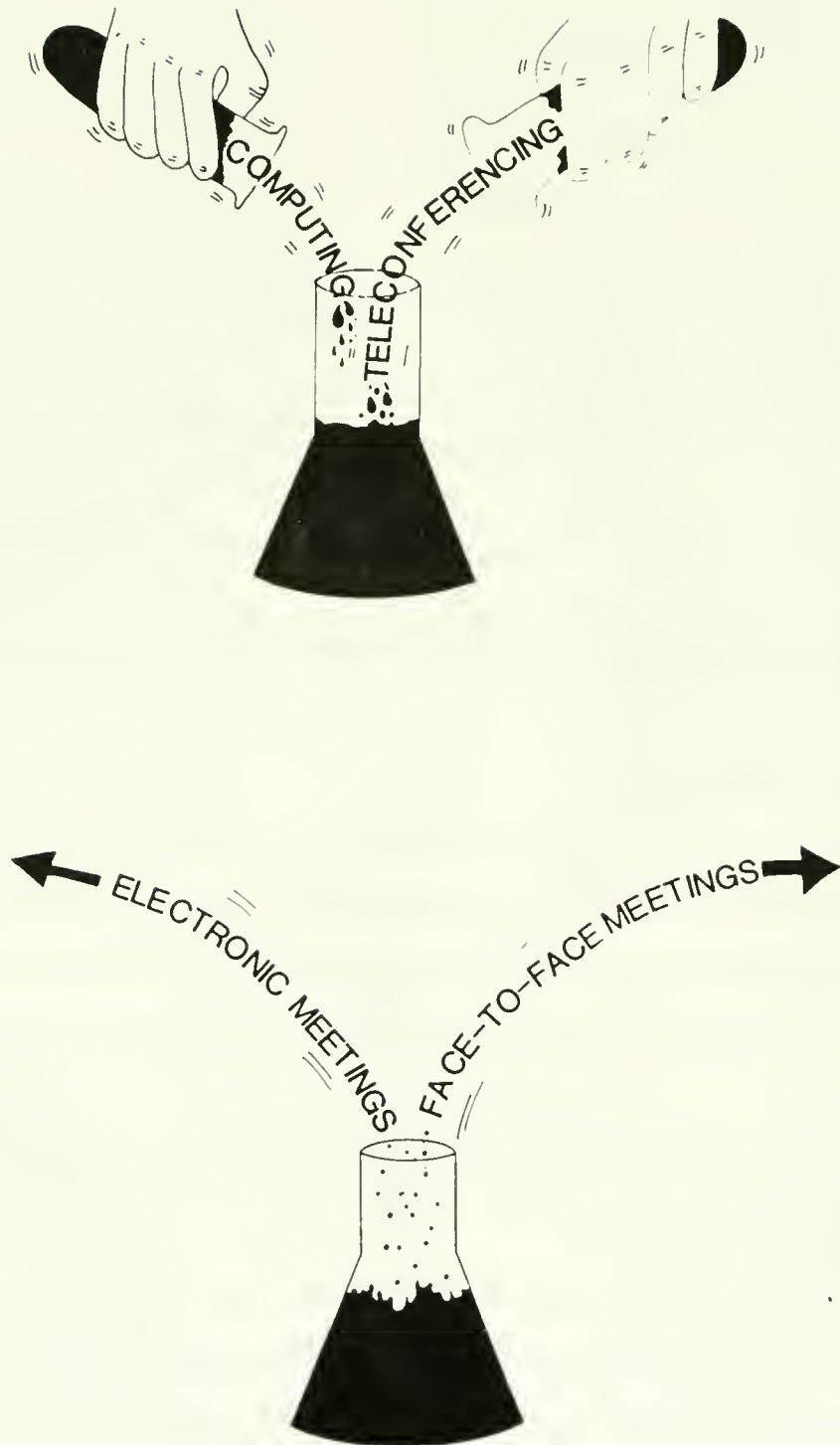


Table 1  
Potential Impacts of Teleconferencing

Cost Displacement

- Reduces net travel expenses.
- Reduces nonproductive time while traveling, as well as travel fatigue.
- Commit fewer mistakes because the "right person" was not present at meeting.
- Allows less nonproductive duplication of effort by geographically separated sites.
- Shortens time necessary for some business cycles to be completed or for key decisions to be made.
- Reduces the need to update people who could not travel to a face-to-face meeting, as well as reduces the possibility of presenting inaccurate information at the update.
- Reduces equipment downtime required because the right repair person is at another site.
- Reduces the possibility of business being affected by disruptions, such as fuel availability or political unrest.

Opportunity Enhancement

- Allows new communication to occur that was not practical before teleconferencing.
- Allows additional people to attend a meeting, even without advance notice.
- Improves opportunities to prepare for and follow up on face-to-face meetings.
- Increases degree of managerial choice regarding frequency and timing of communication.
- Improves managerial control over field sites and decentralized offices.
- Improves ability to share "people resources" when people needed are geographically separated.
- Provides an alternative way of maintaining good personnel relations.
- Makes job assignments less dependent on where a given employee happens to live.
- Provides faster and better responses to emergencies when key people are geographically separated.



- Increases employees' sense of interpersonal contact, morale.
- Allows new opportunities for chance meetings among people who could benefit from working together.
- Encourages consideration of alternative solutions to given problems.
- Allows new potential for intelligent computer programs to contribute to the work of teleconference participants.
- Alters how employees think about themselves and the organization.

### **Negative Side Effects**

- Increases nonproductive time spent in meetings because teleconference meetings are easier to arrange and useless meetings may be called.
- Decreases freedom of operation for remote field sites, resulting from too much control by management.
- Decreases sense of interpersonal contact, morale.
- Encourages overspecialization and narrowness.
- Allows too much dependence on technology to develop, creating a potential for breakdowns, or even sabotage.

Figure 2  
Basic Teleconferencing Functions--A User's Guide

Instructions: Select one or more item from each column below.

<u>Inputs</u>	<u>Computer Aids</u>	<u>Transmission</u>	<u>Outputs</u>
Talk	Text processing	Two-point	Hear
Write	Database manipulation	Multi-point	Text documents
Type	Graphics	Synchronous	Still visual display (real-time)
Draw	Numerical processing	Asynchronous (store-and-forward)	Motion visual ShowVideo recordings
Output from instruments or computers			Computer inputs



(Box A)

People familiar with electronic mail often ask what differentiates electronic mail from computer conferencing. Traditionally, electronic mail involves the private, one-time sending of a specific message and receiving a reply. Unless the user consciously initiates an order ("command") to save the interaction, it disappears. Computer conferencing, on the other hand, is designed to maintain an ongoing "transcript" of the interactions among many people discussing a topic. In this sense, it is a conference, and the electronic file of entries is the proceedings. Electronic mail, then, is a person-to-person medium, while computer conferencing is group oriented. There is no reason why both functions cannot be performed within the same system--but most of today's systems emphasize only one.

(Box B)

Examples of U.S. Teleconferencing Systems\*

PRIVATE SYSTEMS

Aetna: Video teleconferencing  
Allstate: Video teleconferencing  
American Airlines: Audio teleconferencing  
American Bell: Audio, slow-scan, and video teleconferencing  
AT&T Long Lines: Audio, slow-scan, and video teleconferencing  
Atlantic Richfield: Audio and video teleconferencing  
Bank of America: Audio teleconferencing  
Boeing: Video teleconferencing  
CIGNA: Audio teleconferencing  
Conoco: Audio teleconferencing  
Department of Energy: Video teleconferencing  
Digital Equipment Corporation: Video teleconferencing  
Electric Power Research Institute: Computer-based teleconferencing  
Exxon USA: Audio and slow-scan teleconferencing  
Ford: Slow-scan and video teleconferencing  
Hercules: Slow-scan teleconferencing  
Honeywell: Audio-graphics teleconferencing  
IBM: Slow-scan teleconferencing

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\*This list is not complete, but it is a good sampling. The alphabetically ordered list includes only those companies that are actually using some form of teleconferencing or have immediate plans to do so. Closely related media (such as electronic mail or telephone conference calling) are not included here. The most comprehensive survey to date of teleconferencing systems was done by IFTF in 1978. Updates of each system in the catalogue are published each month in the Telespan Newsletter (Altadena, CA).

Illinois Bell: Video teleconferencing

Liberty Mutual: Video teleconferencing

NASA: Audio, slow-scan, video, and computer-based teleconferencing

Ohio Bell: Video teleconferencing

Pacific Coast Stock Exchange: Audio teleconferencing

Pacific Northwest Bell: Video teleconferencing

Procter and Gamble: Video and computer-based teleconferencing

Roche Laboratories: Audio teleconferencing with remote slide projection

Sperry-Univac: Video teleconferencing

Stanford Linear Accelerator/Lawrence Berkeley Laboratories: Video teleconferencing

Texas Instruments: Slow-scan teleconferencing

Union Trust (Stamford, CT): Audio teleconferencing

United California Bank: Audio teleconferencing

Wang Laboratories: Video teleconferencing

Xerox: Slow-scan teleconferencing

#### INTERCOMPANY SYSTEMS

Picturephone Meeting Service: AT&T Long Lines, video teleconferencing

NOTEPAD: Infomedia Corporation (San Bruno, CA), computer-based teleconferencing

EIES: New Jersey Institute of Technology (Newark, NJ), computer-based teleconferencing

PARTICIPATE: Participation Systems, Inc. (Winchester, MA), computer-based teleconferencing

CONFER: Advertel (Ann Arbor, MI), computer-based teleconferencing

Conference Calling (local telephone companies)

Connex International (Danbury, CT), audio teleconferencing

Kellogg (Littleton, CO), audio teleconferencing

Darome Connection (Harvard, IL), audio teleconferencing

ConferTech International (Arvada, CO), audio teleconferencing

International Telecom Systems (Madison, WI), audio teleconferencing

Hilton Hotels Corp. (Beverly Hills, CA), ad hoc video teleconferencing

HI-Net: Holiday Inn, (Memphis TN), ad hoc video teleconferencing

Public Broadcasting System (Washington, DC), ad hoc video teleconferencing

Robert Wold Company, Inc. (Los Angeles, CA), ad hoc video teleconferencing

(Box C)

### Rules of Thumb About Which Medium to Use and When

#### Full-Motion Video

1. Consider using it only when you can afford it.
2. Use when a task requires motion displays (for example, TV ads, moving mechanical parts).
3. Use when more social presence is needed (for example, executive sessions).
4. Don't forget about good audio.

#### Still Video

1. Use when focus is on flip charts, overheads, or other simple graphics.
2. Remember that it is more compatible with users who are technically oriented.
3. Don't forget about good audio.

#### Audio-Graphics

1. Use when the focus is on drawing or documents.
2. Select a graphic systems carefully, based on your needs.
3. Don't forget about good audio.

#### Audio

1. Use when visual communication is not important.
2. Use when you can't afford visual aids.
3. Don't forget about good audio.

#### Text

1. Use when participants have trouble scheduling meetings.
2. Use when participants are comfortable using keyboards.
3. Use when tasks are adaptable to text-only communication, or when there are special needs for computer-based resources.



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