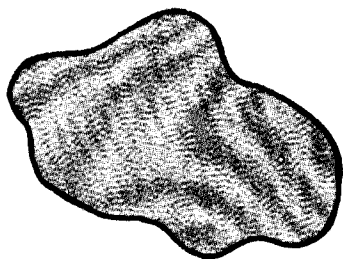


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# Computerized Conferencing for the Developing Countries

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*In meeting the special needs of the developing nations it may be better to skip the stage of conventional communications and move directly to computerized conferencing systems.*

Computerized conferencing—wherein a computer functions as a kind of centralized blackboard that is connected through telephone lines to its human users—has received considerable attention in the United States for its great potential as a communications medium for technical and managerial personnel. I believe, however, that even greater benefits might accrue to those developing countries that can bring themselves to adopt this system of communication rather than the “normal” telephone system. In these countries, where time and distance impose such major constraints on economic and social development, computerized conferencing could produce an atmosphere of cooperation and closeness in societies that badly need them. I will explain how this can be accomplished after first reviewing the fundamentals of computerized conferencing.

In its simplest form computerized conferencing is a system in which a group of people who wish to communicate about a topic may go to computer terminals at their respective location and engage in a discussion by typing and reading as opposed to speaking and listening.<sup>1, 2, 3</sup> The computer keeps track of the discussion comments and the statistics of each contributor's involvement in the discussion. In effect, one may view this process as a written version of a conference telephone call. However, the use of the computer provides a number of advantages in the communication process, compared to the use of telephones, teletypewriter messages, letters, or face-to-face meetings.

In the use of the telephones and face-to-face meetings, the flow of communication is controlled by the group as a whole. In principle, only one person may speak at any time. With the computer in the communication loop, each participant is free to choose when he wants to talk (type) or listen (read) and how fast

or slow he wants to engage in the process. Therefore, the process would be classified by psychologists as a self-activating form of communication. Also, since all the individuals are operating asynchronously, more information can be exchanged among the group in a given length of time, as opposed to the verbal process where everyone must listen at the rate one person speaks. Furthermore, because the computer stores the discussion, the group does not have to be involved coincidentally in time. The discussion may take place over hours, days, weeks or be continuous. Therefore, an individual can choose a time of convenience to him to go to the terminal, review the new material and make his comments.

When compared to letters or teletypewriter messages, the first item to note is the common discussion file available to the group as a whole. Having this file in a computer allows each individual to restructure or develop subsections of the discussion that are of interest to him. Normally the computer supplies each participant with whatever he has not yet seen any time he gets on. In addition, the participant may choose to ask for certain groups of messages which contain key words or for the messages of certain specific individuals in the group. The computer also allows users to write specialized messages which may be conditional in character:

- Private messages to only one individual or to a subgroup of the conference.
- Messages which do not enter the discussion until a specified date and time in the future.
- Messages which do not enter unless someone else writes a message that contains a certain key word.
- Messages which enter as anonymous messages, etc.

The possible variations are open-ended once one incorporates directly into the communication process the flexibility provided by computerized logical processing.

The next dimension the computer can add to the communication process is the addition of special comments, which allow the participants to vote as a group. For example, a comment classed as a proposal would

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allow the group to vote on scales of desirability and feasibility. The computer would automatically keep track of the votes and present the distribution back to the group. Based upon discussion, the individuals can shift votes and reach a consensus or better understanding of the differences in views.

The computer also permits incorporating numeric data formats as well as coupling the conference to various modeling, simulation or gaming routines that might aid the discussion in progress.

In practice, one should view computerized conferencing as the ability to build an appropriate structure for a human communication process concerning a specific subject (problem). One can consider different conference structures for different applications—project management, technology assessment, coordinating of committees, community participation, parliamentary meetings, debates, multi-language translation, etc.

With all the demands for scarce resources facing those dealing with a developing country, it may, on the surface, seem absurd to recommend a relatively new "high technology" communication process for serious consideration. However it is my own feeling that the resulting benefits to a developing country are tremendous—both from a physical and psychological standpoint. I hope by describing a number of applications to convey this feeling to the reader. However, in order to lay to rest the concerns associated with the problems of implementing such a system, let me first summarize the physical requirements for implementation.

### **Tying together 100 villages**

Let us assume, as an example, that we wish to tie together via computerized conferencing 100 villages or small towns in a geographical region. It is first necessary that there be a reasonably reliable telephone system (radio or hard wire) capable of connecting each of the 100 locations to a central point, and that sufficient power is available to run the equivalent of a few television sets at each location. Under these minimum

conditions, the following equipment is needed:

<i>Item</i>	<i>Cost Range (Dollars)</i>
One mini-computer	100,000–200,000
One terminal at each location (\$1,000–\$2,000 each)	100,000–200,000
Total Cost	200,000–400,000
Cost per Village	2,000–4,000

We see that the cost of installing such a system is roughly equivalent to buying a small truck for each village. In terms of viewing communications as a substitution for travel, this cost comparison is a useful one to keep in mind.

A keyboard that utilizes a TV set as a screen currently sells for about \$1,000 at single unit price, and a complete hardcopy terminal can be obtained for about \$2,000. The costs could be higher if the phone system is of sufficiently low quality that special equipment is needed to reduce noise-generated errors in the phone lines and switches.

In addition to these requirements, an individual at each location must be taught to operate the system. Experience indicates that the hardest part of that is probably the acquisition of a casual typing skill.

Costs of equipment are declining at a rapid rate, and by perhaps 1978 they should be about half what they are today. Costs could be further reduced if planning efforts for improving the two-way communication network in a developing area by either wire or radio give careful consideration to installation of this type of capability. As part of an integrated design, the marginal costs for adding this capability should be minimal.

### **A blackboard and a long piece of chalk**

What we have, once this equipment is installed, is a large blackboard with each village or location having a long piece of chalk. We can divide this blackboard into various segments, each devoted to a different pur-

pose—in essence, a separate conference. This system differs from the more common information system configurations in that the information is that which the users are putting in; i.e., system data sources and recipients are synonymous. Some obvious applications for this kind of information exchange are:

- *A "Bid and Barter" Conference.* If someone in one village has something he wishes to exchange, sell, buy, or rent, he can put in a notice. The responses would also be entered, as well as a final agreement and physical arrangements for the exchange.

This particular conference would enhance the economic viability of the region, providing a village and its individuals with a much wider market. Temporary exchanges of equipment among villages would facilitate more efficient resource sharing.

- *Regional Planning and Issues.* Villages in a given area could set up a conference to discuss some project that affected them all, such as a new road or an improvement to a water system.

This type of capability could have a tremendous psychological impact by producing a feeling of regional cohesiveness among villages that previously felt isolated or independent. It also means a region could arrive at its own consensus, which might represent much stronger input to plans formed at the national level. It presents a unique capability for building up regional democratic processes which could only be duplicated otherwise by time-consuming travel among representatives of all the villages.

- *Regional Crop Planning.* Here villages could compare notes on various plans for agricultural products. Villages could compare how much planting of a particular crop they plan and perhaps arrive at a more efficient distribution.

Once again this type application would aid in producing a feeling of working together as a region. It also provides a forum for specialists to participate by offering advice on particular plans. This leads us into another application.

- *Use of Specialists.* A number of conferences could be set up on particular problem areas, such as insect control, public health, and crop diseases. Villages could submit their questions, problems, requests for special aid or visits. Each conference would have a specialist who could respond directly as needed.

In any developing area it is likely that specialists are in short supply. Such a capability would allow better use of a specialist's time and probably allow better planning of his travel around the region. Such an individual could interact with the conference from any of the villages and modify his travel plans as appropriate at any point in his trip.

- *Governmental Information Exchange.* Requests to the central government for information or aid could be entered through one conference where all the villages observe what is taking place. There might be a separate conference for each of the major government divisions—public works, education, etc.

Such a conference would have the benefit of eliminating duplicate requests from different villages. It would also put psychological pressure on government departments to be responsive in a timely manner, since everybody sees a written record of how quickly responses are forthcoming. Given that the government would be responsive (this is not a foregone conclusion, even in developed countries) this could have the obvious benefit of making the villagers feel closer to their governments. Note, however, that this visibility of government services is likely to be unpopular with government officials, and therefore could jeopardize implementation or support of the whole system.

- *Education.* The system could be used to hold classroom-type discussions where the pupils are spread out in a number of villages and the instructor is traveling or located at one of the larger towns.

Such an application would allow for a rich and varied set of educational opportunities beyond the basic literary effort. It would now be possible among a hundred villages to find sufficient numbers to justify

classes in topics that could not be supported by enrollment if done in only one village. The instructor would probably still tour the villages to meet with students individually on some sort of regular basis. However, the students could now interact with each other and carry on a continuous dialogue with the teacher between visits.

- *Personal Messages.* The system can be used to allow an individual to send a message to an individual in another village. In essence, this could be an ability to send short letters.

This personal use is important to overcoming any psychological blocks to using the system. It might also be argued that the government department that handles the postal service would be a logical vehicle for instituting the system, as it could be viewed as an electronic mail system. On the other hand, extensive use of this capability can overload the system and reduce the effectiveness of other functions, so that some form of control or upper limit must be considered for imposition when necessary.

As with all forms of communication, the particular user environment and experience will no doubt generate a multitude of applications beyond those suggested above. The use of the computer as a storage medium for the content of the communication also allows the ability to structure the communications for any particular purpose. This runs the gamut from free discussion formats to highly structured voting procedures.<sup>4</sup>

### **A word of caution**

Systems of the type I have discussed are intended for use by non-technical people. A lesson I have learned over many years is that several seemingly mundane considerations are exceedingly critical to achieving successful use. Such items as the layout of the keyboard, the form of the terminal interaction, and

the number of functions or symbols that have to be learned and remembered, can make tremendous difference in how easily individuals learn to utilize these systems. Such problems are often overlooked by individuals wrapped up in the technology. I would urge that any effort to implement such a system receive special emphasis on this aspect of its specific implementation from individuals having extensive understanding of the behavioral patterns of the intended user community.

One approach to implementation is to train one individual in the village as a "village communication." His role would be analogous to the radio operator on a ship. Assuming the individual can read and write, this training should not take more than a month and most of the effort would be to develop a typing skill. As such a position is likely to carry with it a degree of respect within the village structure, motivation should not be a problem. It is probably better from a psychological standpoint to train a villager for this function than to bring in an outsider. At one time in the United States the only telephone in a small town was at the country store and everyone went there to use it. The country store was the information center for the town. In a broader sense, the system proposed could be the nucleus of an established village information center.

There are many problems characteristic of any given area that will make some of the potential applications exceedingly difficult to implement. In certain countries the villagers must taste the salt and watch the way the seller dishes it out if they are to minimize the ratio of sand to salt. How then does a villager rely on a communication system to arrange for salt purchases? Ultimately this is an educational process for both the buyers and sellers. A system of this sort would allow all buyers or villages to exchange information easily on which salt sellers are treating them fairly and which are not. However, there will be the need to educate them in how to take advantage of such capabilities and utilize them for the general good.

### Leap-frogging the telephone system

Computerized conferencing procedures can be used to accomplish almost any function performed by other media of communications. The use of the computer introduces certain efficiencies in the use of time on the part of individuals that for many applications justifies the necessary investment in equipment. I would normally emphasize this aspect in justifying the system for use in corporations or government bodies. However, in the developing country environment I believe the psychological effects are likely to prove far more significant. Distance in a developing area is a much more critical dimension, and time a more demanding quantity. Applications that I have discussed, and others that no doubt will be thought of, could go a long way to reducing time and distance constraints. The result could be to produce a new air of closeness and cooperation, both among villages in a region and with the central government.

From a more general standpoint a detailed cost analysis would probably show that placing a terminal in each village is cheaper and more advantageous in the long run than attempting to place a phone in each

family unit. In other words, the developing country would be better off bypassing the evolution of communications that took place in developed countries and moving directly into the "store and forward" forms of communication systems that are more representative of today's digital communication technology. The "store and forward" ability of digital communications allows the breakdown of time-coincident constraints on those communicating in the same sense the phone destroyed the geographical constraints on communication.

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