Teleconferencing and Interactive Media

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Videotex (Viewdata/Teletext) Systems

Computer Conferencing and Messaging Systems

COMPUTER-AIDED TELECOMMUNICATIONS FOR THE DEAF
(A PROTOTYPE FOR THE HEARING)

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"DEAFNET" is an innovative application of electronic mail via a computer system to provide the deaf with an easy form of personal communication and to bring a flow of information into their lives. The method can benefit other handicapped groups such as the deaf/blind and wheelchair-bound persons and may very well become a prototype for the non-handicapped hearing world. The deaf population was chosen as the target group for this demonstration due to its very limited communication opportunities and the barriers imposed by their world of silence.

Present Deaf TTY Network

Presently, deaf people can communicate on the telephone, using a specially designed acoustic coupler and a second-hand teletypewriter, surplus from the Bell system, with anyone having similar equipment. Although fairly successful and used now by over 50,000 deaf people, this method of communication has serious problems. The most important one is that the system was based on outmoded equipment that is no longer manufactured, and is based on a design feature (called 5-level or Baudot code) that is almost obsolete and not compatible with modern data transmission standards. A second problem results from the mechanical models which are bulky, noisy, and not very reliable. Another difficulty is finding spare parts for maintenance of these surplus TTYs which are 15-30 years old. Also, the geographic area has grown to such an extent that volunteer repair people cannot cover all of the territory. The last but not the least of the significant concerns are the high toll charges incurred due to the time required for a typed conversation (perhaps 4 times as long as a spoken conversation) -- which is a deterrent to using TTYs.

Various electronics companies have designed and manufactured small light-weight devices that function on the Baudot code. These new units are compatible with the different models presently in use by the deaf throughout the country. These devices will improve the reliability of telephone communications but may prevent the deaf from ever participating in the new computer technology presently exploding all around us and soon to be an intimate part of our everyday lives.

With the surplus TTYs becoming harder and harder to obtain, and electronic 5-level devices becoming more and more expensive, their rising cost will eventually meet the descending cost of home mini-computers. These developments will have a profound effect upon the deaf telecommunications network as it exists today.

Communication Barriers Caused by Deafness

One of the most serious consequences of deafness in today's world is the lack of information, such as up-to-date news and weather reports that are usually broadcast hourly and general medical, legal, and consumer information that is often included in radio and TV programs. Because of this lack of information, the deaf person lags behind his hearing neighbor and co-worker in knowledge which could improve his employment opportunities and his salary level. The feelings of frustration and dependence on others are heightened by the feeling of isolation from the world at large.

The deaf person who is unable to hear the radio weather report in the morning upon wakening is also unable to call the telephone weather number and must instead look at the sky and hope his guess is right. He has not heard the latest ballgame score and so cannot enter into coffee-time conversation with his fellow workers. When that conversation turns to the latest current events, again he is an under-informed citizen and the isolation from his hearing co-workers increases. Unaware of the latest legal rights legislation, he does not know he is entitled to an interpreter for a work seminar on upgrading his employment skills, so he remains underemployed.

A recent study by NBC reports that:

95% of the cars in America have radios;

90% of people who go shopping drive; and
the car radio is used during 62% of
driving time;

60% of radio listening is done in the home;

20% in the car and 20% elsewhere.

No Wonder Hearing People Are So Well-Informed!

Modern Technology Changes Ways People Communicate

In recent years, there have been various
attempts using modern technology to help over-
come the communication barriers of deafness in
daily living. None have had the far-reaching
impact that the computer and an electronic
message system can have on those never able to
use the telephone for voice communication.

For the first time a new communication
technology promises to mean as much, or per-
haps more, to the deaf as to the hearing.
Unlike the telephone, radio, or TV, computer-
based message technology will not isolate deaf
people further from hearing people. On the
contrary, we can improve communications between
the deaf minority and the hearing community at
large by providing adequate access between deaf
people and friends, relatives and fellow em-
ployees of the members of the deaf community.

DCC DEAFNET Demonstration

Since April, 1978, the Deaf Community
Center (DCC) has been operating a demonstration
to evaluate the usefulness and effectiveness of
computer-assisted telecommunications for the
deaf. Funds for the project are provided by a
grant from the HEW Office of Telecommunications
Policy (OTP). Using leased computer resources
and the HERMES message system developed by
Bolt Beranek & Newman, Cambridge, MA, the
demonstration has interconnected individual
deaf users, state agencies for the deaf,
schools for the deaf, a hospital, a museum, a
television station caption center, a univers-
ity, and other institutions. Through the use
of telephone lines, a person can dial a central
computer and then exchange private messages or
get public messages (from a bulletin board).
The demonstration uses ASCII (8-level) ter-
minals, in contrast with most telecommunica-
tions devices for the deaf, which use Baudot
(5-level).

HERMES Message System

HERMES assists the user to compose mes-
sages, correct typing or spelling errors,
format and justify the margins, and then dis-
tributes the messages to the addressee. The
user can carbon copy himself or several others;
he can also multiple-address messages by using
a previously prepared list. When he receives
a message, a simple command allows him to re-
ply to or forward it to another person.

When a HERMES message is typed by a
sender, it is not transmitted to the recip-
ient's terminal, but is stored in a file within
a computer system. This message, along with
any other mail that has accumulated, is read
when the addressee dials the computer and is
informed that there is new mail in his com-
puter "mail box". By typing a simple command,
he surveys a list of those messages and then
may request that any or all of them be printed
out at his terminal.

Advantages of Computer Message System

One key advantage of a computer message
system is that the recipient need not be
present when a message is sent. In his
absence, the message is retained automatically
in computer memory and is available on demand
when he returns.

What other advantages does a computer-
assisted system offer that is different from
the present Baudot TTY communications network?

1.	Communication	transfer of messages electronically at high speed
2.	A Bridge	between 5 & 8-level,
		between hearing & deaf-including friends, relatives, employees of deaf people,
		between hospitals, other institutions & deaf,
3.	Information	daily news, weather, sports,
		deaf community info - i.e., community mtgs. and socials

4.	Home Education	computer-aided instruction, including improvement of writing skills
5.	School Education	language-adjusted current events, math, science, English practice exercises
6.	Home Employment	opportunity to earn money and learn new skills via telephone hookup
7.	Other Handicapped	useful to deaf-blind, including persons with severely limited vision,
		persons confined to wheelchairs, and persons with other disabilities that limit their mobility

Breaking Down Communication Barriers

Although the immediate appeal to the user is exchanging messages with friends, one of the most useful accomplishments is the speed of sending emergency announcements. Consider if you will, the fact that many members of the deaf community have gone through 12 years of school together, and while some of them may move to different geographic locations, as a group, they remain close-knit. Birth, marriage, and death announcements are a vital part of their lives -- but until the advent of electronic mail, several days could pass before important events were known.

This is more dramatically illustrated in the case of the death of a political figure such as John F. Kennedy, when many deaf people did not learn of the tragic event until 2 or 3 days later.

Where would you go for entertainment if you could not hear? Listings of captioned movies, notices of interpreted lectures, tours, meetings, church and social activities are not listed in public newspapers. The radio is useless if you are deaf. Captioned TV has had some such news, but only once a week -- usually at a very late hour, such as 11:30 PM or midnight. This information is a high priority need for the deaf and can easily be provided in a computer data base.

Emergency announcements of weather changes such as hurricane warnings, snow storms, dangerous driving conditions, school

and meeting cancellations are other bits of vital information unavailable to deaf people via present broadcast media. Alternate forms of information like many of the popular auditory dial-up tape services for medical, legal, and consumer information are inaccessible to the hearing-impaired.

Hearing relatives, friends, and employers can communicate quickly and easily when all are on the same system. The system, in turn, offers its computer "goodies" to the hearing community: latest local, national and world events, sports and weather reports -- all are as useful to the hearing as to the deaf.

For obvious reasons, radio and non-captioned TV programs never reach the deaf. Much of today's information is broadcast in this manner, effectively shutting out the deaf, while the hearing are offered vast amounts of information to assist their learning process and thus function more effectively in society.

While Cable TV does provide captioned news, etc., from which the deaf can benefit, it does not offer CAI (computer-aided instruction) which could upgrade a deaf person's educational and employment skills.

Education for the Handicapped

There is a special need for English language instruction for deaf children and adults. School instruction is important but other forms of language tutorials should be available to make the deaf person a fluent writer and capable reader. Plans are underway to present through DEAFNET a specially designed tutorial for both the production and comprehension of written English. The project, entitled ILIAD (Interactive Language Instruction Assistance for the Deaf), which is being developed under a special HEW/BEH (Bureau of Education for the Handicapped) grant to the Boston University School of Education) will be tested and evaluated by present DEAFNET users with an eventual goal for final implementation in a desk top micro-computer with a TV terminal. Most of the system components would be directly usable by any students (deaf or hearing) who wish to test or exercise their command of English.

There are many Computer-Aided Instruction (CAI) programs available, but none written with such a significant impact for the deaf community as the two described here. Both the ILIAD program and the LAN (Language-Adjusted News) are available in the demonstration DEAFNET.

Deaf people are tremendously disadvantaged in gathering and exchanging information due to their inability to hear. Deaf people whose reading level hinders and often prevents them from understanding newspapers and other print materials have had no easily understood source of news until this experiment with Language-Adjusted News (LAN). They have been able to gather only bits of information or misinformation, depending on friends or relatives for explanations, or else have lived unaware of world events.

For each regular news story that is entered into the system by the staff at the Caption Center at WGBH (Boston), a linguistically controlled version is prepared with careful attention given to control of vocabulary, syntax and inferential content of original materials.

The news service is an educational resource for adults and young people. This news is used at the schools on the system as independent reading material, or as lessons for Social Studies, English or reading classes. This service demonstrated the DEAFNET's capability of providing useful information to this population.

Value to Deaf Individual

The following comments were made by different users participating in the demonstration:

"A valuable addition to my daily living. I am becoming more and more independent."

"Reading and writing (or typing) has increased my writing and composing ability. I can see the improvement myself."

"A plus in my daily living. If there could be more people on the system, it could be even more valuable. It has been a real privilege to be a participant in this project."

"I'm happy that people are beginning to recognize the valuable part telecommunications can and will play as a means of communication for the deaf."

"I know from working in an office that it's frustrating trying to contact people when they're not there. HERMES obviously eliminates that."

"HERMES has given me almost equal accessibility to the many things that were not easily accessible or available to me before, such as legal, medical, and social information I never had before."

Service Providers Comments

The "Hearing Public" providing information on the system for deaf people indicated:

"HERMES gives us yet another way to interact with the deaf community."

"HERMES has helped us to understand some of the needs of the deaf community. If it had not been for HERMES, I am sure we would not be developing programs for the deaf community."

Usefulness to State Agencies
Serving the Deaf

It has been possible for offices directly serving the deaf community to retain better liaison with each other and their deaf clients by using the electronic mail. When these offices have important notices or information, they are able to quickly disseminate it on the network. Committee work is efficiently carried out and even the rapid exchange of reports and proposals is completed.

DEAFNET Potential in Massachusetts

The present DEAFNET is small (the demonstration has less than 100 people) but the potential is unlimited. In the state of Massachusetts alone, the deaf population is 39,000 and the hearing-impaired (the person who has difficulty using hearing alone for getting information) number 297,000 -- a substantial figure to warrant exploring the future potential and economic viability of electronic mail.

Economic Viability

Aspects to study for the future are trends in technology:

What are the costs of electronics equipment? Can a service such as DEAFNET stand on its own feet economically?

For the near term, it seems likely a government subsidy is needed; for the longer term, there is a real possibility that electronic mail services for the deaf could possibly piggyback on similar services for the public generally. To serve the deaf adequately, means must be found so that the deaf have access to the hearing community.

Since it is possible that the interfaces needed by the general business community for electronic message systems are not too different from electronic message systems for the deaf, a marriage between the two is a viable solution.

Deaf Communications Institute (DCI)

The people served by the DEAFNET project believe that their demonstration to date has been a success and they want to continue as well as expand the work that the project has begun. For this reason, the deaf users have formed a community board and incorporated as a non-profit corporation named Deaf Communications Institute (DCI).

DCI is seeking a government grant for construction of a permanent computer facility, to be owned and administered by the new corporation and controlled by the deaf. The computer facility that will constitute the "nerve center" of the Electronic Message Service" will be installed in a central facility at Deaf Community Center in Framingham and will service the Eastern Massachusetts area. Five-year plans include the incorporation of mini-computers into the network at nodes in the Western part of the state and the possibility of servicing all of the deaf in the state via electronic mail on a computer.

A proposal is presently being considered for an "Advanced Telecommunications System" for Rehabilitation offices in the state which will not only provide an internal communication system for counsellors and administrators, but provide access to deaf clients on the system. Computer service charges for such a system could provide "prime" daytime communication service to a state agency and "off-hour" communication service to the deaf users and the hearing community for a monthly service charge that would be affordable because of this concept of a shared resource.

DCC continues the third and final year of the demonstration grant and seriously looks at the role private enterprise can play in picking up services such as this to make them more viable. It is important for data processing firms and computer and terminal manufacturers to be aware of the telecommunications needs of the deaf community and to become actively involved.

Future use of electronic mail services will not be limited to the deaf. Message systems are available and their growth will be prolific in the next few years; but they need to be tailored to actually support and fit the deaf community while still remaining useful to the hearing community. This is the first time the deaf have had an opportunity to be leaders in communication. It represents a breakthrough in modern technology and a strong effort to bring the deaf and hearing worlds closer together in the mainstream of life -- sharing the vast world of knowledge and information that is growing at an incredible rate.