Implementation of a Computer-Based Communication System for Psychiatry Residents

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Abstract

In order to encourage different kinds of communication among residents who were located at a number of geographically separate sites, a computerized communication system was implemented. Priority was placed on both richness of features and ease of use. Residents were able to send private email, join public conferences, and access databases of information. The system was initially used by a large number of residents, and usage patterns are described. The introduction to information technology that residents gained from the system led to other computer projects, and an interest in the resources of the Internet.

With the growth of the Internet and other on-line services the computer is being seen increasingly as a tool for communication in addition to its original role as a calculating machine. Electronic messages can be easily created, stored, and transmitted to any location via phone lines, allowing people who are unable to meet face to face, or even schedule a telephone call, to easily share ideas and information. Physicians, because of their varied and busy schedules, have unique communication problems. Beeper paging systems are commonly used for urgent situations, but it can still be difficult to reach someone to discuss more commonplace matters.

A new platform for communicating and sharing ideas was thought to be potentially helpful for the residents at the New York University Medical Center psychiatry training program. The residents rotate at numerous sites, some of which are geographically remote from the main campus. There are three main hospitals located within an eleven block area in midtown Manhattan; a Student Counseling Center located in lower Manhattan, about 30 minutes by public transportation; a community hospital located in upper Manhattan, about 45 minutes by public transportation; and three state facilities that are located outside of Manhattan.

It was thought that facilitating communication would have a number of benefits. Residents would feel part of a more cohesive group, they would have easy access to information about the program, such as class meetings, lecture schedules, etc., and they would have access to a new environment for sharing experiences, ideas, and information that would stimulate productive thought on a wide variety of topics.

Although a computer based system offered the most flexibility, a voice mail system was initially considered because of its simplicity. The main advantage it seemed to have over a computer based system was ease of use. Everybody already

knows how to use a telephone, and accessing the increased options of a voice mail system is relatively simple. The other advantage is that once the central server was purchased, no specialized equipment would be needed to access it, and it could be accessed from anywhere a telephone was available.

The advantages of a computer based system were thought to be that in addition to sending messages to individuals, users could participate in on line "conferences" in which messages would be stored in a "public" area available to all users. Anyone who wanted to add to the discussion could read the messages already posted, and then add his or her own thoughts. On the Internet conferences that work this way are called Usenet conferences. There are thousands of them that address everything from popular culture to advanced mathematics. In addition to allowing people to share information, they also promote a sense of community. Furthermore, databases of information such as telephone directories, lecture schedules, call schedules, etc. could be easily accessed and searched. Another factor taken into consideration was that accessing information in a written form can be more convenient, and take less time, than listening to audio messages. Written messages can be quickly scanned, edited, copied, and stored for later reference. Audio messages must be listened to from start to finish, and it can be difficult to store them in an easily searchable format. Finally, the computers purchased for the communication system would also be available for other uses such as word processing.

The decision was made to implement the computer based system because it appeared to have more advantages, and because there seemed to be some value in encouraging the residents to become familiar with computer technology.

Because the system was a pilot program to examine residents response to this kind of technology, efforts were made to minimize its cost. The program was funded by the Committee of Interns and Residents which is a labor union that represents interns and residents who work for public hospitals in and around New York City.

Four second hand Apple Macintosh II SI computers were purchased. Each had 5 megabytes of random access memory and an 80 megabyte hard drive. One of the computers was used as a server, and was connected to a Syquest 105 megabyte removable media drive so that the information on the system could be backed-up. An expansion card was installed to allow three simultaneous serial connections, one local via cable and two remote via telephone lines. The other three computers were placed in areas frequently used by residents so that they could conveniently access the system during the course of their day. The software license that was purchased allowed the client software to be freely copied and distributed, so that anyone who owned their own computer could access the system from their home or office. Remote access was accomplished via 14.4 kilobits per second modems. Security equipment was also purchased to reduce the risk of theft. The total cost for the entire system was under $5000.

Ease of use was a priority that influenced the choice of the system's components. Juels found that a computer program that produced standardized psychiatric reports and orders was used regularly by only 2 of 15 physicians, and both of them had prior experience with computers (1). Furthermore, Whiteside found that most residents in

a large urban teaching hospital lacked computer expertise (2). It was felt that if too much training were required before the system could be used, the residents would be discouraged from trying the system, and would not be able to understand its potential benefits. Furthermore, the system would be most useful if a majority of residents used it, and contributed to the online forums. Therefore every effort was made to locate a software package that would be intuitive, and easy to learn.

The software package that was chosen was SoftArc's FirstClass Global-Area Communications system. It utilized a graphical user interface that allowed all of the system's features to be accessed by "point and click" actions on icons and menus (Fig. 1). The client program ran identically on both the Apple Macintosh operating system and the Microsoft Windows operating system. The software also allowed the creation of both private mailboxes and public conferences. Data security was maintained by requiring each user to correctly enter two passwords in order to log on. All data sent between the server and the client was encrypted, and users were told that they should not post any information that identified specific patients.

Computers connected to phone lines were placed in the main outpatient clinic where all PGY 3s and 4s rotate, in the emergency room where all PGY 1s and 2s take call, and many PGY 3s and 4s moonlight, and on the main inpatient teaching ward of Bellevue Hospital through which all PGY 2s rotate. Useful information and conference topics were placed on the system (Table 1), and residents and faculty were encouraged to begin signing on.

A number of training sessions on the use of the system were made available to anyone who was interested. It was felt that those who were familiar with computers, and willing to take the time to read the instructions, could learn to use the system on their own; however, we offered training sessions to attract those who do not like to read manuals, and those who needed personal attention before they felt comfortable with the system. With few exceptions, all users received some live training. The
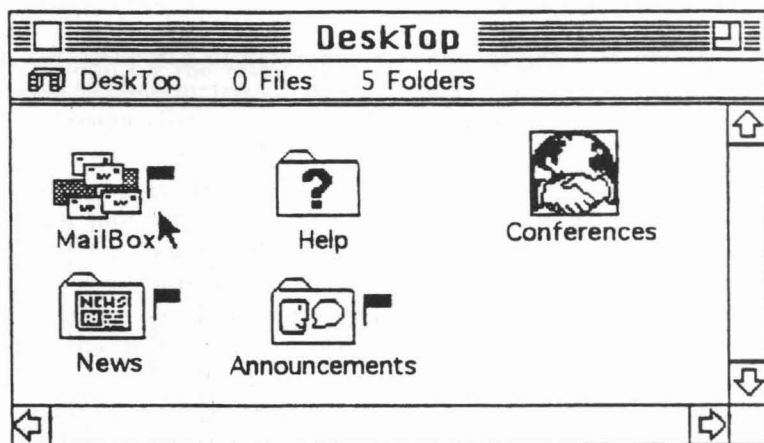

FIGURE 1. Graphically controlled software made it possible to access information with a minimum of training. Clicking on the Mailbox icon opens a window with a list of messages. The flags indicate the presence of unread messages.

TABLE 1.

Conferences	Information
Psychopharmacology	Call Schedules
Psychotherapy	Lecture Schedules
Emergency Room	Grand Rounds Schedules
Life After Residency	Rating Scales: YBOCS, Mini Mental
Residency Issues	Exam, etc.
Research	Telephone Directory
Psychiatry and computers	Insurance & Benefit Information
Evaluations by Resident	

availability of the system was communicated via flyers placed in mailboxes, announcements at residency meetings, and word of mouth.

The server software was configured to record patterns of use. Over a 1.5 year period, a total of 114 users signed on, and used the system at least once. 102 of them were residents, 5 were fellows, and 7 were faculty members who wished to experiment with the system. There were a total of 1453 log on's, or about 3.7 per day. 787 messages were sent (2 per day), and 16,116 messages were read (41.3 per day—conference messages were frequently read by multiple users). Although a fairly large number of people signed on at least once, most did not use the system regularly. There was a core of about eight users, all of whom had previous experience with computers and an on going interest in them, who used the system regularly, and posted most of the conference messages.

The most popular conference was "Psychiatry and Computers." Users posted articles downloaded from the Internet about the use of computers in psychiatry, debated the relative merits of online versus face to face discussions, announced computer training sessions, copied demonstrations of commercial psychiatry programs for downloading, and engaged in general discussion.

"Psychopharmacology" was also popular. Users posted information from the Internet, pharmacology questions and answers, general drug information such as dosing schedules, and occasionally a case history.

"Evaluations by Resident" was set up so that all postings would be anonymous. Residents used this conference to comment on elective rotations, faculty supervisors, and psychiatric text books to help other residents make informed decisions. Rotations about which residents had complaints received the most postings, so the conference appears to have served a cathartic role as well. For example, one resident complained about a supervisor who was unhelpful, and difficult to work with. He advised future residents rotating to this site to avoid this particular supervisor, if possible. Security features of the software allowed this conference to be restricted to residents only.

"Life After Residency" was designed to serve as a forum for graduating residents to pass along career planning information that they gained from their job search. Unfortunately members of the PGY 4 class signed on to the system very infrequently. One user posted a table of average starting salaries across the country. Information on, and discussions of, managed care were also posted.

When the communication system first went on line, there was substantial

enthusiasm among residents with an interest in computers, and prior experience using them. These residents used the system frequently, and obtained useful information from other sources, which they posted for the benefit of the community at large. Residents who did not have experience with the system were initially curious, took the time to learn the basics of the system, and signed on a few times. However, they did not use the system regularly or consistently. After a little more than a year, when the novelty of the system wore off, and it became clear that the system was not being used by the community at large, use by the core group of contributors began to taper off, and eventually stopped completely.

There were multiple possible reasons why the system never became popular with the majority of residents. Some residents reported that they had not noticed any problems with traditional means of communication, and did not feel a need for new forms of communication when rotating at remote hospitals and clinics. These residents tended to socialize frequently with colleagues, either in person or over the phone. This form of contact enabled them to keep in touch with what was happening throughout the medical center. The stereotype of the socially awkward computer user is an exaggeration, but may suggest that those people who tend to be most enthusiastic about the use of computers have less opportunity for obtaining desired information through social channels.

One of the most valued resources for residents is time. As mentioned above, there was not enough money to put a computer on each residents' desk, and consequently residents wishing to use the system had to take the time to locate a terminal and sign in. This process usually involved getting a key from one of the administrative staff, because a great deal of importance was placed on the security of the machines. This tended to be a cumbersome process that took a significant amount of time. The process of signing on, checking one's email, and briefly looking at the conferences took about five to ten minutes. It is possible that given the busy schedules of the residents, they felt they did not have enough time for this kind of activity, or the benefits they derived from using the system did not justify the time spent.

The terminal that was used most frequently was the one placed in the emergency room. This terminal was not locked, since staff were present 24 hours per day. The computer pointing device (mouse) was stolen once, but it was replaced inexpensively, and no other damage or theft occurred. This terminal was used most frequently by residents on call. The unique situation of the on-call resident meant that the resident had to be present in the emergency room, but often had time when there was no work to be done. This presented an ideal environment for exploring and experimenting with the system.

The usefulness of the system would seem to increase as the number of users who regularly contributed to it increased. Larger numbers of users would allow for more active and interesting conferences, and greater confidence that email sent to any given resident would actually be read. It may be that there never was a critical mass of users at any one time for the system to achieve its goal of representing an easily accessible community of users sharing information and ideas.

The project was conceived and implemented by a resident, and funded by a

resident organization. The residency training office did not make an explicit commitment to the system, which was appropriate given its experimental nature. Nevertheless, this lack of support may have led residents to view it as extraneous to the program. Usage might have been greater if there had been an expectation by the training office that residents would use the system.

Some residents were put off by their conviction that they were incapable of learning how to use the system. These residents did not attend training sessions, and when asked why, said that they felt that no amount of training would be able to overcome their basic ignorance of computers. One of these residents was persuaded to try, and she was able to learn how to use the features of the system quickly and easily. She was interested in the novelty of the system, but had difficulty understanding the relevance it might have to her work. For this reason, she did not use the system again following the training period.

A great deal of attention was placed on ease of use, and there was no evidence that any interested resident had trouble learning the system. Explaining the advantages of this new kind of communication proved more difficult. Digital communication does not replace other kinds of communication, but enables a new environment of discussion and information. It is by no means obvious what the ultimate value of this new environment will be, and the pace of change continues to be very rapid. Most people have at least a vague idea of the kinds of digital communication being used and developed, but it is less easy to understand what it is good for. In addition to understanding the procedures needed to make the technology work, potential users also need to be exposed to examples of the usefulness of these tools.

This exposure is currently taking place as the mass media devotes attention to the evolving uses of digital communication. Persuading someone of the value of these tools may involve more than an instruction booklet outlining the features. In the absence of a compelling reason to learn the technology (such as it being a requirement of one's job) the process might be more of a cultural change that can only occur gradually.

The multiple problems with the system allows for multiple potential improvements. Different approaches to this kind of a service might have increased the likelihood of it being more widely used. A system developed at Yale-New Haven Hospital to assist psychiatric residents on a consultation service was more positively received (3). Its success may have been due to the wide variety of services offered, including Medline literature searches, and the explicit expectation that residents would learn and use the system. Another possible improvement would have been to base the system on standard Internet protocols rather than the proprietary SoftArc system. Residents would then have been able to access a great deal more information via the Internet, and may have found it more useful. At the time the system was developed, tools for making information available via Internet protocols were still very difficult to use. Most required a knowledge of the computer language UNIX, which the author lacks.

Another approach to increasing acceptance of a computer system would be to associate it with a preexisting service that is so important that residents already sign

on frequently—such as a lab result database. Because the use of this type of information system is essential to the work of residents, they are willing to devote time and effort understand it. Finally, increasing the number of access points, ideally making the financial commitment to putting a computer on the desk of each resident, might make using computers more of a routine part of a resident's work.

The experimental system was successful in some ways. It encouraged residents to think about how computers could potentially be useful to them in their work. A discussion of this topic in the "Computers and Psychiatry" conference led to the formation of a face to face computer group that focused on training computer novices to access information on the Internet. One of the residents who formed this group went on to develop a sophisticated "Home Page," or area on the Internet for the department of psychiatry (4). Another resident who was very active on the system became interested in investigating how computers can help to improve access to information in the patient medical chart. This resident is currently looking at how different data storage strategies effect the kind of information that is accessible, and what type of information is entered. A large number of residents became interested enough in computers to purchase their own, and their experimentation with the residency system eventually led them to the Internet where they had access to a much larger community and more information.

The computer is a powerful tool for communication, and can be especially helpful for those whose schedules makes it difficult to meet face to face or speak over the telephone. Current technology allows for the creation of powerful messaging and conferencing systems that can make useful information easily accessible. Those with prior experience with computers are most likely to accept such a system, and understand its potential. Users without a preexisting interest in computers might be less willing to put in the time necessary to learn and use the system. A firm commitment by the residency training office, and a system with multiple uses, especially those essential to the residents work, may increase the likelihood of broad acceptance. Because of the enormous amount of information on the Internet, systems that allow users easy access to it would be most likely to be viewed as useful.

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