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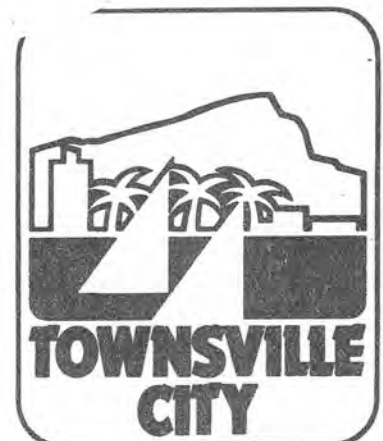
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The Use of Electronic Mail in an Educational Institution

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Abstract:

UCQ, in common with most Australian academic and research institutions, now accesses the outside world through AARNet. Internally almost every Faculty and Department is responsible for providing its own system to access electronic mail. University staff and many students now have access to electronic mail, sometimes through a variety of desktop systems, alternatively using central computers.

This paper examines the introduction of electronic mail into a university faculty where computer literacy was minimal and traditional communication patterns were relatively formal and bureaucratic. It documents some of the problems, and the conflicts, which arose in the use of the new system.

This paper, part of a larger study of the management of technology and change in a tertiary institution, focuses on the introduction of electronic mail within the Faculty of Health Science (FHS) at the University of Central Queensland (UCQ).

Computing facilities on the UCQ campuses have literally exploded over the last five years, and computer usage is now an integral part of every Faculty. UCQ still provides central computer resources, particularly for administrative purposes and off-campus communications, but increasingly individual Faculties and Departments are purchasing and operating their own dedicated facilities.

Until recently electronic communications were restricted to the traditional computer users—primarily the Computer Centre and staff involved in teaching computing. They used a variety of systems including KEYLINK, UNIX/VAX mail, PROFS, and direct connections through AUSTPac.

UCQ, in common with most Australian academic and research institutions, now accesses the outside world through AARNet. Internally almost every Faculty and Department is responsible for providing its own system to access electronic mail. University employees, and many students, now have access to electronic mail, sometimes through a variety of desktop systems and local area networks, alternatively using central computers.

In 1989 the Faculty of Health Science made a major commitment to computer based learning for the delivery and management of undergraduate teaching. This commitment included the building of a basic

computing infrastructure (student laboratories and staff computers, applications software, local area network, and training) and the local development of instructional materials. The Faculty's program was accelerated by the receipt of \$300,000 over two years from the National Priority (Reserve) Fund for the development of the CAL/CML materials.

The Faculty is now one of the leading users of computing technology both within UCQ and among state and national health training institutions. Health Science staff routinely use computers for everything from sending electronic mail messages to developing instructional materials, from collaborating with overseas colleagues to preparing their own conference papers and research reports, if not actually using them as part of their data collection process. Students likewise must use computers for preparing many of their written assignments as well as their tutorial work with the CAL materials.

The changes in computer usage have not come about without difficulty, and have required staff, at all levels of the university, to adapt their ideas, policies, and practices to the new computing realities.

Novices and the Fear of Computers

The small, predominantly female, Health Science staff had a minimum of computer literacy in 1988. An initial concern was the possibility, perhaps even probability, that the staff and students would react negatively towards computers because they either feared or did not understand computer technology.

In one sense this concern was unfounded. By early 1992, many of the staff had become very enthusiastic

users of computers and the related technology. Their enthusiasm, and their insistence that student assignments must be presented as computer output (primarily word processing), helped overcome many of the students' fears as well.

In another sense, the concerns were well founded.

- The installation of staff and student facilities did not occur smoothly.
- Hardware often failed to arrive as scheduled, or if it arrived, had to wait upon over-extended Computer Centre technicians for installation.
- Software 'fixes' sometimes added more problems than the bugs they were supposed to fix.

Because the computer was viewed as an essential tool, and was expected to function *exactly* as promised, students and staff alike were frustrated when the tool did not work properly or responded too slowly.

Some users failed to understand that many of the computer problems were not only universal, they were beyond the control of the computer staff to resolve. These students and staff responded as if they felt that the computers, or more often, the Faculty's computer staff, were deliberately sabotaging their work.

There were problems installing electronic mail services and the computer network(s), for example, that resulted in a significant loss of time and energy for many users. Those users who were not enthusiastic in their support for computerisation sometimes used the loss of services as an opportunity to cease using the system, particularly the electronic mail. Others, while not engaging in active sabotage, may have deliberately ignored basic preventative procedures. One or two individuals, for example, always seemed to have forgotten to save critical materials, or to have 'wiped' a disk, immediately prior to a critical assignment or report being due.

Unfortunately, the repeated problems experienced as computer novices struggled with understanding the computer system may have been misunderstood by their more computer literate colleagues. To the extent that some of the problems represented a genuine plea for a better explanation, and to the extent that the computer staff were overwhelmed by their responsibility for maintaining services, the plight of these novice users may have been ignored.

As the staff grew larger it became progressively more difficult to hold staff training sessions and to ensure that every staff member with a problem received prompt and appropriate assistance. In March 1990 it

was possible for the author to meet with the three staff members most involved and arrange a weekly schedule which alternated between information and training sessions. As staff increased it became almost impossible to find times that were convenient for most staff, and the priorities of teaching frequently led to cancelled training sessions. Student training sessions were easier to organise but, unfortunately, also received a lower priority than maintaining services.

The problem of training for new users has been recognised in other parts of the university. The UCQ Division of Information Technology (Computer Centre) began upgrading their User Services support in 1992 to include both an on-line (electronic mail) and telephone 'Help Desk' service.

It's our responsibility in Computing Services to do the training for all those things associated with computing or information technology-and in information technology I'm including such things as the fancy phones that people have got who, you know, they just pick them up to make a simple call because that's all they've been taught how to do. there's lots of other things that can be done but the training hasn't been done.

I know in a few of the American Universities-lots of the American Universities and certainly in some of the Canadian ones. the computing centre. run[s] non-accredited courses to teach students how to use a word processor, how to use a spreadsheet and how to run a simple database. And they're the sorts of things we would like to do here. If the [academic unit] wants to go ahead and teach them more advanced work, then that's fine but the essentials-of just getting on there and being able to type up an assignment-is a skill that we should teaching, we should be making available to the students. (Computing Administrator 1992, taped interview, 27 May)

The provision of these services centrally, however appropriate, now waits on funding. In the meantime other academic units have also forged ahead with their own programs. The Department of Mathematics and Computing, for example, has expanded its student support services to provide weekly hands-on tutorial assistance in one of the IBM/MS-DOS labs, videotaped tutorials and demonstrations of basic procedures, and a telephone 'Hot Line' service for first year students from all Faculties.

The Network and Electronic Mail

The computers within Health Science have been linked together in a network for sharing files and other resources since the acquisition of their first

Macintosh computer (1988). The original network implementations relied solely on the built-in LocalTalk facilities of the Macintosh.

The staff portions of the network were quickly upgraded to use a central file server and related software for communicating beyond the Faculty, accessing licensed software, and sharing resources (primarily printers). The network has since been upgraded several times and currently uses both AppleTalk and Ethernet connections to a Faculty-owned central file server.

The nursing student lab has used both a broadcast-type file server (designed to quickly broadcast copies of the same software to every connected computer) and AppleTalk-based connections to a less powerful Faculty-owned file server. Future expansion, and software maintenance, is possible through its connection to the Faculty file server.

Electronic mail (email), the computer application which allows staff to exchange messages electronically, was one of the first applications implemented on the staff portion of the Health Science network. Staff use the system to the extent that they identified electronic mail as one of their computer primary applications-in series of staff interviews in 1992 most staff mentioned word processing and electronic mail as their first two computer applications. Students also noted that Health Science staff used the electronic mail system, sometimes in preference to other forms of communication.

We could easily notify all the lecturers of up coming events, whether it was a BBQ on the Friday, whether it was the Ball, or whether it was something else that we wanted all the lecturers to attend.-it was so simple to put it up on email. (Health Science student 1993, taped interview, 10 February)

It seemed to me that they would read email first, before they would read big signs right in front of them that would nearly trip them over. We did have better attendance when we put things on email. Everybody read them on email, but not everybody read them on noticeboards. (Health Science student 1993, taped interview, 10 February)

The Dean, an early and constant user of electronic mail, provided much of the incentive for establishing a workable system within the Faculty, however, even she was amazed at the degree of acceptance of electronic mail by the staff:

I'm just utterly amazed that people have taken to things like the Email system as well as they have, because I thought there might be a lot more resistance. but I haven't really heard [much] opposition. (Dean 1992, taped interview, 7 February)

The message system within Health Science is linked to one of the UCQ central computers via the Faculty file server. The UCQ system is linked to the Australian Academic and Research Network (AARN), with the result that messages can be easily exchanged worldwide.

What is Electronic Mail?

Electronic mail, or email as it is commonly known, provides an almost instantaneous, worldwide, paperless, communication system. Messages are submitted in the form of brief memorandums or ASCII files and transmitted through a wide area network (WAN) commonly called the Internet. The Internet, through dozens of related WANs, is a free-to-the-user, cooperatively operated, electronic highway connecting many of the world's academics and researchers. Commercial and semi-commercial services, such as Keylink and the South Australia/Victoria network for rural medical practitioners, are also available.

The Australian Academic and Research Network (AARNet) is funded by the Australian Vice Chancellors Committee (AVCC) as the Aussie connection to the Internet and provides services to every university and major research facility in the country. QuestNet is the agency which manages the network within Queensland.

A network user gains access to email through a computer connection maintained by one of the participating agencies, often the local university. Addressing conventions vary from institution to institution, computer to computer, and network to network, but most users have an address in the form of *name@computer.institution.network*. From this address, the network locates the recipient of the message, forwarding the message from system to system and country to country. Ultimately, the message is deposited in the recipient's host computer, and is held for reading and a response when convenient.

Unfortunately, electronic mail has not received as wide an acceptance as was anticipated, and in some quarters is actively discouraged. The gossip on the network even suggests that the US portion of the Internet will be disbanded as a free-to-the-user service, and the AARNet in Australia has had similar funding problems.

The use of electronic mail was not without its complications. Successful electronic mail operation requires the network to function reliably and to respond in a specified period of time. As one academic staff member notes, the network quickly becomes a required part of the office and work suffers when the network goes down.

[I cope] by screaming and shouting a lot. like everybody else, [I] go outside for a coffee. it's amazing when it is down, and you're here, it's like you can't figure out what you should do because you're so used to it being on and you think, 'Oh well, I'll do this', and then you think, 'No, I can't because it's on the computer'. so, yes, it's become an extension of what you do. (Academic staff 1992, taped interview, 26 February)

The successive upgrading of the network system is another testimony to the inadequacies of the network at various periods of time. At one point, the academic staff even allocated \$14,000 of money that could have been used for staff travel and other benefits to the network upgrade.

UCQ students in Faculties with business, computing, or engineering subjects have electronic mail access through their use of the general purpose computer laboratories, although many would never check their mail. While it has always been a goal of the Faculty to provide nursing students with electronic mail access, hardware, software and staffing limitations have delayed this implementation.

While the first Vice-Chancellor (previously the Director) used electronic mail for administrative communications and promoted its use across the campus, electronic mail does not have universal acceptance across the campus.

- Some senior administrators use the system, others request their secretaries to read the mail on a regular basis and prepare paper copies.
- Most academic service units respond to electronic mail but may prefer other forms of communication.
- Many support units (Works and Services, Educational Media, et cetera) do not have electronic mail connections.

Academic staff in Health Science, Applied Science, and Engineering generally have desktop access to electronic mail. Even within the Department of Mathematics and Computing, however, less than half of the staff check their mail more than once per week, even though their students are encouraged to

communicate using the system. While all UCQ academics have access to electronic mail through the general purpose computer labs and dedicated Faculty or Departmental laboratories, some academics may not have access to electronic mail within their work area.

The Health Science local area network is also used to control access to licensed software. Most staff and students use an integrated software package, currently Microsoft Works, for their word processing, spreadsheet and database work. Network licenses for this and other software is significantly less expensive, and easier to maintain, than individual packages for every user. Similarly, a relatively small number of printers, connected to the network, can provide for the needs of a large number of users.

Staff and students generally operate on different segments of the network, but even then the network delivery of computing resources means that the both are dependent upon the network for almost all of their computer activities.

Maintaining computer services to staff, while always a priority with the support staff, has not always been successful. By the end of May, 1990, for example, Health Science had moved into its new building and been connected to an internal Local Area Network (LAN) with connections to the university's central computers. While attempts had been made to lessen the disruption to staff during the move, delays in installing the LAN cabling had resulted in staff reverting to single drive computer operation for several weeks. New LAN cable had to be ordered and installed as it was discovered that the cabling pre-installed during construction had been damaged beyond use or destroyed, some of it buried in one of the few poured concrete walls.

The Project's highest priority was the moving of the computer equipment and all computing equipment was moved by the project team itself. Academic staff who were to have computers on their desktops were able to pack up their materials and move directly onto their new computers as we installed these machines from our lab stock, packing up their old machines for installation into the lab at a later date. Three other machines were also made available to staff in the upstairs 'part-timer's office' so that no staff would be disadvantaged. Unfortunately, as the network connection was delayed, these machines had only a single floppy drive. lots of disk changes for their use [ellipses in original]. (1990, CAL/CML Project Progress Report to VC's Advisory Committee, UCQ, 25 May)

Email Use-General Considerations

The nature of electronic mail also imposes some limitations. Electronic mail provides all of the normal communications possible through a textual medium (typewritten mail, telex), and has the additional advantage of being fast. To ensure that email can be sent to any conceivable type of computer system, including some with quite different character sets and file formats, it tends to have difficulties handling graphical materials and formatted text (word processor or desktop publishing output). In addition, since many messages are very brief and informal, conveying emotions and inflection are difficult-but not impossible, as the following email conventions illustrate:

:-c	Real unhappy
:-	Grim
:-C	Just totally unbelieving
:-v	Speaking
:-,	Smirk
:-V	Shout
:-	Anger
:-)	Smiling
:-(Frowning
:-*	Oops!
'-)	Wink

The interface, the way in which the user interacts with the computer software required for email use, is often abysmal. Most email systems, particularly those supplied 'free' (and often without documentation) by university computer centres are based upon interface designs and technologies developed back in the 1960s for programmers and other computer professionals. Newer software, particularly for GUI (Graphical User Interface) systems such as the Macintosh computer, have made email use much easier for the general user. It would be impossible to prove, however it is the author's personal opinion that the Health Science usage of electronic mail would NOT have occurred without the friendlier, albeit still buggy, Macintosh software.

Privacy of electronic communications is also an issue and, for some users, perhaps because they do not wish to demonstrate their relative computer incompetence to colleagues, extends to a need for privacy when reading email. At UCQ, for example, we have had academics refuse to use email until they had a computer or terminal on their own desktop. The shared terminal, often in a corner of the staff common room or departmental office, was considered to be too public.

There are other, more important aspects to the privacy issue. As Col. Oliver North discovered, electronic mail messages may be archived forever on the host computer, and there is some question as to who owns the messages on a system provided by the employer. Until the laws are revised to accommodate newer technologies, and email has been with us for at least three decades, there will continue to be some problems.

In any event, the technology is inherently 'leaky', particularly over a LAN (Local Area Network) where messages are seldom encrypted. It is very annoying, for example, to have a computer centre functionary respond to a message sent to a colleague, before the colleague had an opportunity to receive the message. The rationale for such behaviour? The individual was apparently 'monitoring', ie. reading, all of the electronic mail, an easy task for someone with 'system operator' privileges, to determine usage.

The technology is leaky in another sense as well. Because of the speed and ease of use, it is very easy to snap off a response without proper consideration of what should have been said, leading to hurt feelings, poor communications and potentially even a lawsuit. It is easy to forget that anything in electronic form can be easily forwarded, possibly to several hundred or several thousand recipients. It would be quite embarrassing, for example, for an ill considered private message to be forwarded to every one of your colleagues.

The system, not surprisingly, also has the potential for harassment and fraud. One now ex-student at UCQ discovered that sexually abusive email messages could be traced, and that they were no more favourably received than if they had been delivered by mail, telephone, or in person. The lax security functions on many computer networks also provide the potential for one user to masquerade as another, sending messages as if they came from the second user. Many systems maintain enough records to trace such abuses, but the concern remains.

Conclusion

Introducing a new technology is problematic in any institution, and universities are no exceptions. The introduction of electronic mail into the UCQ Faculty of Health Science was a relative success, regardless of the limitations of the technology, because the demonstrable benefits outweighed those limitations.

There are over 7,000 interconnected networks worldwide with new networks being connected in Africa, Asia, and eastern Europe. Users on all of

these systems can send electronic mail messages to any other user. Directories of users, WAIS (Wide Area Information Service), Archie (a system of sites providing commonly used files and services), and Gopher (a tool for searching the network for specific information) are current tools to make working the network easier in light of its exponential growth in the last five years.

Electronic mail has its difficulties, both technical and human, but these are outweighed by the obvious advantages of an inexpensive global communications system.

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That case study is the focus of the author's soon-to-be-submitted PhD thesis at The University of Queensland, and involved the participation of several dozen such individuals as well as his advisors-Dr Brian Carss and Dr Mary Ann McLees.