Next Steps

Introducing Computer-Mediated Communication into a Distance Education System

Tony Kaye

Abstract: Distance education institutions teaching at university level now exist in a wide range of countries, and many of these institutions cater successfully to very large numbers of students. However, opportunities for discussion and collaboration between dispersed and isolated students and tutors in such institutions are often severely limited. It is argued that computer-mediated communication methods could in principle have a powerful role to play in enhancing communication between and amongst students, tutors and course development staff in distance teaching universities

This article examines the potential of computer communications in a distance education context with specific reference to some early trials of electronic mail and computer conferencing at the British Open University. Three main challenges are identified in trying to introduce this new technology: scale, integration and optimisation. Barriers to acceptance of computer conferencing as an educational medium for distance learners and tutors are described and analyzed. Particular emphasis is placed on the importance of the role of tutors as potential moderators of conferences for distance education.

INTRODUCTION

Distance education methods for university level studies are now part of the normal educational scene in many countries. For example, in Britain, applications for undergraduate courses at the Open University (OU) in 1986 exceeded 56,000, even though only 20,000 new places were available. Altogether the OU has more than 120,000 students in its undergraduate and continuing education programmes, making it Britain's largest university and training agency. Other distance education universities deal with even larger numbers of students. For example, the Central Chinese Radio and Television University with over 800,000 enrolments, the Sukhothai Thammathirat Open University in Thailand, and Universitas Trebuka in Indonesia are likewise demonstrating that distance education at university level is being adopted successfully in a wide range of contexts (for recent discussions of distance education at university level, see Rumble and Harry, 1982; and Henri and Kaye, 1985).

Tony Kaye is Senior Lecturer, the Institute of Educational Technology at The Open University, Milton Keynes, MK7 6AA UK. His research interests include the development and analysis of communication methods for distance education. Reprints may be obtained from the author at the above address.

However, despite this degree of success, there is room for improvement in the methods adopted by institutions of mass higher education; in fact there are a number of problems associated with the teaching methods currently used by these large-scale distance teaching enterprises. Some of these problems are linked to the shift of the major cost elements in distance education, as opposed to face-to-face education, from student-related, recurrent, teaching costs to course-related materials development and infrastructure costs. They include:

- the expense of up-dating and modifying mass-produced print and audio-visual materials (a course life of 5-8 years seems to be generally considered as necessary to amortise high materials development costs);
- the difficulty of introducing innovations in teaching or delivery methods into highly standardised and centralised production and distribution systems;
- the relative inflexibility of many distance education methods in responding to individual students' needs, interests, and experiences; and
- the limited opportunities for dialogue and group interaction amongst students, and between students and tutors, within what is predominantly a one-way communication system.

Some of these problems can become particularly acute when a system originally designed for handling very large population introductory courses is required to deliver, *nationally*, a wide range of higher level low population courses, in response both to the diversity of student interests and to academic expectations of what constitutes a comprehensive university curriculum. In 1985, for example, over a quarter of OU undergraduate courses had less than 200 enrolments. In addition, a number of low population post-graduate courses are being added to the academic programme.

In principle, there are a number of ways in which the new information technologies (see Figure 1, next page) could be applied in the OU system to help overcome some of these problems — when and if sufficient numbers of students and tutors have access to the necessary home-based computer equipment. Electronic storage of text materials could allow for on-demand printing (thus enabling material to be easily revised and up-dated, *and* avoiding warehousing costs), for establishment of course-related and administrative data-bases, and for mailing of interactive text to students on disk. CAL software, as now, could be made available for on-line access, or mailed to students on disk. And, central computer conferencing software could provide an opportunity for easy communication and interaction amongst our widely dispersed populations of students and tutors.

The University has in the past been a major innovator in the use of computers and information technology, in the running and administration of its system (i.e., student registration, fee payments, records, assessment, etc.), in communications between the thirteen Regional Offices and the Milton Keynes campus, and in its teaching (e.g., use of CAL materials in many science, mathematics, and technology courses). The University's Academic Computing Service (ACS) network provides computing facilities at terminals in around 300 local study centres, as well as to a small number of current and planned courses which require students and tutors to have home microcomputers and modems. Users can access this network from a number of dial-up nodes throughout the country, generally based in the University's regional offices — this provides around two-thirds of all current students with local or 'a band' call rate access. The justification for home computing facilities has generally been made in terms of students needing to spend significant amounts of time

FIGURE 1. *Using the New Information Technologies in Distance Education.*
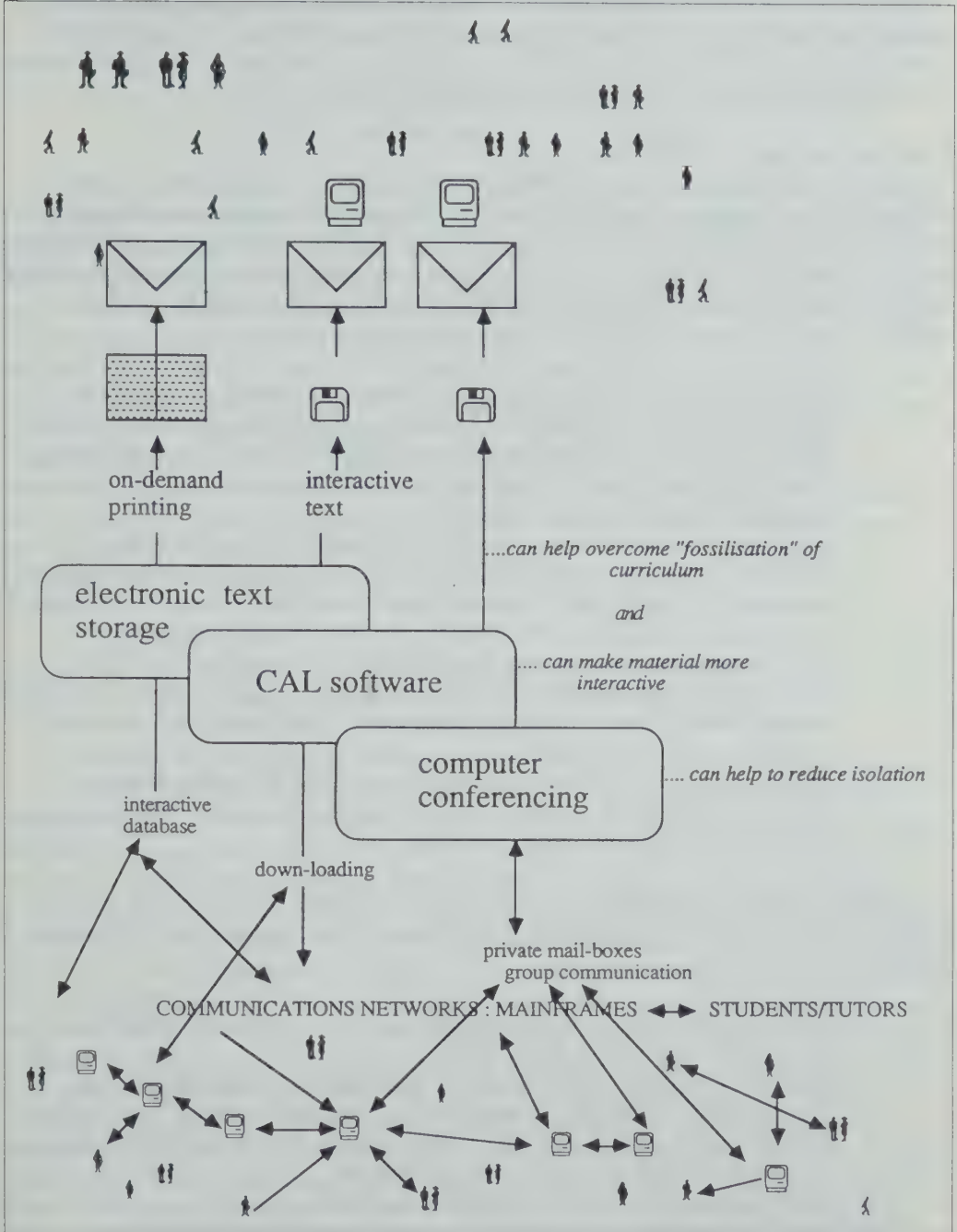
to upload and download software from one of the mainframe computers, to carry out complex mathematical and statistical operations, to access CAL material, or to learn programming skills and languages.

However, little practical thought has been given so far to the potential of using home-based computer facilities to enable students, tutors, and central and regional faculty and administrative staff to *communicate* with each other through electronic mail and computer conferencing, nor to the ways in which on-line facilities could be used for relatively economical up-dating of courses (e.g., through the creation of course data-bases).

Computer-Mediated Communication

Electronic mail and computer conferencing are both examples of current computer-mediated communication technologies. These technologies allow individuals and groups of people to carry on discussions and conversations over a computer network regardless of time and place constraints, via messages keyed in to microcomputers connected by telephone to a central computer. Four features stand out as being practically tailor-made for use by students, tutors, and course developers in distance education systems:

- once the equipment (microcomputers, modems, mainframe) and necessary software and network facilities are in place, *communication costs are very low* (the great majority of OU tutors and students should be able to access our mainframe computers at local call rates of about 50p per hour [= about one Canadian $] on evenings and weekends);
- communications, whilst being virtually instantaneous to the mainframe computer, are *asynchronous,* unlike face-to-face meetings or telephone calls and conferences (messages can be entered and retrieved when convenient to users of the system, permitting time for reflection and for thoughtful composition);
- all communications are *stored* until deliberately deleted, and can be filed in such a way as to be immediately accessible when required — a feature not found with face-to-face and telephone communication unless burdensome recording procedures are employed; and
- the processing power of the mainframe computer and its communications software can be used to *organise* and *structure* inputs, outputs, and communication patterns in a variety of different ways.

This last point is of particular importance. Although current computer conferencing software packages vary in their degree of sophistication, several can support the following functions:

- electronic mail, both one to one and one to groups, usually with automatic signalling of mail that has been read;
- computer conferencing, with the ability to assign specialist roles to different participants (moderator, secretary, read-only membership, etc.), and with different categories of conference (open, closed, private) and in some systems, the possibility of creating branching conferences;
- private notepads for personal documents and notes;
- signalling of current on-line participants, with the possibility of synchronous communication;
- a directory of members with users' names, addresses, interests, etc.;
- on-line text editing;
- free text search and retrieval, enabling participants to access messages by

topic, date, name of sender, or by any given string of characters in either the text or header;

- voting or polling on forced-choice questions, with instantaneous display of results; and
- transfer of files, both to and from other systems (e.g., data-bases, electronic mail systems) and to and from the user's microcomputer.

A computer-mediated communication system is thus qualitatively different from other interpersonal and group communication media. In our context, it should be seen as a new medium which could permit us to do new things, and not simply as an electronic replacement for correspondence tuition, face-to-face tutorials, or telephone contact. In fact, there is some research evidence to demonstrate that introducing computer conferencing technology into organisations and communities (e.g., dispersed communities of scientists) may actually *increase* the frequency of other forms of communication, partly because it enables people who would never have met/communicated otherwise to make contact with each other very easily (see, for example, Kerr and Hiltz, 1982; Hiltz, 1984). Participating in an open computer conference, can be highly serendipitous. One can type in a suggestion, or a request for help or advise (rather like throwing a bottle with a message in it into the sea), and then discover upon logging in a few days later that several other, possibly unknown, participants have responded with suggestions and ideas. As a result, networks of relationships and contacts can develop in totally unanticipated patterns.

THE POTENTIAL OF COMPUTER-MEDIATED COMMUNICATION FOR DISTANCE EDUCATION

Assuming that the necessary pre-conditions can be met (Bacsisch, 1987), the challenge of introducing this technology into a complex distance education system like the Open University's will lie in developing new forms of course design which can not only accommodate this new medium, but also exploit it to its best advantage. This needs to be done without overloading the system, and thus leading to large increases in course presentation costs. Merely adding such a facility to our present course model may not only represent a significant additional cost, but also be pedagogically ineffective. There is little experience to go on, as yet, in the educational applications of computer conferencing within dedicated distance teaching systems like that of the Open University. Current educational applications are either as an alternative to correspondence tuition for external students (e.g., at New York Institute of Technology, see Haile and Richards, 1984), as a tool for in-service management training at the Western Behavioural Sciences Institute (Feenberg, 1986), as a supplement to conventional face-to-face teaching, as at Guelph University, or as the unique teaching medium on totally *electronic* Master's level courses, as in the Connected Education project at New School for Social Research in Manhattan, which uses the EIES computer at New Jersey Institute of Technology (reported in Kaye, 1985). Only a few reports of specific projects using computer conferencing in conjunction with other media, specifically for distance education, have been published to date (see Davie and Palmer; 1984; Harasim, 1986).

Study of projects such as these would lead us to believe that, as far as pedagogical issues are concerned, there will be three main challenges in trying to use computer-mediated

communication in the Open university situation:

- *scale:* most current applications of computer conferencing in the educational field have concerned small groups of students (i.e., in the tens), rather than the much larger student populations typical of many distance teaching projects;
- *integration:* this new technology must be integrated not only with existing print and audiovisual media, but also into complex course development and presentation systems, involving central teams preparing materials to be tutored by intermediaries (to make best use of these new technologies, it will undoubtedly be necessary to re-think many of the standard course development and presentation methods, and this will probably involve major enhancements of tutors' roles); and
- *optimisation:* it makes little sense to use these technologies merely to replace existing procedures (e.g., electronic mail as a substitute for postal correspondence or phone calls, computer conferencing as a substitute for face-to-face tutorials), since the unique characteristics of computer–mediated communication should be used where they can provide maximum benefit in terms of the quality of learning which they can promote.

The problem of scale can be tackled in several ways. Firstly, a clear distinction should be made between one-way and interactive use of computer-mediated communication. In the former case, one could envisage, for example, the use of a data-base under the control of a designated member of a course development team, to be used for stop-press and up-dating items (thus helping alleviate the problems of inflexibility and fossilisation of mass-produced course materials). Course developers and tutors might be invited to submit suggested items for inclusion to the data-base editor, and students would have read-only access. Such a facility would work equally well regardless of the total number of students on the course — in fact the cost advantage of computer-mediated communication over postal mailings increases with numbers in this case.

In the latter case, interactive use in the individual or group mode, the tutor group might be considered as the basic unit within which communication occurs. The Open University norm of 25 students to one part-time tutor fits well within what is probably an optimal group size for computer conferencing applications such as on-line seminars and tutorials. It is also a size which easily permits the establishment of self-help groups, especially as the students would have had the opportunity to meet face-to-face and thus get to know each other personally.

However, this does not imply that communication should occur *only* within individual tutor groups. One could envisage, in addition, the setting up of a conference which could permit all tutors and course developers to share information. Such a facility could be used for briefing, comparing marking and tuition practices, obtaining specialist help, evaluation, and feedback. Finally, on relatively low population courses, it would not be out of the question to have a general course conference to which all students and tutors could contribute.

Integration of computer-mediated communications into an existing distance teaching system is a more problematic issue than that of scale. It is probably only through experience of using the technology that the best ideas will appear for integrating the medium

with core course materials. In this context, it might be useful to explore the potential of computer communication for course development; experience of use of EIES by groups working on common projects demonstrates that computer conferencing can be a very effective medium for achieving consensus and for joint preparation of working group reports. Such a facility would certainly make it easier for dispersed members of course development teams to contribute to discussions on course content and objectives. And out of such an experience, ideas for using computer conferencing in teaching may well develop.

Optimisation of computer-mediated communication technologies for distance education will flow from two key features: 1) the potential for group communication, and 2) the fact that all information can be stored, organised, and retrieved at will. Straight away, this provides an opportunity for learners in the system to contribute and share their own know-ledge and experience, changing a course from an inert set of pre-packaged materials into something much more dynamic and learner-centered. Research is needed to investigate how computer-mediated communication can best be used to facilitate cooperative learning, discovery learning and development of problem-solving and critical thinking skills. On the negative side, it will also be necessary to identify ways of helping users deal with the potential information overload which often occurs on systems using these technologies.

In general, computer-mediated communication has the *potential* for being more than just an electronic substitute for correspondence tuition and face-to-face meetings in the distance education context. This potential should be increasingly realised as the necessary equipment and software, coupled with access to low-cost communications networks, becomes more widely available. And as experience with using these technologies for educa-tional purposes builds up, so new applications should develop — cooperative networking projects, skill exchanges, and peer teaching, are some of the more exciting examples which come to mind for the future. In the meantime, the immediate task is one of initial appro-priation of what is, for us, a new medium of communication.

A STRATEGY FOR INNOVATION

Introducing a new technology into large-scale, well-established, systems is proble-matic. Excellent reasons can always be found for continuing to use well-tried methods rather than venturing down new and unexplored paths. The history of educational technology, as we all know, is littered with experiments and technologies that failed to realise their full potential. Hopefully, we have learned from these mistakes. Our strategy for introducing and developing the use of computer-mediated communication in the OU system is essentially gradualist, based on the notion of helping a network of potential users to develop as and when the value of this technology begins to be appreciated. The strategy is based on a number of elements.

1) Introduction of interested faculty and administrative staff to the use of, firstly, electronic mail, and secondly, conferencing, both from office terminals and from home-based equipment (micro-computers with modems and suitable communications software). Many faculty staff prefer to do their course development and writing work form home, and *a priori*, should be ready customers for text-based computer communication facilities for tasks such as commenting on draft materials, collaborative authoring, and preliminary

discussion of agenda items for meetings.

2) Investigation of existing conferencing software packages for installation on one of our mainframe machines, we have looked at a number of commercially available systems, including PARTICIPATE, PortaCOM, VAX Notes, and CoSy, and finally decided on CoSy.[1]

3) Initial trials of computer communications, as an add-on facility, with a small selection of OU courses which already required students and tutors to have micro-computers and modems at home for their course work (this year, these trials used MAIL MANAGER, a professional electronic mail package developed at Stanford University, and installed on our DEC-20 machines; next year, they will continue with the VMS version of CoSy, installed on a VAX mainframe).

4) Development of a strategy for using computer conferencing as an integral element of the design of a new Open University course — *An Introduction to Information Technology* — which is being planned for first presentation in 1988. This course will require all students (about 2,500) and tutors (about 100) to have, at home, an MS-DOS micro-computer with a modem and printer, to be used for the course practical work (e.g., word processing, spread-sheets, data-base construction, etc.) as well as for communications with other students, course developers, and various on-line data-bases.

5) Research and development work into the use of computer-mediated communication in distance education.[2]

The remainder of this paper refers to (3) above, and is a brief analysis of our impressions from the trials undertaken during 1986 of the use of the MAIL MANAGER electronic mail software on two courses.

---

[1]Some of the reasons for this decision are perhaps of interest: 1) CoSy was developed with a university environment (Guelph University, Ontario), for use by faculty staff, administrators, and students in their conferencing packages and is simple, easy to learn, and functional. CoSy's three principal modes are *personal mail*, *conversations* for informal group discussion, and *conferences* for more formal, organised, group interactio; 2) It has been adopted by *BYTE* magazine for their information exchange (BIX), which is now probably the busiest publicly available computer conferencing facilty in the world. This gives an additional guarantee of future support for the software; 3) We were able to obtain the source code, and are being encouraged to tailor CoSy for our own specific applications. No other commercially available package would allow us to do this.

[2] This work currently has two main strands: a) evaluation of user reactions to current computer conferencing facilities, and the identification of optimal ways of using them in an educational context. We are in touch, via conventional channels as well as through various computer conferencing systems, with other researchers in this field in several different countries [notably Canada, the USA, Denmark, Australia, and France]; b) development of new software for use on distance education work stations (the *Thought Box* project, see Alexander, 1986). This software is being designed specifically for a home-based learner to support both local functions such as word processing and remote functions such as communication with other learners, with tutors, and with on-line data-bases — the analysis of the problems experienced by naive users in learning to master existing conferencing software will be a valuable input to this project.

SOME PILOT EXPERIMENTS

Below is a description of the courses and user groups chosen for trials in 1986.

1) A new undergraduate *Cognitive Psychology* course in which each of the 24 tutors were provided with a Macintosh 512K micro-computer and a DACOM auto-dial modem. The Macintosh is used for a number of experiments in the course, as well as for some AI work (carried out with students at day schools and summer schools). The use of the modem and the electronic mail facility was an add-on element, which the course team thought would be valuable for stop-press notes from the course manager, for discussion of problems with the course experiments, and for providing a rapid feedback channel for problems encountered by students and tutors during the first year of presentation of the course. Students on the course did not use this electronic mail network, as they did not have the necessary equipment, but it was hoped that the tutors would be able to propose ways in which such a facility could, potentially, be used for tutorial purposes were students to have access.

2) A continuing education course, one of several involving the Science and Engineering Research Council (SERC) on the topic of *Software Engineering*. This course involves about 100 hours of study time, spread over up to two years. It contains a significant *hands on* component, making use of an OU-designed micro-computer, together with a modem, to access the university's mainframe machines for undertaking programming and software development exercises. Students can choose when to enrol, whether or not they undertake formal assessment, and the extent they wish to make use of a tutor. Unlike undergraduate courses, there are no group tutorials, but tutors give individual help by telephone or correspondence, and, for those involved in the trial, through electronic mail.

In each course, one group communication facility (a course bulletin board) was set up as users self-registered on each network, so their ID's and names, together with a few personal details, appeared in another bulletin board (*bboard members*), thus giving each user the opportunity to direct personal mail to any other user.

What Have We Learnt from These First Trials?

Firstly, the negative points. There is no doubt at all that, however great the educational potential of text-based computer-mediated communication might be, a certain number of basic technical conditions must be met before any but the most devoted hackers will actually use this technology. Three factors are of obvious importance in this context: 1) the equipment; 2) the communication link; and 3) the software. For the tutors using the Macintosh micro-computer, the equipment was less of a problem than for the students and tutors in other groups — after all, they *only* had to connect together their micro-computer, modem, and telephone, before calling the network (and they had auto-dial modems). But those in the *Software Engineering* course had, in addition, to power up and connect a TV receiver to provide the screen display; and, they did not have auto-dial modems. The communication link is the next problem. Parameters have to be set correctly, characters transmitted without corruption, and the connection made to the mail/conferencing software

on the host computer. Finally, the messaging/conferencing software has to be used correctly. For computer-naive users, this means that the commands must be intuitively evident, and the system easy to learn, transparent, and forgiving.

Our trials have clearly shown that all three of these technical aspects of the communication process are problematic. Some tutors had to wait several weeks before BT installed the new style telephone sockets needed for modem use, others had difficulties with connector cable fittings, and one had a modem that failed on its first use (despite the fact that they had all been tested beforehand). Of the 24 tutors in the first group, two failed even to register on the system either because it all seemed too complicated to set up, or because they failed miserably in their first attempts at access. A fairly regular (and perservering!) user reported 42 failed connections in a two-month period. Each of these calls actually got through to the University's computer network (thus clocking up at least one telephone charge unit) but in each case, for one reason or another, it was not possible to access the particular machine (a DEC-20) on which the mail system was installed. Finally, most users found the Mail Manager electronic mail software hard to learn and confusing to use. Many people failed to register correctly. The self-registration procedure was awkward, complex and unforgiving. Once registered, it proved impossible to modify one's personal details, or to correct keying errors. The log-in procedure was lengthy and error-prone, involving dialing a local phone number, to access the OU network, then choosing the right machine (the Milton Keynes DEC-20), then typing a special log in name (e.g., "d309.a-kaye" for myself on the Psychology course network), followed by a study centre number and a personal identifier. The actual mail system proved confusing to many users (e.g., the same com-mands can produce different results depending on which *level* of the system one is in). Many people experienced difficulty in using the bulletin board facility, hardly surprisingly, as it was called by different names depending on the commands given (to send a message to the *Cognitive Psychology* course board, for example, one addressed it to "d309" — the course code number — but to read the bulletin board, one entered "bboard" at the Mail Manager> prompt. To compound the confusion, when the bulletin board appeared, it was called by the machine "d309.mail.txt.1"!) Any user naive enough to address messages to "bboard" never saw them again. They ended up on the DEC-20 system programmers' bulletin board!

We are assuming that these technical and design problems can be overcome, to some extent, in our context for next year. We will be using proper conferencing software (CoSy) instead of a complex electronic mail system, and new mainframe machines are currently being installed which should help in reducing access problems. However, even if the equip-ment, log in procedures, and messaging system were made as easy to use as, say, any of the *messageries* on the French *Télétel* system, we would still have a second, and even more problematic, layer of factors to consider before knowing whether, in reality, this technology can be of use in our situation.

This second layer is concerned with user motivation, and with the factors which underlie personal preferences for particular modes of communication. We all know of people who love face-to-face meetings, others who are addicted telephone users, and even some who prefer writing and receiving letters and memos to talking on the phone or going to a meeting. And, there are people who feel a stronger need to communicate with their fellows and colleagues than others. Taking the *Cognitive Psychology* tutor group, it should be pointed out that tutors on the average OU course rarely communicate laterally (i.e., with each other) except on special occasions such as tutor briefing and de-briefing meetings at the beginning and end of a course, and, for those courses which include one, at residential

summer schools. Although potentially forming a good basis for subsequent contact on an electronic network (it is good to be able to put a face and a personality to the receiver of one's messages), such communication is not absolutely necessary for tutors to be able to perform their OU work. This perhaps explains why, amongst these tutors, there was a definite split into four more or less equally sized groups:

1) those who won't use the network, either because they are too busy, or just not interested;

2) those who use it very little, because they are slightly resentful of the time it takes, for which they are not being paid, and who, in any case, are "not interested in computers";

3) those who were interested in the idea, and tried, but then gave up, mainly because of access problems and other technical factors; and

4) those who take to the medium, and become regular users, mainly for personal messages.

If one takes the last two groups (those in principle favourably disposed to this medium) and assumes that there is a definite *need* for communication which cannot be, or is not, satisfied through other channels, there is still a further layer of factors to be considered. These are concerned with learning to use a new medium of communication, which, while sharing some of the properties of telephoning, of audio-conferencing, of letter-writing, and of face-to-face meetings, is yet unique. As a result, the protocols, standards, and behaviours associated with the more traditional forms are not appropriate. It is therefore hardly surprising if new users experience problems in appropriating this technology. For effective and stimulating communication to occur it would seem that two factors, other than those already mentioned, are critical:

1) users must develop a regular habit of logging on to the system to read and respond to new messages, and to initiate their own contributions (for example, one of the PMT600 tutors logs in four or five times a week to check mail from students and post contributions to the bulletin board); and

2) for formal conferences, there must be an effective conference *animateur* or moderator, who encourages new users to join in the discussion, who keeps the discussion focussed, and who provides periodic resumes and syntheses of the progress and main outcomes of the conference (Brochet, 1985; Feenberg, 1986).

During our trials with CoSy in 1987, we hope to concentrate our activities on this last point, as it is clear to us that our tutors will be key figures in the development of computer conferencing in our system, as they will not only have to deal with personal queries from individual students, but also assume the responsibilities of conference moderators. Dealing with individual queries via electronic mail should not present particular problems. The skills which tutors have already developed in writing comments on students' assignment scripts should be readily transferable. These skills are concerned with commenting positively on students' work, valuing their contributions, adopting a personal and friendly writing style, and so on. Electronic mail, with its much faster turn-around time than for written correspondence, will undoubtedly be seen as beneficial by students. It is, however, in the area of group communication within tutor-student conferences that we are most likely to run

into problems. Neither tutors nor students are familiar with computer conferencing. and in the large numbers of group conferences that we are likely to be establishing. it is evident that there will be a wide variety of conferencing styles, some of which will be more or less successful than others. The next major phase of our work will involve careful investigation of the most appropriate ways of stimulating effective communication through the interactions between students and tutors within electronic conferences.

In concluding this interim report on the early trials of computer-mediated communications at the Open University, it is important to stress that the successful use of this technology in our system will depend, above all, on the tutors. This is a technology which is liable to change their normal ways of working and interacting with our students. and, potentially, its use could consume enormous amounts of time. For example, the fast turn-around on electronic mail is likely to encourage students to indulge in much more frequent written dialogue with their tutors than is the case at present. and thus present serious overload problems for which we will have to provide training in coping skills (Hiltz & Turoff, 1985). On the other hand, the use of a group space for dealing with student problems could well protect tutors from having to answer the same or similar query several times over with each individual student, and thus save them time. The operation of conferences will require tutors to encourage newcomers to enter comments. to give careful attention to each student's contribution, to monitor conference activity, and to provide resumes, from time to time, of the discussions. Perhaps the key skill that tutors will need to develop will be that of encouraging students to help each other as much as possible within the conference workspaces. Then, if the right balance can be achieved, conferences could become self-regulating, only requiring occasional inputs from a tutor to maintain homeostasis.

LOOKING AHEAD

This paper has done little more than describe and analyse a particular stage in the early adoption of computer-mediated communications in an institution which in many ways is unique in its structure, scale of operation, and teaching methods. It is difficult to know how the early trials of the use of computer communications will develop at the Open Universtiy, but it is already clear to us that certain pre-conditions must be met if this technology is to be of more than marginal importance in our teaching.

1) The necessary equipment must be easily available in students' and tutors' homes, and simple, inexpensive and convenient to use. The current generation of equipment and software does not meet these requirements; however, as Roger Hart has pointed out in his paper in this issue of CJEC (Hart, 1987), work on 'third generation' systems is already advancing, so it is conceivable that in a few years time the goal of transparent, user-friendly systems may be achieved.

2) The educational assumptions underlying course design and student learning strategies must be consistent with an active, cooperative, and group involvement of learners, otherwise the technology will merely be used as a substitute for noticeboards, written mail or one-to-one telephone contact; but it is not evident that distance learners, used to studying alone, will want to adopt a conferencing medium which requires active group involvement. Following on from the analysis presented by Don Beckwith in his paper (Beckwith, 1987), it might be appropriate to consider

integrating group problemsolving exercises into distance course design. to 'coerce' students into using conferencing as a medium for group exchanges. And amongst the suggestions made elsewhere in this issue by McCreary and Van Duren (1987). the use of conferencing for public tutorials, structured seminars and peer counselling should be built into a course. All this, of course, has implications for overall course design and for integration with the other media being used.

3) In large measure, the success or failure of this technology in the distance learning context will depend on the motivation and skills of the tutors. Remember that in the Open University (as in many other open learning projects) the tutors who are in contact with students are *not* the people who developed the courses — they are acting as intermediaries and animateurs for courses produced by others. Tutors will need guidance in developing new ways of interacting with their groups of students, without creating intolerable overload for themselves. Tutors are only viable to accept and use this technology if they find that it helps them organise their time more efficiently, and/or if they find it more effective and stimulating than their traditional modes of interaction with students.

If these three sets of conditions can be met, and the use of microcomputers as home-based terminals becomes more widespread, then it is probable that computer conferencing will have a very important role to play in distance education. But these are three very big ifs!

REFERENCES

Alexander, G. (1986). *The thought box and the scholar's network: Computer-based tools for distributed learning.* Unpublished Manuscript, Open University, Faculty of Technology.

Beckwith, D. (1987). Group problem-solving via computer conferencing: The realizable potential. *Canadian Journal of Educational Communication, 16*(2), 89-106.

Bacsich, P. (1987). Computer conferencing in distance education: Will it work in the UK? In A. Jones, E. Scanlon, and T. O'Shea (Eds.), *The computer revolution in education: New technologies for distance learning.* Brighton, England: Harvester Press.

Brochet, M. (1985). *Effective moderation of computer conferences: Notes and suggestions.* Guelph, ON: University of Guelph, Computing Support Services.

Davie, L., & Palmer, P. (1984). Computer teleconferencing for advanced distance education. *Canadian Journal of University Continuing Education, 10*(2), 56-66.

Feenberg, A. (1986, March). Network design: An operating manual for computer conferencing. *IEEE Transactions on Professional Communications, Vol. PC 29*(1), 2-8.

Haile, P. and Richards, A. (1984). *Supporting the distance learner with computer teleconferencing.* Islip, NY: New York Institute of Technology.

Hart, R. (1987). Towards a third generation distributed conferring system. *Canadian Journal of Educational Communication, 16*(2), 137-152.

Henri, F., & Kaye, A. (Eds.). (1985). *Le savoir à domicile: Pédagogie et problématique de la formation à distance.* Québec, PQ: Presses de l'Université du Québec.

Hiltz, S. (1984). *On-line communities: A case-study of the office of the future.* Norwood, NJ: Ablex.

Hiltz, S. R., & Turoff, M. (1985). Structuring computer-mediated communication systems to avoid information overload. *Communications of the ACM, Vol. 287*, 680-689.

Kaye, A. (1985). *Computer-mediated communication systems for distance education.* Unpublished manuscript, Open University, Institute of Educational Technology.

Kerr, E., & Hiltz, S. R. (1982). *Computer-mediated communication systems: Status and evaluation.* New York, NY: Academic Press.

McCreary, E. K., & Van Duren, J. (1987). Educational applications of computer conferencing. *Canadian Journal of Educational Communication, 16*(2), 107-115.

Rumble, G., & Harry, K. (Eds.). (1982). *The distance teaching universities.* London, England: Croom Helm.