

CONTINUING PROFESSIONAL EDUCATION USING COLLABORATIVE CONFERENCING ON COMPUTER NETWORKS

Michael Middleton

School of Information Systems, Queensland University of Technology

For CONFERENCE: **Lifelong Education for Information Professionals**

SPONSORED BY: International Federation for Information and Documentation Commission for Asia and Oceania (FID/CAO), and Australian Library and Information Association (ALIA/ELISS)

AT: International House, Royal Parade Melbourne, 18,19 November, 1993

ABSTRACT

Greatly increased access to network telecommunications facilities such as the Internet has led to the development of formal courses offered through the networks. For information professionals, network access has made possible the integrated delivery of educational material with access to the resources that the professionals are learning about. This "distributed education" is considered with respect to: course design and learning objectives; conferencing systems and software support; computer-mediated communication and collaborative learning; delivery of resource materials and effect on library processes; and assessment of performance of participants.

INTRODUCTION

As development of telecommunications technology and associated software continues to improve access to and delivery of information, the student as recipient of formal education is becoming more empowered to work with a huge array of learning resources. Successful incorporation of these resources into courses presents many challenges including:

- Effective substitution for student-teacher personal interaction.
- Effective implementation of asynchronous 'classes'.
- Provision of cheap, friendly hardware to minimise a division between information rich and information poor.
- Multicultural interaction within courses conducted in a common language.
- Development of human-computer interfaces that minimise the intrusion of the medium into its messages.

Information professionals are better placed than any to make use of network facilities with which they are professionally familiar. To take best advantage of their position they must be able successfully to bring together information resources, the access mechanisms for those resources, and instructional guidance in an integrated manner within clearly articulated learning objectives.

COURSE DESIGN AND LEARNING OBJECTIVES

Much work has been carried out in recent years on computer-based education and computer-managed learning systems. Investigations have pursued at some length the impact upon education following introduction of computers to the learning process. Attention has been paid to utilisation of computers at the tertiary level through research. Locally, we have had analysis in the area for a number of years (for example Barrett & Hedberg 1988, Fielden, Hicks & Scott 1988).

Heerman has used a simplified taxonomy of learning objectives: "Knowing that"; "Knowing how"; "Knowing where"; and "Knowing what and why", to correlate with informational, problem-solving, investigative and analytical skills. He has further endeavoured to develop a correspondence between these intellectual skills and methods of computer delivery: the computer respectively as teaching machine, simulator, resource, and tool (Heerman 1988).

Information professionals in their work are inevitably concerned with "knowing where" and the corresponding investigative skills using the computer as a resource. However they must bring the other three intellectual skills to bear in support of "knowing where", so in addition to playing its part as a resource, the computer should ideally play a part within delivery of courses to information professionals as teaching machine, simulator and tool.

Course design and delivery is being further influenced by distributed electronic communication, and the extent to which this is being used to supplement or indeed substitute for traditional distance education. In the tertiary education sector, where universities such as Deakin University have significant commitment to distance education, this has led to the development from electronic mail systems of computer-mediated conferencing systems. The ready availability of CMC has stimulated much use, but it remains to be demonstrated that this use carried out within formal learning models will provide a useful educational avenue, building upon its information dissemination role.

Use by information professionals whilst widespread, has usually not been within a formal educational framework. Rather, any continuing education has been incidental, concomitant with use for current awareness and dialogue with peers, and perhaps inhibited by the computing medium. For example, a study of use by librarians at McMaster University (Cooke & Ridley 1990) found that effective use was influenced by task orientation, access to personal computers, and administrative encouragement. Users were discouraged by inappropriateness of messages and 'flaming' (emotionally argumentative discourse).

Nevertheless, with the present political fostering of open learning in Australia, we can anticipate considerable resources being directed to this arena of education. Shore (1993) has pointed out that the open learning approach stands to promote competency-based rather than time-based learning, life long learning, increased retention rates in post-compulsory education, equity and

access, development of key areas of competence, and recognition of prior learning.

There are many proponents of CMC and they expect it to emerge as a new educational paradigm. Kaye (1989) for example sees it taking its place alongside face-to-face and distance education. He anticipates the development of new educational models representing more than a merging of classroom and distance education methods.

NETWORK FACILITIES

We may consider the operational network facilities to be under 4 broad headings:

- Electronic Mailing.
- Discussion Groups.
- File Transfer.
- Interactive Connection.

Use of these facilities is described in detail in documents such as those by Goldstein (1991) and Kehoe (1993). Brief definitions are provided in Appendix 1. CMC software endeavours to bring these functions together in such a way that they present an easy-to-use approach for students taking a course who require seamless access to the different facilities.

Typical of such systems is CoSy developed at the University of Guelph (McCreary 1989). CoSy has been widely used internationally including in such networks as McGraw-Hill's BIX. The CoSy system has been implemented at a number of sites where it is used to support distance education programs. A characteristic implementation is at the Open University at Milton Keynes in the UK. This is of particular interest for information professionals because it has been used for distributing continuing education courses world-wide in this area. A typical recent offering has been a *Certificate in Online Education & Training*.

The following figures show typical introductory screens for students enrolled in the *Online Training* course.

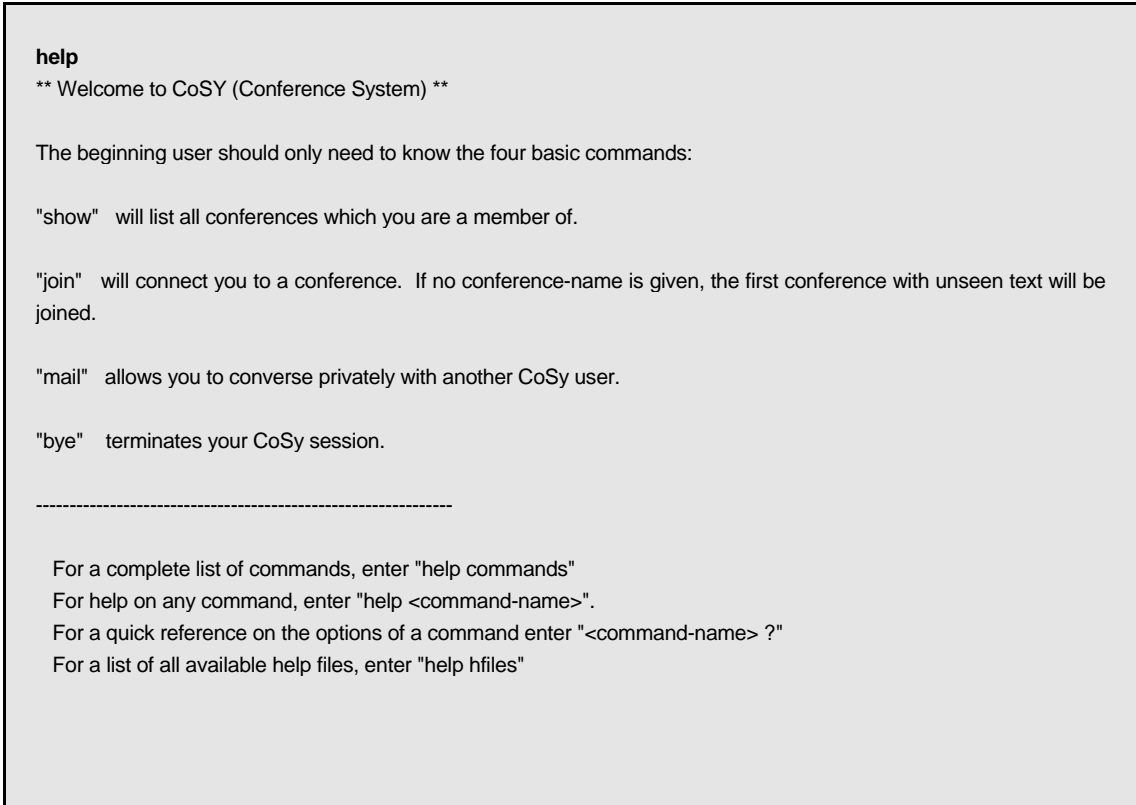


Figure 1: Open University CoSy Help Screen

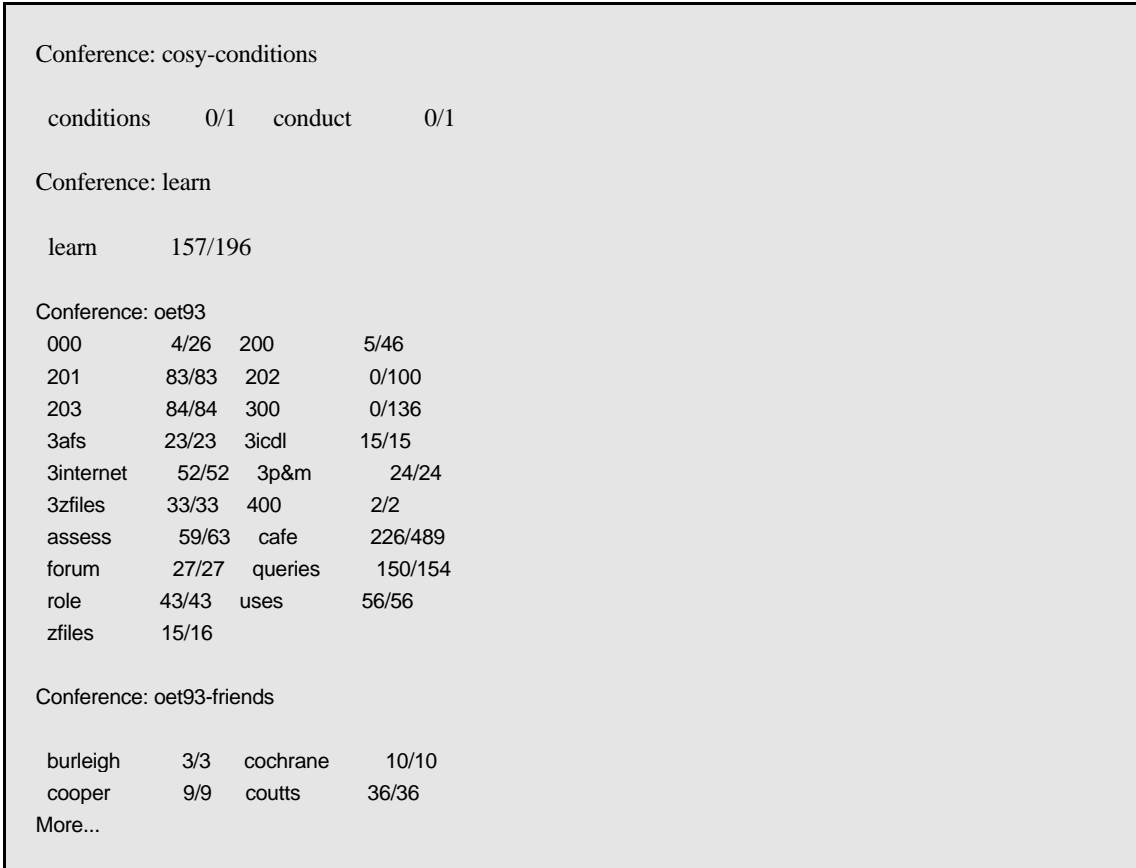


Figure 2: Open University examples of discussion groups in *Online Training course*

[1] Course Modules

=====

There are four course modules [Course Design, Collaborative Learning, The Online World, and Implementations] . Each of the first three modules lasts one month each, and is tutored jointly by two people. There are set readings for each module, as indicated in the yellow information sheet about the course which you all have. Each module has a topic or series of topics in this conference, in which the module themes and associated readings are discussed. The fourth module lasts 3 weeks, and is a chance to do some work applying the information and ideas from Mods 1-3 to your own situation. The start dates of each module are given in oet93/000, msg 8.

[2] Assessment

=====

The overall assessment structure is described in oet93/000 msg 7. The specific assessment tasks for each module will be announced in the relevant module topics

[3] Course conferences

=====

This is the main course conference [oet93], and this is where most of the course-related work will take place; important announcements are given in the Read-only topic, oet93/000. In addition, there is a conference called oet93-friends, with topics corresponding to each friend to whom you have been allocated. The 'friends' are volunteer graduates from last year's oet course. See oet93/000, msg 6, for more details.

So, these are the bare bones of the course; the particular flavour and direction the course will take depends as much on you - the 'students', as on us - the 'tutors'. This is a highly interactive post-graduate seminar, in which we hope each participant.....

Figure 3: Typical Instructions Relating to the Open University Course

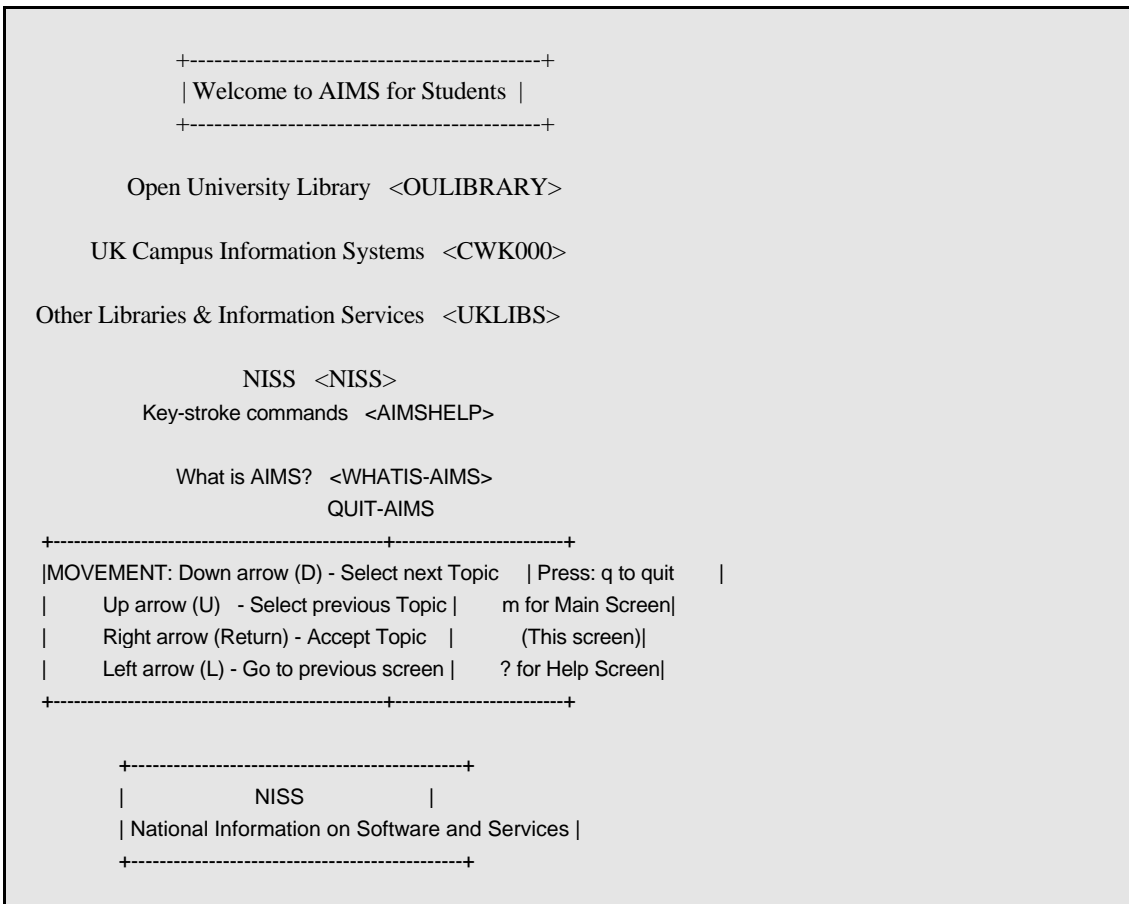


Figure 4: Open University Course Links to Interactive Systems



Figure 5: Example from one level of a personalised Gopher Client

Discovery systems such as **Gopher** which are mentioned in Appendix 1 under Interactive Connection, are also increasingly being used for course delivery, although not as far as I am presently aware, within a formal framework of learning objectives. For example a pair of enterprising individuals in Pittsburgh and New York recently ran their second training program on the use of Gopher. One of the avenues by which one could undertake the course was via a Gopher itself. As the course was being offered via the Internet without charge, I encouraged students working on an Internet assignment in one of my classes to enrol in the course. Those who did found themselves among over 17,000 other participants. There was as you can imagine neither feedback nor assessment in this course.

Increasing sophistication in such course delivery systems, and increasing attention to the learning framework in which they function, can be anticipated. Rapaport (1991) whilst pointing out that interpersonal communication is the primary use of conferencing systems, has indicated the wider decision support, educational and information retrieval uses to which they may be put.

Considerable use of them for self-education by information professionals is already evident. The tools and the educational expertise to provide formal in-service education are available. However there are a number of issues to be addressed before widespread implementation is effective.

I would like to describe how these facilities may be used for delivery of educational programs - what we might regard as distributed education.

DISTRIBUTED EDUCATION

Computer network support for tertiary education may be considered in 3 contexts. I make the distinction for the purposes of comparison, but with more technology support the distinction will diminish. Support may be:

- An adjunct to local education.
- An adjunct to distance education and open learning.
- In the form of 'distributed education'.

As an adjunct to local education there are normal lectures, tutorials with support use of local computer systems, electronic mail feedback, and distribution of software. Local computer-based education for instruction and computer-managed learning for assessment, are also in extensive use.

As an adjunct to distance education, a situation comparable to local education applies, but with little or no personal interaction with instructor, and delivery of course materials and assessment still relatively traditional (postal, examination centres).

With distributed education I anticipate the conduct of a complete course by remote computer system. To achieve this attention must be paid to the following aspects:

- Course design and objectives.
- Delivery of course materials.
- Delivery of associated reading materials.
- Social intercourse.
- Assessment.

The course design needs to be fully developed through to the individual lesson planning objectives, and these must be available to or communicated to students as they commence lesson modules. The method of conference interaction including optimal size of groups and the role and participation of group moderators (or tutors) is an important aspect. For example, some courses have been started with discrete conference groups which have disintegrated as the course instructor has referred to material being discussed in other groups.

The nature of the medium is such that it is seen to encourage cooperative learning, and the Open University course referred to earlier is an example of a course embodying objectives for continuing education of information professionals dealing with the role of computer-mediated communication in education and training and collaborative learning for online education.

Delivery of Course Materials including initial registration material and promotional material and study guides must be fully available through networks. Courses at present tend to have a proportion of such material still on paper, naturally in order to reach potential markets, but for an online course it is reasonable to expect all material online.

The hardware on which the material is to be delivered presents significant problems for instructors who must be able to disseminate the same content to participants who may have equipment ranging from workstations that can accept multimedia video and graphics, down to home machines with low bandwidth Modem access and limited printing capability.

Courses for information professionals are particularly likely to require delivery of associated reading materials. These may be paper-based, computer-transferable or computer-based.

The corpus of paper-based materials will be with us for a long time yet, and will be handled by traditional library methods including interlibrary loan. Now that scanning systems may be linked with personal computers for relatively cheap information delivery, I anticipate increasing use of document transmission systems such as ARIEL developed in the U.S. by the Research Libraries Group and presently on trial at universities in Victoria and Tasmania.

There are now such vast amounts of information in computer-based form that the predominant delivery method for CMC courses must be via online access to the information in question, through avenues linked to conferencing as shown via AIMS in Figure 4, or more generically via access aids such as Gopher a menu from which is shown in Figure 5.

This approach may be assumed relatively easily by information professionals for education, but the increasing availability and simplicity will see it being used by many disciplines. This has a

significant implication for libraries - sometimes characterised as the changing of the role of libraries from ownership orientation to access orientation.

This change of orientation has been presaged in the context of library networks for decades. However where the access under discussion has generally been to other libraries, networking and data capture is increasingly making available the source material independently of repositories such as libraries. In fact the access problems are not so much technological, but relate to dealing with reward systems for creators and publishers through such legal constructs as copyright, royalty payment and barriers to transborder data flow.

I like the approach taken recently by Hoadley (1993) in which she sees ownership and access as complementary. She points out that libraries have happily embraced CDROM's because they can be acquired. This has enabled them to continue to be judged on how much they have. Instead they must be able to substitute measurement of the extent to which they provide access to external services when they are putting together their budgets.

This means that there must be less emphasis on materials processing and more emphasis on providing access. An example of the latter might be development and maintenance by subject librarians of pathways to electronic facilities (as in the Gopher menu shown in Figure 5), or by provision of electronic reference service through a conferencing or email system.

Social Intercourse is the significant factor missing from computer-based systems of education, and many efforts have been made to introduce informal substitutes into CMC. Graddol (1989) among others has emphasised the importance of informal discourse capacity in a conferencing system, rather than dismissively referring to such a facility as 'chat' or 'off topic'.

There are various ways of approaching this matter, such as provision of online resumes of fellow students and staff (accompanied by photographs if support multimedia facilities are available), use of informal conferences to encourage discussion about anything other than the course under way (for example *Lounge* on Telecom's Discovery, *Cafe* at the Open University), and email support from mentors who may have previously undertaken a course.

In an time where much effort is being put into trying to measure skills and competencies, it is important to pay attention to assessment, and the extent to which it may be implemented in CMC.

CMC may be linked with computer-managed learning systems which will carry out a testing process, but there is still much development to be carried out before analytical and practical (through simulation) capabilities may be tested.

Other matters are still to be resolved. These include the acceptability of "lurking" (monitoring a conference without contributing to it, which of course also happens in face-to-face tutorials), and the ease with which file transfers, up-loading and down-loading make plagiarism possible (can it be encouraged for the positive collaborative aspects, but otherwise prevented?).

SUMMARY

Although educational research is still to point the way to the most effective delivery of computer-mediated courses, information technology already provides the capacity for such courses. Information professionals who are comfortable with the human-computer interface will not have their own learning experience inhibited by the medium, and at the same time can contribute to the improvement of the interface so that it may be used effectively by the less computer-literate.

REFERENCES

Barrett, J., Hedberg, J. eds. (1988) *Using Computers Intelligently in Tertiary Education: a collection of papers presented to the Australian Society for Computers in Learning, Sydney, November 29th to December 3rd, 1987*, ASCILITE, Kensington, NSW.

Cooke, D., Ridley, M. (1990) 'Computer-mediated communications systems', *Canadian Library Journal*, 47, 6, pp. 413-417.

Feenberg, A., Bellman, B. (1990) 'Social factor research in computer-mediated communications', in L.M. Harasim, ed., *Online Education: Perspectives on a New Environment*, Praeger, N.Y., pp. 67-97.

Fielden, K., Hicks, F.Scott, N., eds. (1988) *ASCILITE-88; Computers in Learning and Tertiary Education, Proceedings of the Sixth Annual Conference* Canberra College of Advanced Education, Canberra.

Goldstein, C., Heard, R. (1991) *Getting the most out of AARNet*, Vax/VMS Version, QUT Computing Services, Brisbane.

Graddol, D. (1989) 'Some CMC discourse properties and their educational significance', in R. Mason and A. Kaye eds. *Mindweave: Communication, Computers and Distance Education*, Pergamon, Oxford, pp.. 236-241.

Heerman, B. (1988) *Teaching and Learning with Computers*, San Francisco: Jossey-Bass

Hoadley, I.B. (1993) 'Access vs. ownership: myth or reality', *Library Acquisitions: Practice and Theory*, 17, pp. 191-195.

Kaye, A. (1989) 'Computer-mediated communication and distance education', in R. Mason and A. Kaye eds. *Mindweave: Communication, Computers and Distance Education*, Pergamon, Oxford, pp. 3-21.

Kehoe, B. (1993) *Zen and the Art of the Internet: A Beginner's Guide*, 2nd ed., Prentice-Hall, Englewood Cliffs, NJ.

McCreary, E. (1989) 'Computer-mediated communication and organisational culture', in R. Mason and A. Kaye eds. *Mindweave: Communication, Computers and Distance Education*, Pergamon, Oxford, pp. 101-112.

Rapaport, M. (1991) 'Computer conferencing, bulletin boards, and information professionals', *Online*, 15, 3, pp. 33-37.

Shore, D. (1993) 'Open learning & educational technology', *LASIE*, 23, 4&5, pp. 71-84.

APPENDIX 1: OPERATIONAL NETWORK FACILITIES

Electronic Mailing

The ability to exchange messages on a computer system and between computer systems that are linked by networks. Facilities normally include the ability to compose material using editors, to forward or file incoming material and to maintain distribution lists. Addresses for email systems refer to specific mailboxes on computers and for the Internet follow a standard symbolism called the 'domainised format'. Typical of an outgoing mail message is the following:

```
MAIL> send
To:  in%"dobson@uts.edu.au"
CC:  lachlan
Subj: Standards Committee
Enter your message below. Press CTRL/Z when complete, or CTRL/C to quit:

I'll see you in Sydney on the 14th at 8pm.

Jan
<CTRL/Z>
```

Discussion Groups

Exchange of messages in a public or semi-public forum. An example of a public forum is the Usenet News which is distributed over the Internet. It contains public electronic conversations recorded in newsgroups for particular subject areas. An excerpt from the Newsgroup list appears as follows:

```
NEWSGROUPS [ALL, 1624 Newsgroups]

Newsgroup                Count  Unread
1407 _ rec.video.releases      19    19
1408 _ rec.video.satellite    111   111
1409 _ rec.windsurfing         44    44
1410 _ rec.woodworking         103   103
1411 _ sci.aeronautics          15    15
1412 _ sci.aeronautics.airliners  0     0
1413 _ sci.answers             20    20
1414 _ sci.anthropology        29    29
1415 _ sci.aquaria             14    14
```

Many discussion groups are closed or restricted to people working in the discipline. These are often known as lists and in many cases the discussion is handled by what is known as LISTSERV software which controls user registration, mailing etcetera. There are a number of printed and computer file directories of these Listservs available.

File Transfer

This is the process of transferring computer files across the networks without examining their contents at the time of transfer. The files may contain any type of data and are obtained by use of a special protocol (known on the Internet as **ftp**), which permits non-interactive connection to remote machines without password requirements. A typical ftp session may appear as follows:

```
$ ftp
REDGUM.QUT.EDU.AU MultiNet FTP user process 3.2(106)
FTP>open oat.qut.edu.au
Connection opened (Assuming 8-bit connections)
<
<
<  >>>>  OAT - QUT Anonymous FTP Server  <<<<
<
<
Username: anonymous
Password:
<Your login was from machine redgum.qut.edu.au.
<Guest login ok, access restrictions apply.
OAT.QUT.EDU.AU>dir
total 87
(EXCERPT SHOWN)
drwxr-xr-x 6 sidney  guest    512 Oct 21 12:42 papers
drwxr-xr-x 3 sidney  guest    512 Jul 21 14:39 security
drwxr-xr-x 2 sidney  guest    512 Mar 10 1993 src
drwxr-xr-x 2 sidney  16      7168 Jun 30 15:05 startrek
drwxr-xr-x 2 sidney  guest    512 Oct 19 1992 user-guide
OAT.QUT.EDU.AU>cd user-guide
<CWD command successful
OAT.QUT.EDU.AU>dir
<Opening ASCII mode data connection for /bin/lS.
total 1745
(EXCERPT SHOWN)
-rw-r--r-- 1 sidney  guest    7680 Sep  8 1992 aarnet_user_guide_updates.wp
-rw-r--r-- 1 sidney  guest   466071 Sep  8 1992 aarnet_user_guide_vms_v1.ps
-rw-r--r-- 1 sidney  guest   160906 Sep  8 1992 aarnet_user_guide_vms_v1.txt
-rw-r--r-- 1 sidney  guest   216050 Sep  8 1992 aarnet_user_guide_vms_v1.wp
<Transfer complete.
OAT.QUT.EDU.AU>binary
Type: Image, Structure: File, Mode: Stream
OAT.QUT.EDU.AU>get aarnet_user_guide_updates.wp
To local file: guide.wp
<Opening BINARY mode data connection for aarnet_user_guide_updates.wp (7680 bytes).
<Transfer complete.
OAT.QUT.EDU.AU>
```

Interactive Connection

The process of online real-time connection to a remote machine. This may be achieved using a variety of connection protocols. The standard protocol on the Internet is known as TCP/IP and use is made of a facility called **telnet** for establishing the connection. Increasingly other facilities are being introduced to make identifying, connecting to and switching between remote systems much easier. Examples of these facilities are **Gopher**, **WAIS** and **WWW**.