Acceptance and use of computer-mediated communication by female and male information students

by

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Abstract

Current trends in information technology developments mean that computer-mediated communication (CMC) systems can be expected to become progressively more versatile, widespread and significant both for work and for education. All students and staff of the Department of Communication and Information Studies at Queen Margaret University College, Edinburgh, have used CMC systematically for more than five years. This has made it possible to carry out detailed studies over time of the impact of CMC on academic users, and of the value they derive from it, with a particular focus on gender differences. Results are presented of a survey of student use, including levels and patterns of messaging as well as perceptions of, and attitudes towards CMC activities. Some results are compared with related surveys of UK distance learning students using CMC, and of computing use by students at a US local campus. Despite rapid changes in technological capabilities, there appears to be some stability of reactions to CMC. Students most highly valued course-oriented and administrative uses of CMC. When compared with face-to-face tutorials, CMC was rated negatively, though least so as a medium for intellectual exchange. However, students were positive about their present and future use of CMC, and became more positive over time. Some evidence was found to support concerns that females may be disadvantaged in the use of CMC. There was also, however, evidence of the related gender differences diminishing, disappearing, or reversing with experience and over time. It is suggested that CMC may best be regarded as a complementary rather than substitutionary medium in higher education.

Contents

Chapter 1:

Introduction

1 Introduction

Computer-mediated Communication (CMC) is an umbrella term for a range of computerized information and communication technologies of which the most notable is electronic mail, but which also includes electronic discussion groups, electronic bulletin boards, computer conferencing systems, groupware and more recent Internet applications such as the World Wide Web.

The significant commonality in these systems is that they allow a technologically mediated means of written, recorded communication, which is asynchronous in nature. In general, this involves users of a multi-user computer system or network being able to compose messages in text-editing or word-processing software, and being able to provide completed messages either one-to-one to other individual users, or one-to-many to multiple users of the system. Recipients are then able to read the message(s), and optionally make their own response(s), at their preferred times and locations.

1.1 Computer-mediated communication (CMC)

Three distinct architectures of electronic communication systems are generally recognised within CMC, though operational examples of any one system of these types may include, or be made to appear to include, characteristics of the other two, as illustrated in table 1.

Electronic Mail	Conferencing	Bulletin Boards
Multiple copies of one-to-many messages.	Single copy accessible by many.	Single copy accessible by all.
Most **transient**.	More **archival**.	Most **planned**.
Users' mailboxes *may* contain **different** sets of messages (by deletion).	All users read **same** information *if* given conference subscribed to.	All users read **same** information from same menus.
Least WYSIWIS.	More WYSIWIS.	Most WYSIWIS.
Most **immediate** and **active**, **notifying** new message arrival.	More **passive**, but often with **unread message** information.	Least **immediate**, and least **informing**, but often with *options for this*.
Least structured.	More structured.	Most structured.
Private one-to-one and one-to-few messages.	Many participants *or* small groups.	Public, all-user access (with restriction options).

Table 1.1. Characteristics of CMC systems for CSCW uses

The acronym 'WYSIWIS', for "What You See Is What I See", is a coining from groupware designers, to denote the extent to which different users have a shared view of information within a configurable Computer Supported Co-operative Working

(CSCW) software environment. (The second "C" in CSCW is alternatively taken to stand for "Collaborative".)

The key characteristic of a bulletin board system is that it offers multiple access to a single copy of a stored document. Although most conferencing systems include one-to-one messaging facilities, their distinguishing feature is the provision of a common writing space for group deliberations, whereby only one copy of any message or comment is physically stored on the host computer. As in many areas of information technology, the boundaries between these approaches are in fact being blurred by convergence.

Conferencing software usually includes an option for sending e-mail to individuals or small groups. Commercial bulletin board services also often provide e-mail or conferencing facilities. Similarly, e-mail is often used in conjunction with bulletin boards or conferencing systems, as a means of informing users of updates.

This convergent conjunct and adjunct usage of CMC architectures has increased with what may be regarded as the 'second generation' systems that have emerged with the expanded use of the global Internet for communication and information dissemination, and in particular the recent networked information discovery tools, such as the Internet Gopher, and the World Wide Web. For example, both these tools offer e-mail as a method of delivering retrieved items.

Similarly, in some instances, the 'first generation' Internet tool FTP (file transfer protocol) may enforce entry of an e-mail address before permitting access to 'anonymous FTP' information. Information about existing and emerging Gopher and World Wide Web resources are commonly exchanged between individuals in subject-orientated electronic discussion groups, using e-mail distribution lists or Usenet Newsgroups, which are a form of conferencing.

World Wide Web browser software particularly embodies this convergence, since it can be configured to deal with the Uniform Resource Locator (URL) types **`mailto:`** and **`news:`**. Selecting a hyperlink of the former type results in a prompt for entry of the message text to be e-mailed to the address specified by the **`mailto:`** URL. In the latter case, it invokes newsreader and news-posting software for the Usenet newsgroup specified by the **`news:`** URL.

1.2 Education and training for computer-supported co-operative work (CSCW)

Computers have evolved from number processing, through data processing, to being primarily information and communication tools. This trend in information technology developments, and increased use of networking both locally and globally via the Internet, means that CMC systems can be expected to become progressively more versatile, widespread and important.

It is also recognised that in global, post-industrial society, the management of organizations consists increasingly of managing information and communication for project planning and decision support. As the computer-workstation has become increasingly ubiquitous at the workplace, significant benefits have been identified for organizational use of CMC as a complement to conventional information and communication systems, and for CSCW.

In February 1994, the UK government announced a £13m three-year Department of Trade and Industry/Engineering and Physical Sciences Research Council CSCW programme as part of the Joint Framework for Information Technology (JFIT), to help to focus UK industry on the market for CSCW products and to promote the benefits of adopting CSCW to potential users of all sizes throughout the country (Department of Trade & Industry 1994).

Clearly one factor influencing the uptake of organizational CSCW will be the ability of education to deliver, firstly, a range of graduate professionals with experience of using such systems and expectations of using them in work for organizational activities and problem-solving tasks, and, secondly, specialist graduate 'knowledge workers' whose primary function is the analysis and management of the information function itself. The technical aspects of such education are of diminishing marginal importance relative to an understanding of the individual, social and organizational aspects of information and communication. It is also apparent that, in addition to teaching it as a subject, higher educational institutions are themselves appropriate organizations to make widespread beneficial use of CSCW for the delivery and support of teaching and learning. Indeed, 'Computer Supported Cooperative Learning' has emerged as a variant term (Davies 1989, McConnell 1994).

Furthermore, as something of a converse to the exploitation of CMC and CSCW by industry, institutions of higher education in the UK (Dearing 1997) and in other OECD countries (Renwick 1996) are being encouraged by governments to adopt some of the business practices and metaphors of industry. Universities are being perceived as competitors in educational marketplaces in which one of the key solutions to the problem of reducing the per-student unit cost is the development of systems of mass education and training, substantially based on the use of just such communications and information technology. Some optimistic outcomes have been perceived (Ehrmann 1996) in the application of such technologies in post-secondary education. However, more pessimistic observers have foreseen a 'dim future' (Noam 1995) for the traditional university, and - again invoking an industrial metaphor, but this time of the earlier, industrial revolution - a threat that online education may lead to universities becoming 'digital diploma mills' (Noble 1997, 1998). Some researchers have also expressed concern that, as students are required to communicate increasingly via CMC, females may be disadvantaged by their lack of familiarity with computers and by ways in which males and females differ in their use of computing (Taylor *et al.* 1993).

1.3 Queen Margaret University College, CMC and information studies

Queen Margaret University College (QM), in Edinburgh, is one of the Scottish Central Institutions. As such it is funded by the Scottish Office, along with the university-designated higher education institutions (HEIs), rather than by a local authority. The institution received its present designation in 1999, having previously been named Queen Margaret College. In 1990, there were about 1,400 full-time students in attendance, and about 800 students on part-time and short courses. By 1996, the expansion of higher education had seen these numbers increased to 2,600 full-time students and around 3,600 part-time and short-course students.

QM courses fall into two main categories. Firstly, there is an extensive range of health care courses, making QM one of the main European providers of paramedical education. Secondly, there are courses within the areas of business, management and information.

QM has always had a substantial number of international students, particularly from Africa and Asia on the healthcare side. In 1990, around 4% of students were international. By 1996 this had increased to around 8%, with some financial impetus from the attraction of full-fees non-EC international students to business, management and information courses. Along with the other Edinburgh HEIs, QM enjoys a substantial population of Scandinavian students, particularly from Norway.

The 1986 Transbinary Report described the information studies courses provided at QM as being:

> ... courses which are concerned with information management education ... which do not have such an emphasis on technology, are more concerned with information itself (UGC/NAB 1986, pp.55-56).

At that time, and until validation of an Information Management degree by the Library Association in 1994, and subsequently by the Institute of Information Scientists, QM was outwith the traditional LIS sector. However, most of the key components of the mainstream LIS curriculum were represented in various information syllabi. So also was a key component which was not then generally to be found in the curricula of the LIS schools (Wilson 1989), though this has subsequently changed (Wilson 1994). This was a focus on the use of computer networking and computer-mediated communication software.

By academic year 1987-88 all QM information students had electronic mailboxes and made routine use of them on them in their courses, and to complement communication with teaching staff and other students. Through inter-departmental collaboration, the use of CMC was also extended to include staff and students in other departments and on other courses such as nursing (Wyatt *et al.* 1989, Taylor *et al.* 1990) and physiotherapy (McMurdo & Durward 1988). Experiences from this latter collaboration were later transferred to wider national and global contexts (Upfield & McMurdo 1993, McMurdo, Upfield & Durward 1995, Salter *et al.* 1995).

Supporting rationales for this use of CMC in teaching generally (McMurdo *et al.* 1990) proposed that teachers in higher education actually had two jobs. One was their professional and subject specialism - being a clinician, therapist, scientist, manager, etc. The other job was the general one of communicating, interacting, and being a resource facilitator. And while the former aspect was where educators had initially sought to apply information technology, with CAL software, or by introducing students to simulations of applications used in their professions or disciplines, the latter had been little addressed - with the exception perhaps of 'computer-aided printing' use of word-processing to prepare and revise handouts. Yet, as emerging notions such as the 'Virtual Classroom' (Hiltz 1986a) implied, CMC was potentially a key educational technology, capable of enhancing the process of communication with students, where the complexities of the software environment were minimal, and the benefits to be derived consequently dependent on the flexible and creative exploitation of such tools.

In the more particular area of using CMC in the teaching of information students, this general rationale was extended to note that this medium would be likely to be one in which information professionals could participate not simply as users, but as providers and facilitators. It had been predicted some time earlier that:

> The development of vertical retrieval services such as online databases and videotext will continue to grow rapidly to provide a plethora of facts and figures. Lateral services such as electronic mail, computer conferencing, and online expert services will emerge as a significantly more powerful force. People will continue to seek counsel of people not just databases in deciding which strategies and opportunities to pursue (Cross 1983).

Information provider, or collaborative working, projects in which QM information students participated included: producing an electronic students' handbook; producing an online College prospectus; production of paper abstracting and review publications, using electronic management of contributions (McMurdo 1988, 1989a); uploading CD-ROM literature searches to subject bulletin boards (McMurdo 1990); developing a small database of indexed abstracts to articles from publications in the College library; Internet 'information gatekeeper' projects, where third-level students acted as providers to first-level students, etc. During this period, QMC was pinpointed by the CTI Centre for Library and Information Studies (1991, p.21) for experience with electronic mail and bulletin boards, and subsequently in a general national inventory of contemporary teaching and learning practices (Hounsell *et al.* 1996, p.73).

1.4 Study aims and objectives

The present study reports some finding of surveys carried out in 1990 and in 1995 and 1996 of usage and acceptance of CMC by students of the Department of Communication and Information Studies at QM.

The study presents information about students' reported levels of usage of e-mail and CMC, messaging destinations, sources of useful messages, and attitudes towards computing and CMC. There is as yet no directly comparable published UK local campus data. However, some attitudinal comparisons can be made with results of prior studies, firstly, at Carnegie Mellon University (CMU) in the United States (Kiesler & Sproull 1987a), and, secondly, at the Open University in the UK, with its students on the second level DT200 course, *An Introduction to Information Technology: Social and Technological Issues* (Open University 1990).

1.4.1 The aim of the study

The aim of the study was, to examine quantitatively to what extent student use of, and attitudes towards, CMC changes over time, with particular reference to gender issues.

1.4.2 Objectives of the study

The objectives of the study were:

- To present an analysis of the core CMC student user population and levels of CMC usage.
- To identify students' preferences for different kinds of information made available via CMC.
- To investigate students' attitudes towards CMC.
- To explore possible gender differences in students' uses of, preferences for and attitudes towards CMC.
- To compare results with benchmark data from comparable institutions of higher education.

Chapter 2:

Literature

2 Literature review

Major general reviews of computer-mediated communication have been provided by Hiltz (1986b), Steinfield (1986) and by Culnan and Markus (1987). For a more technical perspective, Quarterman's text (1990) is a valuable update and consolidation of his seminal *Notable computer networks* (Quarterman & Hoskins 1986) with a useful opening section reviewing historical developments and the literature, though the latter sections serve best for reference. December (1993) provides an extensive bibliography which includes a helpful structured guide to the subject area, including the main points of key publications.

The rapid growth of the Internet in recent years has probably also increased interest in CMC studies. In this aspect, the current use of the Internet embodies at least one, and perhaps two, recognised characteristics of the evolution of computer use. The first is the convergence towards being a text-processing and communication tool, and away from the original computational function. The second is that - consistent with the previous characteristic - computers and related communications technologies have regularly found unintended uses. Turoff (1989) recounts a visit to the US Department of Defense's Advanced Research Projects Agency (ARPA) in 1971, when the Internet did not yet exist as such, still being the US defence application called ARPANET, and for which an electronic messaging function had not originally been intended or anticipated. Turoff asked for data on the use of the ARPANET for messaging.

> In a rather frank discussion it was pointed out to me that they were embarrassed that the single biggest application of the network at that time was message traffic. This sort of application was completely unintended and had no justification under their formal requests for funds to support ARPANET. As a result they were not releasing any measurement data on applications of the network.

Turoff goes on to relate that a few years later ARPA staff rewrote the objectives of their research activity to include messaging as part of a new mission to examine management applications, and that the ARPA office subsequently began to publicize message systems as a great innovation resulting from their R & D effort.

Malamud (1992) and Salus (1995) have produced very readable texts on the origins and history of the Internet, which combine technical details with the various key personalities involved.

Although CMC has lately become a most popular topic for research and publishing, two US schools stand out for quality of work and quantity of publications over time, and their main textbooks include good guides to the subject area. These are Carnegie Mellon University (CMU), and the New Jersey Institute of Technology (NJIT). From

NJIT, the seminal reference for broader aspects of computer conferencing is Hiltz and Turoff's *The Network Nation* (Hiltz & Turoff 1978). Texts from CMU likewise cover both the literature of educational computing and applications of CMC in wider contexts (Kiesler & Sproull 1987a, Sproull & Kiesler 1991).

The primary effect of CMC, with heavy use, is increased human interaction, which may lead to better technical productivity through the exchange of ideas and information. In addition to work-related contact and communications increasing, informal communications may also increase by an order of magnitude. This phenomenon has been named superconnectivity (Turoff 1985, Hiltz & Turoff 1985).

2.1 Some key characteristics of communication technologies

Sproull (1991) has identified six characteristics which differentiate electronic mail from other communication technologies. These six characteristics are, that it is:

- asynchronous
- fast
- text-based
- has multiple addressability
- has externally recorded memory
- this external memory is computer processable

He presents table 2.1 to compare communication via a computer network with other communication technologies.

	Technology Attributes					
	Asynchrony	Fast	Text content only	Multiple address-ability	Externally recorded memory	Computer processable memory
Meeting	no	yes	no	yes	no	no
Telephone	no	yes	no	no	no	no
Letter	yes	no	no	no	yes	no
Telex	yes	yes	yes	no	yes	no
Facsimile	yes	yes	no	no	yes	no
Voice Mail	yes	yes	no	yes	no	no
Electronic mail	yes	yes	yes	yes	yes	yes

Table 2.1. Sproull's comparison of communication technologies

Some brief consideration of these characteristics, Sproull's footnotes to them, and the evolution of e-mail and other communication technologies, may help inform the following review of the literature related to the present study.

Electronic mail is asynchronous:

The important concept of 'asynchrony' means that senders and receivers of a message need not be in attendance at the same time. This is not simply a matter of convenience - it means that communication crosses time as well as space. Sproull notes that although there are options for synchronous, simultaneous electronic communication (via 'talk' programs) they were as yet little used in organizations. As will be seen, the characteristic of asynchrony, which also means that messages can be processed, reflected on, and responded to in a mediated, literate mode (as opposed to an immediate, oral mode) may have important benefits at a cognitive level. At the time of writing, two types of synchronous CMC systems are in actual use, and being envisaged for greater use.

The first is the use of Internet-wide 'talk' or 'chat' type programs for communication or multi-user game-playing, which tends to be regarded as trivial (other than possible issues of wasted time and communications bandwidth).

The second is the emerging use of real-time video-conferencing, which may in fact negate some possible benefits of asynchronous CMC if perceived simplistically (and perhaps technologically deterministically) as a general purpose replacement for it, as a 'better, new' way of doing CMC. For example, research on the rationality of processing of immediate, oral messaging, relative to mediated, reflective literate messaging (Goody 1987, Ong 1982) suggests certain intellectual benefits from asynchronous, text-based interactions (see **2.4** below).

Similarly, while real-time video-conferencing systems will doubtless be found to have valid benefits in certain particular contexts, they sacrifice benefits of asynchrony in that they are accessible only while they are happening, and that they are limited in the amount of interaction they can allow. Against this kind of real-time, synchronous use, Renwick (1996) suggests that "the guess is that the future for education systems lies with technologies that store sophisticated teaching/learning programmes and enable students to interact directly with them but in their own time".

Electronic mail is fast:

An electronic message can reach its destination in seconds, whether that be across a hallway, a continent, or around the world. Again, this is not simply convenient - but means that it enables long-distance conversations, decision-making and other interactions. Sproull notes that conversations in face-to-face meetings are instantaneously fast, but only if people do not have to travel to the meeting. Likewise, telephone conversations are fast, but only when both parties are simultaneously available to talk.

Electronic mail is text-based:

Sproull notes that electronic text-based messages look pretty much alike and lack the social rules and statuses that usually regulate communication. There may again also be important cognitive differences in the rationality of processing of literate, text-based messages, relative to oral messages. However, Sproull's observations that video images and speech are not transmittable, and that few e-mail programs can transmit pictures, have been overtaken by MIME-enabled systems which can deliver any priorly known filetype, even if most messaging is at present still text-based.

Electronic mail has multiple addressability:

Other communication technologies can approximate this characteristic. Telephones can be used for conference calls, fax machines can be programmed to dial multiple numbers, letters can be photocopied - or, in the earlier letter copying method and terminology which is found in the `cc:` field of electronic mail message headers - 'carbon copied' to other recipients. However, there are orders of magnitude of difference in the ease and scale with which this can be done using electronic mail.

Electronic mail has built-in external memory:

The contents of electronic messaging can be stored and retrieved at a later date. So also can meetings, or telephone conversations, or voice mail, be recorded or transcribed, but without the ease and flexibilty of storage and retrieval possible with electronic messaging. Electronic mail enables the creation of an automatic 'audit trail' of the deliberations and decisions of a participating group, which can at any time be accessed by members who may wish to trace the history of an issue, or by newcomers wishing to orientate themselves. As has been seen in recent years, such electronic memories may also have negative effects on participants in electronic discussions, where messages thought deleted may in fact have been archived and be presented as incriminating evidence, or where employers monitor the content of employees' messaging.

Electronic mail's external memory is computer-processable:

This attribute extends the power of the previous characteristic, making the externalized memory convenient to share, search, edit, analyse, etc. Steps can again be taken to approximate this characteristic in other communication technologies, with computerised document and image retrieval systems, and by scanning and optical character recognition techniques.

2.2 Features and evolution of CMC systems

> In 1972 there was a community of less than 100 people who had been exposed to computer conferencing, most of them inside government, and a few hundred who had used electronic mail, most of them in the military (Vallee 1984, p.xi).

A most comprehensive summary of CMC system features is provided by Kerr and Hiltz (1982). Their book reviews the features of most of the major CMC systems then in operation, including 17 characteristics of the interface and 19 system factors.

As in many areas of information technology, the boundaries between these approaches are blurring. More than a decade ago Adams (1985) noted that commercial electronic mail services such as Telecom Gold, One To One, Comet, Easylink, etc, offered access to the telex network and perhaps also the capability to forward messages to other compatible mail systems. They also often offered additional facilities, such as conferencing, database functions, electronic diaries, word processing and other office facilities.

More blurred boundaries of terminology are to be found within the umbrella term electronic mail itself. In the literature of the subject, the term electronic mail is increasingly substituted for by the term computer-mediated communication (CMC), and to a lesser extent electronic messaging systems (EMS) or computer-based messaging systems (CBMS). This recognises three distinct architectures of electronic communication systems: electronic mail, bulletin boards and conferencing, though operational examples of any one system of these types may include, or be made to appear to include, characteristics of the other two. Most authors describing the elements of electronic mail systems include: entry of message text at a terminal or PC; distribution to one or more user mailboxes; display of message text by recipient user; filing and retrieving messages; use of distribution lists (Bamford 1980, Meyer 1988, Miller & Vallee 1980, Rice 1984)

The key characteristic of a bulletin board system (BBS) is that it offers multiple access to a single copy of a stored document, as with conferencing. As suggested in the introduction, it has been noted that many examples of bulletin board systems also offer other CMC facilities, such as messaging (Melton 1986, Golfer 1986, Schack 1987). Whereas formerly BBSs existed in some variety, accessible as individually hosted systems, the growth of the Internet has seen BBS provision greatly unified, firstly in the Gopher system (McCahill 1992), and subsequently in the World Wide Web (Berners-Lee 1992).

Conferencing systems are usually described as programs for enabling groups of participants with terminals or PCs connected to a host computer system to access a shared file and read and enter comments. Although most conferencing systems include one-to-one messaging facilities, their distinguishing feature is the provision of a common writing space for group deliberations, whereby only one copy of any message or comment is physically stored on the host computer (Hiltz & Turoff 1978). Descriptions of existing computer conferencing systems are also given by Davis (1987), Kerr and Heimerdinger (1982), and Kerr and Hiltz (1982).

Woolley (1996) suggests that, historically, there have been "five great rivers" of conferencing and conferencing-like software that have evolved more or less independently of one another:

- centralized forums
- groupware
- bulletin board systems (BBSs)
- Usenet
- mailing lists

Centralized forums:

Centralized forum software originated on mainframe computers in the early-to-mid-1970s with systems like EMISARI, EIES, FORUM, PLANET, COM, and PLATO Notes. The first such computer conferencing system was designed and implemented by Murray Turoff and others (Hiltz & Turoff 1978, p. 47) at the Office of Emergency Preparedness, and named EMISARI (Emergency Management Information System and Reference Index). EMISARI was based on the Delphi method of group planning and decision making (Linstone & Turoff 1975), and was a tool to facilitate that method over a distance, and to record the process. Experience from the EMISARI project went into the development of EIES (Electronic Information Exchange System) at New Jersey Institute of Technology in 1977, to investigate (Hiltz 1978) how such a system could support scientific processes.

EIES inspired the development of FORUM (Lipinski & Miller 1974), which became the Institute for the Future's PLANET in 1975. COM (Palme 1985) was influenced by

EIES and PLANET when it was developed in 1997 for the Swedish National Research Institute. In turn, COM influenced the CoSy conferencing system developed at the University of Guelph in 1983, and introduced by the UK's Open University for the support of some of its courses in the late 1980s (Mason 1989), notably the second level DT200 course, *An Introduction to Information Technology: Social and Technological Issues.*

Control Data Corporation's PLATO Notes was the basis for Digital Equipment Corporation's (DEC) VAX Notes, which became an official DEC product in 1986, as a distributed conferencing system.

Groupware:

Groupware, or workgroup collaboration software, was defined as a new category of software by the introduction of Lotus Notes in 1989, also evolving out of PLATO Notes and thereby being an offshoot of centralized forum software. However, whereas forum software focuses primarily on group discussion, groupware products support a variety of activities, such as document sharing and scheduling. They tend to be marketed mainly to corporate customers for internal use by workgroups, in which an efficient workflow may be perceived as at least as important as discussion.

Bulletin board systems (BBSs):

BBSs were pioneered by microcomputer hobbyists in the late 1970s. The creation of the first BBS for personal computers is generally attributed to Ward Christensen and Randy Seuss in Chicago, Illinois in February 1978 (Sterling 1992, p.68).

Usenet:

The Usenet distributed conferencing system began in 1978 and is thus one of the oldest co-operative networks (Emerson 1983). Its two main distinguishing characteristics are, firstly, use of standardized protocols to format and transmit messages, and secondly, that messages are passed from one news server to another and thus replicated at many sites around the world, rather than being stored at a single, central location. Its name is usually taken to mean "users' network". The idea for it was originated by Jim Ellis and Tom Truscott, graduate students at Duke University, to help a group of Unix developers at Duke and the University of North Carolina (UNC) collaborate. The news software itself was written by Steven Bellovin, then a graduate student at UNC.

Mailing lists:

E-mail is the least structured form of CMC, and it could be argued that it shouldn't be called conferencing at all. However, it has various advantages, such as being the lowest common denominator of Internet services, and thereby potentially reaching more people than any other method. The first major system of worldwide mailing lists grew from the US Bitnet (Because It's Time Network) in 1981, originating from developments led by Ira Fuchs (1983) in networking the dispersed campuses of the City University of New York (CUNY). Its LISTSERV software, written by Eric Thomas, manages subscriptions to e-mail discussion lists, allowing members to automatically subscribe themselves to lists, leave lists, and perform various other information retrieval functions associated with the lists.

The usefulness of mailing lists for conferencing activities has latterly been enhanced by the development of software to provide Web interfaces to the archives of mailing lists, such as the Hypermail program developed by Tom Gruber and Kevin Hughes for Enterprise Integration Technologies (`http://www.eit.com/`) and used, for example, by the UK Mailbase system of higher education e-mail discussion lists (`http://www.mailbase.ac.uk/`). Udell has demonstrated how Earl Hood's MHonArc Perl program (Udell 1996) for converting e-mail archives to be Web-interfaced can also be used on local Usenet newsgroup archives to provide groupware (Udell 1997) based on the combination of HTML (HyperText Markup Language) and NNTP (Network News Transport Protocol).

2.3 Organizational issues in CMC usage

A number of management 'gurus' have written and provided consultancy to organizations on the need to adapt to technological change (Drucker 1971, Kanter 1984, Handy 1989, Peters 1992, etc). The two main approaches to technological change are described by Elster (1983, p.9). Firstly, it can be conceived of as a rational, goal directed activity, in which a choice is made of the best innovation from among a set of feasible changes. Secondly, technological change can be seen as the cumulative addition of small and largely random modifications to the production process. He notes that technological change exhibits both of these aspects, but that there are differences in emphasis between the contending explanations. To illustrate the dangers of ignoring the latter, continuous change, to a point at which it becomes discontinuous, and catastrophic, Handy (1989, p.7) notably tells the story that a frog, if put in water which is heated slowly, will allow itself to be boiled to death. The common factors in the writing of Handy and others on the ways that modern organizations need to respond to change, and technological change, are firstly, that discontinuous change must be embraced, and secondly that the solutions are less technological than organizational. The corrective recommendations are generally about organizational structuring, re-structuring and flexibility, and closely related to information and communication flows.

It has been suggested that CMC and networking - both in its technical and social sense - may assist the management of modern organizations which need to be increasingly adaptive to change. Sproull and Kiesler (1991, p.160) envision a networked organization of soft structures in which dynamic and flexible relationships emerge and evolve. The model of organizational communication traditionally associated with traditional, pyramidical industrial age organizations was a primarily vertical one, in which it was a weakness that downward communication of information, instructions, and 'bad news' might be on a limited need-to-know basis. Yet as Kanter (BBC 1987) has observed of the need-to-know principle:

> ... unless we make communication accessible to everybody at all levels, then they may be inhibited in their drive for improvement because there will always be things they don't know, things they'll be banned from finding out ... who KNOWS who needs to know?

And conversely, the upward flow might tend to be restricted to 'good news', rather than possibly unpopular information, even though it might be strategically important. This traditional model is now widely regarded as a threat to post-industrial commercial organizations in which competitiveness is perceived as closely related to responsiveness to change, and to being able to open up channels of communication which cut across administrative hierarchies.

Loasby's (1976, p.130) quoting of C. W. Suckling offers a related idea, since the motivation to perform beyond reasonable expectations must in large measure depend on the possession of sufficient strategic information to justify and rationalize the exceptional contribution.

> Things get done because people want them to be done, and in the last resort the success of industry depends on its members being willing to contribute beyond the limits of what might reasonably be expected of them when the situation demands it.

Sproull and Kiesler (1991, pp.13-14) describe something close to this ethos in some companies which use computer networking in a liberal way whereby communication is open and employees cross barriers of space, time and social category to share expertise, opinions and ideas. The organizational culture emphasizes openness and innovation, a participatory style, and structures to minimize differences between management and workers.

Toffler (1990) describes some of the characteristics which have led to the networked model of communication achieving popularity both with managers and academics.

> These networks, formal or not, share common characteristics. They tend to be horizontal rather than vertical - meaning they have either a flat hierarchy or none at all. They are adaptive - able to reconfigure themselves quickly to meet changed conditions. Leadership in them tends to be based on competence and personality rather than on social or organizational rank. And power turns over frequently and more easily than in a bureaucracy, changing hands as new situations arise that demand new skills. All this has popularized the notion of the corporate network both among academics and managers.

Sproull and Kiesler (1986) and Kiesler (1986) have also proposed benefits from CMC in business and management contexts, arising from reduced social context cues, and from effects which cut down hierarchies, and cut across organizational norms and boundaries. Sproull and Kiesler (1991, p.73) also suggest that, for some purposes, electronic group meetings may be more effective than face-to-face meetings. Group problem solving can fall short because the person with a good solution must convince the others to adopt it, which is likely to be influenced by status. The suggestion is that electronic meetings are less influenced by status, and therefore support for correct answers might be more easily obtained from lower-status members.

Toffler (1990, p.108) reports that in 1987 IBM had 355,000 terminals around the world connected via its VNET network, handing an estimated 5 trillion characters of data in that year. IBM estimated that the use of their PROFS system for inter-office electronic communication saved the purchase of 7.5 million envelopes and that without PROFS it would need nearly 40,000 additional employees to perform the same work.

Toffler (1990, p.198) also describes the use of the VAX Notes electronic conferencing system by Digital Equipment Corporation's engineering management group, in which each person puts forward her or his draft objectives. He quotes the leader of the group, whose members are dispersed around the world, as saying that after a month and a half of such dialogue they are able to create a shared set of team objectives.

James Treybig, the CEO of Tandem Computers, also describes his organization's use of global CMC for problem solving purposes, by exploiting inter-connectivity and the resource of the company's employees.

> Almost 99 percent of the people at Tandem have terminals connecting them via electronic mail to every other person in the company. This is essentially a concept of no structure. A person in Switzerland on electronic mail, for example, can request help with a problem. He can say help to 5,000 people (which a person cannot do on the telephone). The next morning he may have 15 answers to the problem, of which 13 are wrong. But he has answers (Treybig 1985).

Microsoft's Gates (1995, p.158) describes his organization's use of e-mail partly in terms of replacement of paper-based communication and conventional meetings, and as an essential method of reaching consensus in a large-scale workforce.

> Even when we had only a dozen employees, e-mail made a difference, and it quickly became our principal method of internal communication. We used e-mail in place of paper memos and many meetings, to set up the meetings we still wanted to have, for quick technology discussions, for trip reports, for phone messages, and for reaching consensus of all kinds - from when we'd be able to deliver our next product to what kinds of toppings we wanted on a pizza. E-mail contributed a lot to our efficiency when we were small, and it's essential to us now that we have thousands of employees. Without it, we couldn't move as fast as we do.

Stewart (1994) reports a strategist at Andersen Consulting as noting that network relationships are more transactional than social, with many people working together who may never have laid eyes on one another, resulting in a certain remoteness. A fourth major computing multinational's experience of CMC identifies a paradoxical aspect of successful use, to do with the importance of seeking the right balance between, on the one hand, CMC interactions and, on the other hand, face-to-face meetings. Some industrial users of CMC have discovered the paradox that the more dispersed a workgroup, the more important it is to meet face to face, and Stewart quotes the CIO of Sun Microsystems thus on this aspect:

> You can't have a virtual conversation unless you also have real conversations. The indispensable complementary technology to the net is the Boeing 747.

Given the efforts of the earlier studies to establish justifications and benefits for implementing CMC systems within organizations, it is ironic that currently, in a great many organizations, it is taken as read that such technology should be invested in. This has come about as a result of the contemporary ubiquity of the Internet, firstly, literally in terms of its connectivity throughout the industrialized world, and secondly, in terms of advertising and marketing activities suggesting that Internet connectivity is vital for business success. A television advert by the IBM computer manufacturer, screened at the end of 1997 and the start of 1998, was sophisticated enough to parody this blind acceptance of the need to be connected to the Internet, but still with little more explanation than that IBM will sell the solution. Its script is as listed in table 2.2.

Scene: *An organization's boardroom or office. Two male executives are musing upon the contents of a report or internal memorandum. One of them reads from it:*	
First male:	**It says here the Internet is the future of business - we have to be on the Internet.**
	pause
Second male:	**Why?**
	pause
First male:	**... 'doesn't say.**

Table 2.2. Script of IBM TV advert of 1997-98

The further irony is that much of this is, of course, salesperson's hype, and little based on analyses of how CMC might in fact be integrated with organizational information management. As Cronin (1994, p.6) notes:

> So far, the external characteristics of the Internet have captured the lion's share of attention. Its rapid spread into companies and organizations around the world, the exponential growth of the traffic it carries, and the overflowing reservoirs of its information and data resources have been noted frequently in the past few years. There is notably less press coverage of what happens inside an organization once the Internet connection is made. What network applications are the most valuable for business? How does the Internet contribute to a company's information management strategy?.

The extension of the Internet into the metaphor of the 'Intranet' (Jones 1996, Patrick 1997, White 1997) may lead to greater consideration of the questions posed by Cronin. Intranets are primarily the province of the corporate sector, but the higher educational sector has also recognised the concept (Wilson 1996).

A review by Rice (1992) indicates the diversity of research perspectives and methods which have latterly been perceived as applicable to earlier traditions for studying organizational CMC.

> ... it should be obvious that a wide variety of research contexts can be applied to traditional approaches to studying organizational CMC, such as diffusion of innovations theory; underlying meta-theoretical assumptions about the rationality, symbolism or political nature of the adoption process; attributes associated with specifically situated but generically described CMC systems that may influence the adoption and evaluation process; multiple levels of analysis, such as individual, group and organizational adopters; different evaluation criteria, such as adoption, types of usage, extent of acceptance and satisfaction, and reinvention; multiple sources of data, such as surveys, case studies, reported and computer-monitored usage and network data; adoption phases and reinvention processes; contingent influences on adopting and evaluating a CMC system such as information processing requirements and situational constraints; models of organizational implementation and individual media choice with specific propositions about new media; and wide-ranging, often inconsistent results and critiques from substantial prior research about the influences on and process of adopting CMC systems.

A number of earlier studies sought to demonstrate the organizational cost-benefit of investing in CMC systems.

In a study using self-reported measures of improvements in working by university administrators using an electronic mail system, Rice and Case (1983) found reported improvements in both quantity and quality of work, with some substitution of electronic mail for the use of the telephone and conventional mail systems. However, both CMC meetings and telephone conference calls share a counterintuitive advantage over face-to-face meetings. Because there are no physical cues other than voice or text it is easier to concentrate on the topic rather than the person (Hiltz 1977). It has even been said to be easier to tell if someone is lying, since lying is usually supportively reinforced by non-verbal signals (Turoff 1980).

Rice and Bair (1983) argue that as studies of office behaviour consistently highlight the large amount of time managers and professionals spend in communication activities, then this is where benefits of CMC must be sought. They propose five areas in which CMC may have productivity benefits: greater control; improved timing (e.g. less delay-time before meetings); automation of processes (e.g. addressing of messages); fewer media transformations; reduced shadow functions (e.g. time wasted dialling busy numbers).

Turoff (1980) reports that 25% of the salaries of office workers is used in time spent in communications by managers and professionals, and that if appropriate CMC services are widely used, then widespread effects can be expected, since any means of communication strongly affects the actual communications and thus the organization of any group using it.

Crawford (1982) and Montgomery and Benbasat (1983) offer cost comparisons showing that electronic mail is at worst no more expensive than other media, but can offer great savings if use is high enough.

2.4 Social and psychological aspects of CMC

Social aspects of the use of CMC, and in particular group processes and decision-making, have featured prominently in the literature. This has been primarily led by researchers at the New Jersey Institute of Technology's Computerized Conferencing and Communication Center, and at Carnegie-Mellon University. Many such studies use a controlled experimental setting in which groups are given problems to solve, or decisions to reach, and measures of group interaction are collected. Common dependent variables are: equality of participation, leadership emergence, ability to reach consensus, quality of decision, satisfaction, etc. Typically, results from face-to-face settings are compared with CMC findings.

Researchers at Carnegie-Mellon (Kiesler *et al.* 1984) also studied decision quality, equality of participation, and consensus forming. The lack of widely shared norms and social-context interpersonal information is hypothesized to result in more impersonal, less-inhibited interaction, though also producing greater equality of participation and promoting democratization (Dubrovsky *et al.*). They suggested that the relative anonymity of CMC reduced status and prestige cues, lessening the influence of charismatic and high status people in favour of more equal participation. This study also focused on the high incidence of uninhibited verbal behaviour (often referred to as 'flaming' - said to be frequently observed on CMC systems). As an explanation they propose that CMC is a new medium lacking in regulating feedback and status cues which, as yet, has no established etiquette.

> Culturally, computer-mediated communication is still undeveloped. Although computer professionals have used electronic communication for over two decades, and they make up a subculture whose norms influence computer users and electronic communication, no strong etiquette as yet applies to how electronic communication should be used. A few user manuals devote a paragraph to appropriate uses of a computer network, but generally speaking, people do not receive either formal or informal instruction in an etiquette of electronic communications.

Since that time, however, a substantial literature about networking etiquette - sometimes called 'netiquette' - has developed. McMurdo (1995) has identified and provided a digest of the key sources of such advice. While many of the original sources of advice of networking and CMC etiquette were in electronic form, latterly entire monographs have been devoted to the topic (Angell & Heslop 1994, Rose 1994, Shea 1994), and even just to compilations of the typographic 'emoticons' known as 'smileys' often used in e-mail messages (Godin 1993, Sanderson 1993). For example:

`:-)`	:	the basic smiley, happy
`:-(`	:	a sad or angry smiley
`;-)`	:	a winking, knowing smiley
`:->`	:	ironic, sarcastic smiley
`:-|`	:	apathetic, neutral smiley
`:-O`	:	shocked smiley
`:-D`	:	laughing out loud smiley, etc etc

Hiltz and Turoff (1985) take issue with the findings of Kiesler *et al.* regarding uninhibited verbal behaviour arising from lack of non-verbal regulating cues. They argue that these findings arise instead from the use of college students as subjects, who themselves lack an established social history and shared norms. They conducted experiments with professionals and managers from a large corporation under three conditions: face-to-face; pen-name (i.e. concealing identity) synchronous conference; real-name synchronous conference. Little uninhibited verbal behaviour in the form of verbal hostility was observed under any of these conditions, though the pen-name groups were most likely to demonstrate a bandwagon effect where a participant did enter an uninhibited comment.

Lea *et al.* (1992) also take issue with the idea of flaming behaviour as a universal, decontextualized feature of the medium. Their argument is that flaming is in fact radically context-dependent, that it is a comparatively rare occurrence in CMC, but that for various reasons specific instances are observed or remembered by large numbers of people, thereby contributing to an illusion of universality.

The early reports about the intrinsic nature of CMC by Kiesler *et al.* (1984) have also been re-examined with regard to findings about its qualities for producing greater democracy and equality of participation within organizations. Mantovani (1994) challenges the view of CMC as being inherently apt to foster democracy in organizations as technologically deterministic. It is proposed rather that such an effect will depend on aspects such as social context, on the history of each organization, and on the regulations under which the network is operated.

Spears and Lea (1994) similarly seek to provide a corrective to the early, rather optimistic, dominant assessment, particularly within social psychological analyses, that CMC tends to equalize status, decentralize and democratize decision making, and thus empower and liberate the individual user. They argue that, far from status differences being generally levelled out in CMC, it can equally be seen to be capable of enhancing the effects of power and influence as well as diluting them, and that such technological effects cannot be divorced from their underlying social context.

With regard simply to the development of literacy and writing ability, and regardless of possible deeper effects described next, Brock Meeks is quoted (Elmer Dewitt 1994) as saying about young persons participating in Internet online discussion groups, that:

> There are a bunch of hacker kids out there who can string a sentence together better than their blue-blooded peers simply because they log on all the time and write, write, write.

December (1993b) has compared the networked discourse in Usenet newsgroups with the characteristics of orality as defined by Ong (1982), and suggests that this discourse brings back pre-literate characteristics, but is in fact a tertiary form of orality - the first two being pre-literature culture, and widespread radio and TV broadcasting.

Interesting cognitive-level observations about the rationality of the processing of immediate, oral messages in oral cultures, compared with mediated, print messaging in literate cultures (Goody 1987, Ong 1982) suggest possible benefits from electronic messaging, where a proportion of messaging is shifted from immediate, oral mode to reflective, text mode. The detachment between speaker and audience allows critical assessment without the pressure of an immediate audience or the need for immediate action. It is easier to perceive contradictions or illogicality in writing than in speech. Media theorist Marshall McLuhan, in various aphorisms, for example, that in the transition to a literate culture tribal man "exchanged an eye for an ear" (McLuhan 1962, p.26), noted the shift in consciousness that technological extensions to our senses can bring about. For better or for worse, members of literate cultures, working in detachment from the immediacy of oral messaging, become more capable of carrying out tasks of abstract reasoning, whereas members of preliterate cultures are reported to be quite disinclined to follow rules of formal reasoning at all (Scribner 1977, Luria 1976).

Noting the limitations of computer networks to provide much of the reality of the face-to-face campus to distance learners, Feenberg (1999) presents a related argument for the academic importance of written communication.

> On the other hand, we have a well established method for communicating in a narrow bandwidth. It's called writing. And we have a rich experience of using writing to overcome the limitations of bandwidth. Writing is thus not a poor substitute for physical presence and speech, but another fundamental medium of expression with its own properties and powers. It is not impersonal, as is sometimes supposed. We know how to present ourselves as persons through writing; this is what correspondence is all about. Nor is it harder to write about ideas than to talk about them; most people can formulate difficult ideas more easily in written form than in speech in front of an audience. These considerations on writing hold the key to online education. The online environment is essentially a space for written interaction. This is its limitation and also its potential. Electronic networks should be appropriated by educational institutions with this in mind, and not turned into poor copies of the face-to-face classroom which they can never adequately reproduce.

Also in the context of distance education, it has been noted that the time for reflection allowed by this model encourages deep learning. From a 1995 study of Open University computer science students Wilson and Whitelock (1998) describe a student having "time to reflect about his own understanding of a domain rather than just thinking he understood it". These authors note that this finding supports Laurillard's (1993) claim that this type of medium gives students time to reflect upon their understanding, and that Mason (1994) describes reflective activity as being "related to deep-level learning and the development of critical thinking". Related findings have been reported from a study at the University of Southern Queensland, Australia (Joughin 1992). Distance education organizations are also, of course, prime candidates to take advantage of CMC, where the transfer of communication from immediate, oral mode to reflective, text mode similarly holds some promise of encouraging deeper learning approaches. In a study involving distance learning students at the University of Sheffield during 1995-96 (Barrett & Lally 1999) it was conjectured that instances where messaging was found to draw upon deep processing cognitive skills may be related to the time for reflection allowed by asynchronous communication, permitting the individual to continue working with an idea in private before pursuing it further in public. (Other educational uses of CMC which may encourage deeper learning are noted in **2.6** below.)

And, as reported more prosaically perhaps by Harasim *et al.* (1995, p.194), this mediation may for some students beneficially remove pressures of the face-to-face classroom setting.

> Students report many benefits to learning networks. For example, they can review and reread what has taken place as often as is needed for understanding and retention. They can take as long as is needed to reflect on what they are reading and decide what questions to ask or comments to contribute to the discussion. No one in class can observe how long it took or how much effort went into an individual student's response, a characteristic that provides the slow learner with a virtual equality that is not usually available in the face-to-face class.

Table 2.3 summarizes some of the key ideas about the social and organizational characteristics and effects of CMC found in the literature.

Social and organizational effects of CMC

- Lack of interpersonal feedback and nonverbal cues can lead to misunderstandings.
- Information processing may be more rational than for immediate verbal messages.
- Reduces status and other social cues.
- Consensus takes longer to reach, but participation is more equal.
- Special tools and skills are needed to participate, possibly broadening an Information Rich vs Poor gap.
- May cause experience of information overload.
- May enhance face-to-face workgroups.
- May require more attention to planning face-to-face meetings.
- Collaborative work can be time and distance-independent.
- Cuts communications costs.
- Permits novel organizational structures; flattens and works across hierarchies.
- Supports project teams and other management techniques.
- Requires cultural and intercultural expertise.

Table 2.3. Social and organizational effects of CMC

2.5 Implementing and managing CMC systems

Many guidelines for implementing CMC systems appear within broader studies of the introduction of office automation (Helmreich & Wimmer 1982, Culnan & Blair 1983, Tapscott 1982). Hiltz and Turoff (1981) suggest that user-behaviour in CMC systems will evolve, leading to the need for refinement of structures to support interaction. Common features include: piloting and introducing with a small group; auditing existing communication flows; providing appropriate documentation and user support; maintaining an adequate level of use; adequacy of access to terminals or PCs; achieving a critical mass of users; evaluation of use and benefits; ongoing research to enable refinement of the system.

Wilson (1983) suggests that choice of users for the pilot study should be influenced by three factors:

- users who already have terminals, to minimize long-term resource commitment.
- users who already have a need to communicate with each other.
- users who are enthusiastic and committed and so make good pioneers.

Wilson also identifies the mistake of simply providing an electronic mail system and expecting users to use it, recommending that some positive applications (such as sending all internal memos over the system) need to be selected at the beginning of the pilot.

Kiesler and Sproull (1987b) provide a series of useful checklists of policy statements in the concluding chapter of their *Computing and Change on Campus.* Although this text is about educational computing in general, their various policy recommendations have a recurring theme of communication and computer-supported collaborative working applicable to other organizational contexts.

Hiltz (1978) came to six main conclusions about the conditions for the successfulness of the use of EIES conferencing system:

1. There has to be investment of time and effort by several group members.

Successful groups had moderators who attempted to play a strong leadership role.

2. The group must be 'real' and want to use the system.

Members must have shared concerns and goals and familiarity with one another's work. Users who are not thus motivated to communicate with other group members may not be willing to invest time learning to use the system.

3. Members must have easy access to computer terminals.

4. There seems to be a minimum 'critical mass' for successful groups.

Below this 'critical mass' there may not be enough new messages or conference comments to be received and responded to. Some members of low-activity groups stopped using the system, and some migrated to larger, more active groups and conferences.

5. Those who actively use the system find it acceptably pleasant.

6. It is possible for groups to engage in very productive communication.

Some groups were found to engage in activities which might not be thought possible without being co-located and communicating face-to-face.

The question of whether CMC increases users' ability to handle greater volumes of communication, or results in information overload (Kerr & Hiltz 1982, Palme 1984), has been addressed. Some researchers express concern that CMC users may be swamped with electronic junk mail (Denning 1982), and recommend strategies for filtering incoming messages, such as restricted access based on traditional organizational hierarchy, private mailboxes with unlisted addresses, automated content filters, etc.

Hiltz and Turoff (1985) argue against this, suggesting that while such strategies may limit volumes of incoming messages, they will probably also neutralize the benefits of CMC. They argue that the greatest strength of CMC is its ability to create new communication pathways, and that no automated filtering system can ensure delivery of all valuable messages. Rather than automating filtering in the system design, they favour providing the users with tools for screening messages themselves (for example by keyword searching) and relying on social norms to impose voluntary restrictions on unnecessary messaging. They also report from EIES studies that more experienced users are less likely to experience information overload. Sproull and Kiesler (1991, p.167) also caution that filtering poses an opportunity cost by cutting off unexpected information from unexpected sources.

Table 2.4 summarizes some of the guidelines for introducing and implementing CMC systems commonly reported in the literature.

Guidelines for CMC system implementation
Pilot and introduce with a small group who have a need to communicate.
Audit existing communication flows, but anticipate unmet needs.
Get top-down organizational commitment to using CMC.
Provide appropriate user documentation and user support.
Identify initial applications to maintain an adequate level of use.
Actively encourage the creation of electronic forums, and experiment with electronic events (eg. debates, teach-ins, discussions).
Ensure adequacy of access to terminals or PCs.
Achieve a critical mass of users.
Actively encourage participation by all segments of the population.
Make it as easy to find people on the computer network as on the telephone network.
Evaluate use of the system and benefits from it.
Conduct ongoing research to permit refinement of the system.

Table 2.4. Commonly cited CMC implementation guidelines

With regard to the third guideline in table 2.4, about getting top-down organizational commitment to using CMC, in an educational context, the UK Dearing Report of the Committee of Inquiry into Higher Education (Dearing 1997), in the thirteenth chapter on *Communications and Information Technology*, made an interestingly pointed observation about the implementation of an educational intranet at the US Harvard Business School:

> 13.21 On our visit to the USA we were particularly impressed by the communications infrastructure developed and adopted by the Harvard Business School. This Intranet-based system of teaching and administration was established across the entire School *'due to determined management, including at the highest level, and a dedicated and skilled implementation team.'* We have noted that *'a very significant element in the success of the project was due to top-down enforcement by a technically expert Dean.'*

2.6 CMC and education

Nasser and Ashton (1998) provide a bibliographic resource base in the area of networked learner support (NLS) in which the majority of items have abstracts. The US leads in the mass use of this technology. As would be expected, the literature offers both optimistic and cautionary comments on the virtual classroom (Hiltz 1986a) and the computerized campus (Roszak 1987). The latter cites Carnegie-Mellon as a possible example of how a campus of the future might develop, and speculates apprehensively about a time when all grades and assignments may be exchanged electronically with little need for students and teachers to meet. Hiltz outlines the use of the EIES conferencing system at New Jersey Institute of Technology, and describes positive results of the use of computer conferencing (using EIES) in distance education, as a substitute for classroom instruction, creating the *Virtual Classroom* (TM). These views are from the early days of the field, and as understanding has grown, so much of the early extreme comment has moderated.

A general introduction to the use of computing in higher education is provided by Balkovich *et al.* (1985) and these authors give recognition to the value of CMC for enhancing student-staff interaction. Welsch (1982) describes the use of electronic mail to increase his availability to a class of students on a computer programming course. Work specifications, progress reports, queries and answers were communicated by electronic mail between face-to-face classes. He noted that students were more willing to challenge grades when assignments were returned quickly, electronically, and that students believed that the course was much improved by the use of electronic mail.

Since 1991 CMC has been used at Deakin University, Australia, in a number of courses. Graham *et al.* (1999) present an overview of the CMC technology used by Deakin University, and specifically how it has been implemented at undergraduate level in the School of Economics within the Faculty of Business and Law. In 1996 and 1997 about one-third of students on a Bachelor of Commerce degree opted to register for participation in an online version of a first year macroeconomics unit. Graham and Scarborough (1999) evaluated the project using quantitative data from questionnaires and qualitative analysis of the experience of both staff and students. Examination of age and gender variables with overall performance did not show any strong correlation. It was concluded that there was evidence of a positive response by students to the use of CMC in the teaching of economics using a collaborative learning approach. For those students connected electronically, access to staff and other students was perceived to be the greatest benefit. One respondent commented on finding that writing out queries and receiving written answers was preferable to phoning staff.

However, despite such accounts emphasizing the value of CMC for enhancing aspects of staff-student interaction, and recognition of the limitations of the traditional lecture (Bligh 1971, Jackson & Prosser 1989, etc), there are various sources of inertia for its maintenance. Ehrmann (1996) discusses the dominance of directed instruction via lectures, and notes some reasons why its importance tends to be over-emphasized. For example, it can operate economically on a quite large scale, since an auditorium once built, costs no more to lecture to a hundred students than to ten. He also notes that, despite the discrediting of the lecture for directed instruction by educational researchers, a 'silent conspiracy' between students and teachers may exist to preserve the role of the lecturer as the 'sage on the stage' (whereas the role of the teacher using CMC, assisting students engaged in learning-by-doing activities is sometimes described as the 'guide on the side').

> Instructors and students have been known to indulge in a silent conspiracy to emphasize directed instruction. It can be easier for the students to believe that the learning that matters most is what the instructor tells them. Thus, it can be easier for faculty to accept their position as "sage on the stage", accepting that some students learn more than others in that setting. Although "teaching as telling" has long been discredited in the research literature, it is still widely practiced (Ehrmann 1996).

When Ehrmann's silent conspiracy is *not* at work, Fox has noted the mismatch that can occur where only the students view the teaching and learning process as a transfer of knowledge:

> They will expect well-structured lectures which leave them with a set of comprehensive notes which they can learn and later reproduce in an examination. Such students will be impatient with any attempts at introducing experiential learning such as projects, simulations and games. They will see such exercises as a waste of time because they know that the information transferred in such procedures can be transferred much more rapidly in lectures and duplicated notes (Fox 1983).

Fox further suggests that some students may even see some activities designed to help them 'learn for themselves', in which they have to work independently or in a group, as an abdication of responsibility on the part of the teacher, because they see it as the teacher's job to teach them.

However, Renwick (1996) has noted some of the limitations of directed instruction via traditional lectures, even just in their reliability for the transmission of information.

> Lectures, particularly to large numbers, are essentially one-way transmissions; it is of their nature that students have few opportunities, if any, to ask questions, seek clarification or make a comment. And as transmissions, they are often inefficient; explanations are not always coherent or clearly stated; students mishear or misunderstand what they hear, miss some points while they are writing others down, have lapses of concentration and can be distracted by others. These deficiencies can be repaired in tutorials, laboratory sessions, through the use of study guides, and by lecturers who are accessible to students in search of clarification. But the central question remains: for many, perhaps most, of the purposes served by lectures, are there more effective ways of facilitating learning? (Renwick 1996)

Nevertheless, in terms of quality of pedagogy, to go much beyond Renwick's implicit suggestion of 'low-level' benefits of CMC as a more reliable transmission medium, or beyond an argument that CMC-assisted teaching permits students more flexible learning in terms of time, place, and pace, or beyond anecdotal accounts of enhanced staff-student communication, is also to go beyond objective research findings to date.

There are as yet no studies which convincingly argue that the use of CMC actually improves the quality of pedagogy - as opposed to producing student satisfaction, or even higher scores in assessments. However, firstly, such improvements in pedagogical quality are not easy to measure objectively, and secondly, there are reasons for believing that CMC can be less ambitiously perceived as a facilitator of circumstances held to produce quality in teaching and learning.

A concept associated with such quality in recent years has been that of 'deep' learning, as opposed to 'surface' learning. Deep and surface approaches to learning have been characterized by features such as those listed in table 2.5 (Marton & Saljo 1976, Entwistle & Ramsden 1983).

Deep Approaches	Surface Approaches
Intention to understand the material for oneself	Intention simply to reproduce parts of the content
Interacting vigorously and critically on content	Accepting ideas and information passively
Relating ideas to previous knowledge/experience	Concentrating only on assessment requirements
Using organizing principles to integrate ideas	Not reflecting on purpose or strategies in learning
Relating evidence to conclusions	Memorizing facts and procedures routinely
Examining the logic of the argument	Failing to recognise guiding principles or patterns

Table 2.5 Deep and surface approaches to learning

Deep learning can be difficult to foster, and students scoring high grades can nevertheless fail to understand the science underlying material they have supposedly mastered (Ehrmann 1996). Ehrmann notes the need to shift some instructional energy away from lectures and simple problems, towards realistic project-based, collaborative learning which can be supported by CMC, and which he relates to such deeper approaches. Team working is, of itself, an important workplace capability which has been observed to be seldom taught in schools or universities (Boyatzis 1982).

Ehrmann suggests firstly, that working on a sequence of appropriate projects can develop some of the higher order analytical, synthesizing, critical features characteristic of deeper learning, and secondly, that CMC can be a useful support system for such activities. For example, as soon as face-to-face class-time ends, students may need to scatter to homes or workplaces, but the use of CMC can make further time-delayed collaboration possible despite schedules which do not mesh.

Deeper learning may also be anticipated from the cognitive-level observations about the rationality of the processing of immediate, oral messages, compared with mediated, print messaging in literate cultures by Goody (1987) and Ong (1982) noted in **2.4** above. These suggest possible benefits from electronic messaging, where a proportion of messaging is shifted from immediate, oral mode to reflective, text mode, allowing critical assessment without the pressure of the need for immediate action.

2.6.1 CMC, enterprise, and transferable skills

Some of the characteristics and uses of CMC may also be seen too have educational validity and benefits in the areas of enterprise and personal transferable skills. In the UK in 1987 the Employment Department - subsequently to become the Department for Education and Employment (DFEE) - launched the *Enterprise in Higher Education* (EHE) initiative. The main elements of the initiative were stated as follows (Employment Department 1989):

> a) every person seeking a higher education qualification should be able to develop competence and aptitudes relevant to enterprise;
>
> b) these competencies and aptitudes should be acquired at least in part through project based work, designed to be undertaken in a real economic setting, and they should be jointly assessed by employers and the higher education institutions.
>
> The intention is that enterprise programmes offer more than simple, bolt on modules of business studies. There should be an attempt to integrate the new programmes with the education provision already offered to the students. The initiative is not a narrow vocational substitution for broad academic education and does not displace the need for high level expertise and professionalism in any number of specialisms.
>
> Associated staff development is a critical feature of the initiative and it is expected that institutions will design training programmes for staff to deal with the needs generated by their programmes. As well as being qualified in a particular discipline, students who have attended a course which includes enterprise will:
>
> - have a positive attitude towards enterprise activity;
> - have developed personal transferable enterprise skills;
> - be better informed about employment opportunities, aims and challenges and make better career choices;
> - be better prepared to contribute to and take responsibility in their professional and working lives.

Despite a variety of EHE models adopted by institutions, with no consensus on the range and definition of core or transferable skills, it has been noted that the summary developed for the General National Vocational Qualifications (GNVQ) (Heywood 1994, p.12, Binks 1996), and the parallel Scottish reforms (Kemp & Seagraves 1995) are helpful. Mandatory core skills for these qualifications include communication, application of number, problem solving, and information technology. Although it has been observed that the advance of NVQ qualifications into higher education has been limited (Newby 1998), a similar set of personal transferable skills were also included as the common factor in curriculum change in an overview from the EHE funding body (Whiteley 1995).

Clearly at a literal level, CMC can be seen as a potential contributor in the categories of both communication and information technology. However, at a deeper level it may also offer a means of at least partly delivering some of the EHE intentions regarding workplace skills and enterprise activities.

Work placements or work-based projects are generally seen as the preferred way of developing employment-related competencies. However, courses or modules with large student numbers can present considerable logistical problems in finding and administering appropriate placements. It has been noted (Drummond *et al* 1998) that some degree programmes attempt to ease this situation by turning to 'live' project work in which students are required to complete either an internal or external collaborative project. As has been proposed in the preceding section, CMC can offer a support system for collaborative student projects (Ehrmann 1996). Also, students who have been equipped with the knowledge of the conventions and practices of local electronic discussion forums may become viable participants in national or global discussion forums. In various professional disciplines and in economic and technological activities, electronic discussion forums offer a means for students to observe and perhaps take part in state of the art developments and problem solving. Quite commonly in such electronic discussion forums some of the individuals leading the commercial and technological developments in their fields are active and central participants, sharing and making accessible at least some of their ideas and knowledge.

With particular regard to gender differences and transferable skills, some interesting findings have been reported from a 1996 survey of graduates of the University of Central Lancashire by Nabi and Bagley (1998). Their global finding were firstly, that the graduates tended to rate the importance of particular skills more highly than their own abilities in those skills, and secondly, that they tended to rate their level of ability lowest in IT skills and highest in their ability to work without supervision. However, they also found some significant gender differences. Females tended to rate most of the skills as more important than did males. This difference was reported as especially evident for time management, planning and organising, flexibility, listening and IT skills. The skills on which females rated themselves higher than males included team working, time management, planning and organising, and prioritising. Males, by contrast, tended to rate the quality of their own communication, problem-solving and IT skills more highly than did females. This area of gender difference matches with a study of university entrants in the USA. Wilder *et al.* (1985) report that males tended to rate themselves more highly skilled in computer interaction even compared to females with objectively similar backgrounds and skills. Conversely, despite having similar levels of computing experience, female students rated their levels of comfort and ease of use less than that of males.

Table 2.6 summarizes some of the key findings from the literature with regard to possible effects or benefits of using CMC in education.

Reasons for using CMC in education

- Vocationally relevant experience for students in most subjects.
- Develops information seeking, handling and exchanging skills.
- Empowers students. (May threaten and overload teachers.)
- Useful for opinion surveys and votes.
- Offers students more flexible learning environment, in terms of time, place, pace.
- Amplifies teacher effort in responding to tutorial enquiries.
- Previews and follow-ups may enhance quality of face-to-face seminars and lectures.
- Easy provision of course documentation encourages a more transactional approach.
- Good support environment for guiding access to external networked information sources.
- For information students, particular relevance due to additional professional 'knowledge worker' role in CSCW.

Table 2.6. Reasons for using CMC in education

2.6.2 Carnegie-Mellon University

Carnegie-Mellon University (CMU) is a private university in Pittsburgh, Pennsylvania. The two founders and benefactors were Scots steelmen. In 1982, Carnegie-Mellon embarked on a project with IBM to develop a network of computing workstations, and an electronic campus. The workstation and file system project is called ANDREW, first-named after both founders, Andrew Carnegie and Andrew Mellon. Described as the most computer-intensive campus in the world, by 1985 it was estimated to have 2,800 microcomputers (plus those personally owned by students and staff), which by 1987 had risen to 5,513. With this influx of new technology, CMU set about systematically learning about the attendant educational, organizational and social changes (Kiesler & Sproull 1987a).

Blackwell (1987) reports results of studies during 1983-85 involving automatic electronic monitoring of mainframe computer program use at CMU, some of which correspond directly or indirectly to CMC or CMC-related facilities. These were: communicating (electronic mail; bulletin boards), and text processing (text editing, correcting, printing)

Although other forms of computer-use were monitored (e.g. programming; data processing; using networks) the text editing, electronic mail and bulletin board programs were all near the top. Blackwell (1987) suggests that perhaps the most interesting result of the study is the popularity of a program called Finger, which is used to identify and obtain information about other users currently logged onto the system, and also the recreational programs Joke, which tells a new joke each day, and Cookie, which tells a fortune. It is worth noting that while the latter pair of programs may be regarded as trivial, the former in fact performs a non-trivial organizational function.

Anderson (1987) reports some results of a 1985 survey of students and staff at CMU about their attitudes to computers and to computing at CMU. Table 2.6 shows the percentage of faculty and students who strongly agreed, or agreed, with various attitudes:

Attitude statement	Faculty who strongly agree or agree	Students who strongly agree or agree
Everyone at CMU should have full and easy access to a computer.	87.3	93.9
Almost everyone should learn how to use a computer.	73.8	83.0
One of the things I like about CMU is the access I have to computing.	64.0	67.4
In general, I would like to see more practical uses of computers made at CMU in my courses.	51.9	62.6
I like to experiment with computer systems.	42.3	53.1
I would like to use a computer more than I do now.	37.5	51.0
There is too much emphasis on computing at CMU.	32.0	21.8

(Note: Faculty *ns* range from 66 to 80; student *ns* range from 137 to 147)

Table 2.6. Extracts from Anderson's survey of CMU attitudes to computers and computing.

Anderson (1987) also measured reported computer use across some of the categories used by Blackwell (1987), confirming the popularity of text processing and communications programs. He found that text editing received the highest reported use, with electronic mail close behind. Discussing differences between different user groups, he comments on the common belief that attitudes towards computing and the amount and purpose of computer use vary substantially between technical professionals and nontechnical professionals, and between males and females. His finding was that it was difficult to distinguish between technical and nontechnical faculty in their computer attitudes, amount of use, or kind of use. Also, male faculty were found to be indistinguishable from female faculty with respect to computing. Technical students knew more programming languages than did non-technical students. Male students knew more programming languages and used a PC for more hours per week than did female students. These, however, were the only differences across a wide range of attitude and behaviour measures.

2.6.3 The Open University

Although there is no comparable UK local-campus study to date, in the distance-education context, there has been extensive UK work in this area by the Open University (for example, Castro 1988, Kaye 1989, Mason & Kaye; 1989, Smith 1988, *et al.*). As a feature of the DT200 course, *Introduction to Information Technology: Social and Technological Issues*, students were provided with a project booklet (Open University 1990), part of which surveyed them about their experiences of using CMC with the Open University, and about their attitudes to CMC in areas identified as significant in the social-psychological literature of CMC (Kiesler *et al.* 1984). This included responses from about 800 students from the 1989 cohort. Students were surveyed on how they compared conferencing with face-to-face tutorials, with results as shown in table 2.7.

As a means of getting help with their course-related difficulties:	Better:	60	(7.6%)
	As good :	148	(18.7%)
	Less effective:	521	(66.0%)
	Don't know:	61	(7.7%)
As a means of socialising:	Better :	26	(3.3%)
	As good :	75	(9.6%)
	Less effective:	619	(79.1%)
	Don't know:	63	(8.0%)
As a medium for intellectual exchange:	Better :	108	(13.9%)
	As good :	228	(29.2%)
	Less effective:	379	(48.5%)
	Don't know:	67	(8.6%)
In terms of cost, conferencing is:	More expensive :	410	(52.7%)
	About the same:	214	(27.5%)
	Less expensive:	155	(19.9%)
In terms of time spent, conferencing is:	More time consuming:	355	(46.3%)
	About the same:	166	(21.7%)
	Less time consuming:	246	(32.1%)

Table 2.7. How OU students compared computer-conferencing with face-to-face tutorials.

The OU students were also asked if their own experiences generally supported or contradicted some suggestions about computer-mediated communication, with results as shown in table 2.8.

Individuals can participate more equally than in face-to-face communication:	Agree :	441	(56.0%)
	Disagree:	207	(26.3%)
	Uncertain:	139	(17.7%)
Computer communication is depersonalizing:	Agree :	467	(59.4%)
	Disagree:	184	(23.4%)
	Uncertain:	135	(17.2%)
Computer conferencing encourages individual assertiveness:	Agree :	273	(34.6%)
	Disagree:	256	(32.4%)
	Uncertain:	260	(33.0%)
Personal interaction is more difficult with computer communication because of the lack of contextual and verbal feedback:	More difficult:	623	(79.3%)
	About the same:	79	(10.1%)
	Uncertain:	84	(10.7%)

Table 2.8. OU students' attitudes to computer-mediated communication.

There was also a final question asking students, based on their experience so far with CMC, to describe their interest in continuing to use it after the end of their course, assuming access to the necessary equipment, with results as in table 2.9.

Very enthusiastic:	95	(12.1%)
Quite interested:	361	(45.6%)
Neutral:	168	(21.2%)
Barely interested:	107	(13.6%)
Definitely not interested:	60	(7.6%)

Table 2.9. OU students' interest in future use of computer-mediated communication.

Mason (1989) presents findings suggesting that CMC is marginally beneficial for some of these OU students, but very valuable for others in getting information and maintaining contact.

Thomas (1989a and 1989b) has reported on implications of the OU experiences in computer conferencing for conventional campus-based institutions. Rather than proposing local use, he mainly identifies opportunities for remote use by part-time students, and for students to exploit the resources of dial-up bulletin boards. This latter proposed use could perhaps be projected forward from the time of writing to correspond in principle to the way many students can currently access Internet resources.

Although there has been more than a decade of literature on the subject of CMC in education, the following assertion still has much validity.

> It is not clear whether email can be an effective replacement for face-to-face seminars and tutorials (Kernohan 1994).

2.6.4 CMC and the economic future of higher education

There is a view, convincing in various aspects, that academic quality is still ideally achieved by the methods of the original Athenian academies, wherein a small number of scholars would walk with their teacher through a grove of olive trees, being led to knowledge and understanding through conversation and processes of systematic questioning.

Mid-way through the present century Professor Highet, discussing the art of teaching, expressed his admiration for the tutorial system invented by Socrates, and by which he himself had been trained at Oxford, but finally rejected it because of the expense involved, in time, effort, and money.

> Socrates was poor, and lived mainly on presents from his pupils; but there are not many professional teachers who could afford to live on the fees paid by the few pupils they could teach by this system, and there are not many pupils who would be willing to pay enough to make the life liveable. ... Also, it is far easier to give two one-hour lectures to classes of fifty or sixty than to tutor one or two pupils for two hours (Highet 1950, pp.108-109).

At the end of this century, and on the verge of the new millennium, Ehrmann (1996) identifies three daunting challenges for institutions of post-secondary education, each of which makes the other two more difficult to resolve. These are:

- extension of access, despite possible difficulties of location, schedules, disability, or cultural differences.
- quality of learning, especially learning for the 21st century, both for economic life chances, and more widely - "how to make a life, which is quite different from how to make a living" (Postman 1995).
- costs of achieving the first two goals in the face of slow economic growth and other urgent social needs.

Renwick (1996) reports that all OECD countries are currently planning increases in their post-secondary education sectors, recognising that they must become learning societies, and must develop systems of mass education and training in order to do so. These governments are telling their educationalists that education is crucially important, and more of it is needed, but not more of the same. Many countries have introduced new funding regimes and systems of accountability aimed at steering educational institutions towards greater efficiency in business terms, casting them in the role of competitors in educational marketplaces, and students as clients or customers, and with a primary objective of reducing the per-student unit cost.

In the UK, in 1997, the *Report of the National Committee of Inquiry into Higher Education*, the Dearing Report (Dearing 1997), noted that over the last twenty years the number of students had much more than doubled. In Scotland, in 1998, a Green Paper on lifelong learning (Scottish Office 1998) set out an action plan including the goal of enabling an additional 42,000 students to participate in further and higher education system by 2002.

Regarding the unit of funding, in 1995, noting that higher education had gone through a period of rapid growth against a background of falling revenue, the Joint Information Systems Committee (JISC) reported that public sector funding per-student had decreased by 27% over the previous five years, and was predicted to fall by a further 10%, in real terms, over the next three years (JISC 1995). The Dearing Committee's corresponding observation was that public funding per student in higher education institutions had fallen by more than 40% since 1976, and that if the further reductions in the public expenditure plans up to 1999-2000 were added, the cumulative reduction would be around 50%.

The solution to the problem of increasing access, while maintaining quality, but reducing unit costs, has been sought in the application of modern computing and communications technology. The Dearing Report (Dearing 1997) devoted an entire chapter to *Communications and Information Technology* (C&IT) and references to this term and the need to exploit C&IT pervade the remainder of the report. Recommendation 46 of the Dearing Report was:

> We recommend that by 2000/1 higher education institutions should ensure that all students have open access to a Networked Desktop Computer, and expect that by 2005/6 all students will be required to have access to their own portable computer (Dearing 1997).

It has also been recognised that the successful use of C&IT will require some re-thinking of the pedagogy of the traditional face-to-face university. Recommendation 14 of the Dearing Report was for the immediate establishment of a professional Institute for Learning and Teaching in Higher Education, whose functions would be to accredit programmes of training for HE teachers, to commission research and development in learning and teaching practices, and to stimulate innovation. In the mission to drive down the per-student unit cost by use of C&IT, educationalists have not surprisingly examined the lessons to be learned from the experiences of distance learning institutions, and there has been discussion of traditional face-to-face universities becoming 'dual-mode' institutions.

There has been some speculation that the use of C&IT may lead to an interaction and convergence between the methods of face-to-face teaching and those of distance education, which have usually been thought of in contrast with each other, and with the latter "a coherent and distinct field of educational endeavour" (Keegan 1990, p.205). Whereas it was the policies and practices of the conventional face-to-face teaching institutions which set the initial agendas for distance education, the reverse may now be beginning to be the case (Ehrmann 1996).

Indeed there has also been discussion of the consequent economic threat to single-mode providers of distance education (Rumble 1992), who have a strength in having amassed a body of operational knowledge, but one which is public and can thereby be readily appropriated by others.

Reflecting on the implications for face-to-face teaching that have emerged from experimental work in distance education, where attention to the problems of distance has been shifted to the concept of guided self-study, Renwick suggests the possibility of a paradigm shift in the way post-secondary teachers conceive their roles:

> Deeply ingrained attitudes are being challenged by new technological possibilities. Instead of thinking of part-time, extra-mural and distance education students, teachers must now consider the advantages that information and communication technology could offer *all* students, full-time and face-to-face no less than distance students. Instead of thinking of distance-education modes of teaching as second best solutions, all teachers must become familiar with the pedagogic principles they express and then ask themselves how far these are or should become part of their personal stock in trade (Renwick 1996).

He observes that the design of good distance education programmes is based both on a knowledge of the subject, and on a knowledge of the ways the content of subjects can, under any given circumstances, be most usefully organised and presented for students to study by themselves with varying degrees of assistance. He further suggests that inspection of such programmes reveals that their standard practice is no less than the classical Socratic method of teaching, whereby students are led into a subject by means of carefully framed questions intended to take them to its heart.

A pair of key and complementary texts about the link between technological change and educational change have come from senior figures at the Open University. Laurillard (1993), influential on the Dearing Commitee (Dearing 1997), addresses pedagogical issues in the use of educational technologies. Interestingly, a key concept in her interpretation of teaching is that it is an act of 'mediation'. Academic learning is differentiated from other kinds of learning in everyday life in that it is not directly experienced, but mediated by the teacher. Undergraduates do not learn about the world directly, but via others' descriptions of the world. She suggests that the main reason that new educational technologies fail to make the impacts predicted for them is neglect of the learning context, and that greater effort is needed to embed them in their educational niche. By contrast, Daniel (1998) addresses the infrastructure of teaching and learning, analysing the challenge of knowledge media - the combination of computers, telecommunications, and cognitive science - for both 'mega-universities' and campus universities. Mega-universities are defined as distance learning HEIs with more than 100,000 students. He notes that the involvement of campus universities in distance and open learning are already blurring the boundaries between the two types of institution. Two main models of distance education are identified. The first is the 'correspondence course' in which the student learns from supplied materials, does exercises and obtains feedback. The second is the 'remote classroom', in which the student is presented with a distance education class via video, audio or synchronous computer conference. His argument is that the key to the response to technological change for all types of university is the cost-effective and strategically planned integration of both these models into flexible learning.

Against optimism about online learning, Noam has predicted the "dim future of the university" (Noam 1995). While he suggests that the advantages of electronic forms of instruction have been wildly exaggerated (while also acknowledging that face-to-face teaching is often romanticized), he accurately identifies the key point that they can be delivered at lower cost. However, in that he suggests "dramatically" lower costs, and that curricula could be offered electronically not just to hundreds of students nearby, but to tens of thousands around the world, he is surely falling into the trap of technologically deterministic thinking, and ignoring, for example, the infrastructure that would be needed to assess and moderate the assignments that such a body of students would generate.

Hanna (1998) has examined the ways in which organizational models for HEIs are changing in an era of digital competition. He notes Toffler's three conditions for developed organizations to change significantly (1985). These are that firstly, there must be enormous external pressures, secondly, there must be people inside who are strongly dissatisfied with the existing order, and thirdly, there must be a coherent alternative embodied in a plan, model, or vision. Hanna argues that the first two conditions describe higher education as a system. The third is the focus of his paper, which analyses trends, characteristics and examples of emerging organizational models for HEIs. These include, extended traditional universities; for-profit adult-centred universities; distance education/technology-based universities; corporate universities; university/industry strategic alliances; degree/certification competency-based universities; global multinational universities. His conclusion is that the growth in worldwide demand for learning, combined with improved learning technologies, is forcing existing universities to rethink basic assumptions and marketing strategies. The new digital environment both encourages and enables new organizational models for HEIs and these will challenge traditional campus-based universities to change more quickly and dynamically.

Nevertheless, for some of Noam's predictions, such as of the emergence of electronic alternatives to traditional universities offered by media companies and publishers, there are already signs that he is correct. Noble (1997, 1998) has voiced concerns about such trends towards a commoditization of online instruction leading to the emergence of 'digital diploma mills', and has documented agreements already reached between a number of US universities and commercial consortia of publishers, broadcasters, and software producers.

In a piece indicatively titled *The Computer Delusion*, Oppenheimer (1997) questions the validity of the current enthusiasm for the use of computers in education, suggesting that the dramatic benefits being predicted for information technology may prove no more substantial then earlier technologies which were predicted to have revolutionising effects (e.g. film, radio, TV, and video) but which did not in fact fundamentally change the structure of education, as opposed to adding some new possibilities.

Cuban (1986) has observed a historical pattern emerging as successive rounds of such new classroom technologies failed to meet their promoters' expectations. The commercially driven cycle begins with the articulation of great promised benefits by the developers and manufacturers of the technology. In the classroom, however, teachers do not really embrace the new tools, and also no significant academic improvement takes place. This failure then provokes consistent responses, such as, that the problem was financial, or teacher resistance, or due to educational bureaucracy. But what tends to fail to be questioned is the original claims of the advocates of the technology. Finally, as the last phase of the cycle, the blame is laid on the technology itself, but soon educationalists are being sold on the next generation of technology, and the lucrative cycle begins again.

Like Cuban, Renwick also observes that, instead of being able to prescribe requirements based on educational research in their disciplines, teachers have typically been confronted with new technologies designed primarily for other purposes.

> Instead of being pulled towards technology that will provide answers to their pedagogical questions, they are being pushed towards items of equipment that are being promoted as the latest "hot" product in some company's marketing strategy (Renwick 1996).

To some extent, the same market-driven accusations could be levelled against present-day computing technology, in the way that in the past few years typical PC specifications have doubled and doubled again in terms of hard-diskspace, memory and processor speeds, and are thus able to accommodate bloated new versions of software packages that in fact bring little new useful functionality, but make lower specification PCs - which may have been successfully delivering all the functionality required of them - obsolete.

However, Ehrmann's (1996) view on the present generation of communications and information technologies is more optimistic. He similarly notes the fascination that new technology can have, and how it can tend to "draw all eyes to itself", and focus discussion on the quest to discover what it can do best. He advises that for educators this is usually a mistake, and asserts that cutting edge education cannot be built on cutting edge technology. His argument is that cutting edge technology is usually too expensive (relative to lesser prices in later years), too 'brittle' and too difficult to learn to use. However, he suggests that as a result of the extensiveness of their use within and outwith education, the newest applications of computing, video and telecommunications technologies have become affordable, reliable and familiar.

Although there are low-cost, single-user variants of video-conferencing systems, some institutions are currently making substantial investments in expensive 'real-time video-conferencing suites' which are possible contenders for Cuban's theory of failed educational technologies, for reasons raised in **2.1** above on asynchronous CMC. As noted there, while these may have valid specialist applications, for general use the greater likelihood is that the future lies with asynchronous CMC and with technologies which store sophisticated teaching and learning programmes and enable students to interact directly with them, but *in their own time*.

Despite his prevailing pessimism above, Noam's (1995) conclusion surely also identifies the logical strength and opportunity of the educational institution which has a physical campus available to it as a resource, in a complementary use of CMC technology to strengthen community on campus:

> Thus, the strength of the future physical university lies less in pure information and more in college as community; less in wholesale lecture, and more in tutorial; less in Cyber-U and more in Goodbye-Mr-Chips College. Technology would augment, not substitute, and provide new tools for strengthening community on campus, even beyond graduation (Noam 1995).

2.7 Gender, learning and education

The literature of *learning styles* offers further related grounds for belief that the flexibilities offered by the educational context of CMC may have pedagogical benefits. A useful and widely cited concept in this field is Curry's (1983) onion model. The onion model consists of three layers in which the assumed influence of the educational context varies. Within the innermost layer, learning concepts are considered to be stable, and anchored in personality, and even physiology. Some writers prefer the term *cognitive* style within this layer, in which the educational context is presumed to have no effect on the way students learn. Conversely, in the outer layer, learning is assumed to depend on the educational context. In the literature of theories positioned in this outer layer, the term learning *strategies* is often used in preference to the term learning *styles*. (In the middle layer, an intermediate position is assumed, that the way students learn is stable, but not entirely fixed.)

Perry (1970, 1981) proposes a model in which college students may journey through nine positions of intellectual development, the first five of which are cognitive-structural and the latter four are considered psychosocial. Perry's stages of development can be characterized in terms of the student's attitude towards knowledge. Initially, there is a basic dualism, that there are right and wrong answers and received knowledge to be learned. The student progresses to stages where multiplicities of answers are recognised as possible, and that knowledge can be subjective. In the latter stages an appreciation of relativism and procedural knowledge develops, recognising that there are disciplinary reasoning methods which depend on context. Here Perry notes the opposition of 'connected' knowledge, which is empathetic and subjective, and 'separated' knowledge, which seeks to apply techniques for objective analysis. The final stage of learning recognises that, rather than knowledge being received or given, it is constructed and integrated with personal experience and reflection. Perry's research has been influential, has been substantiated by subsequent research, and has been followed up in related studies such as that by Belenky *et al.* noted in **2.7.1** below.

Riechmann and Grasha (1974) present a style of learning identifying the three bipolar dimensions, participant-avoidant, collaborative-competitive, and independent-dependent. This style construct was subsequently described by Jonassen and Grabowski (1993, p.281) as a social interaction scale because of its basis in patterns of preferred styles for interacting with teachers and fellow students. Keefe's (1989, pp.2-3) style construct includes elements of study and instructional preference such as verbal risk orientation, time (early or late morning, afternoon, evening), verbal-spatial grouping, posture, mobility, lighting and temperature. Dunn *et al.* (1989) similarly aim to influence pedagogy and teaching arrangements, advocating methods which capitalise on individual students' modes of learning by matching environmental factors to learning style. These include preference for group learning, time of day, opportunity for independent learning, presence of authority figures, etc. While in a conventional teaching situation, it could be variously problematical to individualise teaching in this way, some of their factors could be facilitated by CMC.

2.7.1 Gender differences in learning styles

As regards gender differences, the literature is somewhat equivocal, and with problems in the interpretation of links. Riding and Rayner (1998, p.113) propose that there do not appear to be overall differences with respect to cognitive style, and that such differences as do occur are usually small and non-significant. However, they note studies of 7-15 year-old and 11 year-old schoolchildren (Riding & Vincent 1980, Riding & Smith 1981) investigating information processing differences in spoken prose passages. Results were interpreted to suggest that females undertake a more complete search of related information in memory, and consequently when processing details they take longer and may run out of time to complete processing at faster speech rates. By contrast, males were concluded to process more in the nature of an overall scan, faster but to a more superficial level than females, who were more thorough.

Belenky *et al.* (1986) conducted a follow-up study to the work of Perry (1970, 1981) noted in the previous section. This found that women had a somewhat different development model to males, and also concluded that much traditional teaching in higher education was unsuited to the learning styles of women. The key area of difference they identified related to Perry's concepts of 'connected' as opposed to 'separated' learning. Gilligan (1982) had previously observed that students who preferred to learn in the separated style were associated with autonomy, certainty, control, and abstraction, and were often males. Conversely, connected learners were often females. Belenky *et al.* (1986) develop a view of this gender difference in learning style, and in particular the connected version associated with females. Like Perry's, their separated version has its basis in objectivity, where anything presented as fact is to be adversarially scrutinized and doubted. But by contrast, their connected version, while still reasoned and procedural, develops from non-adversarial debate which may be more like gossip, which is empathetic in nature, where co-operation is stressed rather than competition, and which depends on relationships in which the participants know and respect each other.

Similarly, in a study of the support provided to distance learning students, Kirkup and von Prummer (1990) found that female students showed a stronger desire for connection with others during their studies than did males, and would make efforts to meet other students to engage in shared learning. Whereas only 24% of males found isolation on their distance learning course to be a problem, 40% of females did. They concluded that in the design of distance education systems it was important to put effort into creating networks of support amongst students, and that female students in particular did nor benefit from, or enjoy, isolation as learners.

In a meta-analysis of seven studies using Entwistle's Approaches to Studying Inventory (ASI) (Entwistle 1981), the scales of which are defined in table 2.10, Severiens and ten Dam (1994) found that on average men score higher on the extrinsic motivation scale and the achievement motivation scale, whereas women score higher on the intrinsic motivation scale, on fear of failure, and on the surface approach. They found, however, that on most scales gender differences varied according to the studies included in their meta-analysis, and results were heterogeneous. For example, they relate that whereas in one study it was found that men report that they more often use a deep approach to learning, in other studies women indicate that they more often use this deep approach.

Scale	Meaning
Meaning Orientation	
Deep Approach	Active questioning in learning
Use of Evidence	Relating evidence to conclusions
Inter-relating Ideas	Relating to other parts of the course
Comprehension Learning	Readiness to map out subject area and think divergently
Operation Learning	Emphasis on facts and logical analysis
Intrinsic Motivation	Interest in learning for learning's sake.
Reproduction Orientation	
Surface Approach	Preoccupation with memorisation
Syllabus-boundness	Relying on staff to define learning tasks
Improvidence	Over-cautious reliance on details
Fear of Failure	Pessimism and anxiety about academic outcomes
Achieving Orientation	
Strategic Approach	Awareness of implications of academic demands made by staff
Achievement Motivation	Competitive and confident
Non-Academic Orientation	
Disorganised Study Methods	Unable to work regularly and effectively
Negative Attitudes to Studying	Lack of interest and application
Globetrotting	Over-ready to jump to conclusions
Extrinsic Motivation	Interest in courses for the qualifications they offer

Table 2.10. Scales of Approaches to Studying Inventory (ASI)

Subsequently, however, Severiens and ten Dam updated their analysis (Severiens & ten Dam 1998), drawing on twenty-two instead of seven studies, and using a multilevel approach which they believed made it possible to examine gender differences and the possible effect of the relevant and available background variables (e.g. age, discipline, country). They found that women score higher on the Reproduction Orientation, while men score higher on the Non-academic Orientation. No differences were found in scores on the Meaning Orientation or the Achieving Orientation. These results were tested to be homogeneous, meaning that they are apparently independent of the specific contexts in which the twenty-two studies were conducted.

2.8 CMC, CSCW and information education

Aspects of CMC have featured widely in the library and information science (LIS) literature over the past decade, in a range of contexts. Use of e-mail has been examined, both generally and in combination with existing services such as online retrieval (Adams 1986, Buckland 1987, Dewey 1989, Whitaker 1989, Glausiusz & Yates-Mercer 1990). Bulletin-board applications in libraries have been surveyed (Dewey 1986), and their design aspects evaluated (Sulaiman & Meadows). Indeed, library OPACs and their networked access (Stone 1986, Buxton 1988) are, in principle, a particular example of bulletin board systems. Of the 'first generation' CMC types, conferencing systems have been described, both as sources of information and as forums for participation (Rapaport 1991, Williams 1992, Polly & Cisler 1994).

Involvement of LIS professionals with CMC systems has increased in pace with the advent of 'second generation' Internet navigation and information retrieval tools, such as archie (Deutsch 1992), WAIS (Kahle 1992), Gopher (McCahill 1992), veronica (Foster 1995), and the World Wide Web (Berners-Lee 1992). Again this is across a range of perspectives, assessing new roles (McLaughlin 1994, Schankman 1994, Kelly & Nicholas 1996), designing and implementing systems (Bridges 1993, Powell 1994, Schuyler 1996), examining new access opportunities to online services (Green 1995), evaluating Web search tools (Winship 1995, Brandt 1996), and constructing subject guides, both in software and in publications, such as the current *College & Research Libraries News* series on Internet resource guides by discipline (e.g. Hancock 1994, Battenfield & Temple 1997, Vileno 1997, etc).

There is wide documentation of the expansion of the information sector of post-industrial economies, and the trend that in most professions and fields, work increasingly involves information work. For example, in a chapter titled *The 'Screenie' Generation*, and in a section discussing an emerging 'information divide' in vocational abilities, Toffler (1990, p.367) argues thus, constructing a profile which goes beyond simply information skills, and implies global, inter-cultural communication skills:

> What is increasingly clear, however, is that work requires higher and higher informational skills, so that even if jobs are available, most of the members of this group cannot match the knowledge requirements. Moreover, the knowledge needed goes beyond task-specific job skills. To be truly employable a worker must share certain implicit cultural understandings about things like time, dress, courtesy, and language. Above all, the worker must be able to get and exchange information.

CMC is still in the process of becoming recognised as a part of information curricula, being omitted, for example, from a comprehensive inventory of UK information management (IM) courses produced by Wilson (1989). However, Meadows later described CMC-related studies at Queen Margaret College, the Information Studies Department at Sheffield University, and the CTI Centre in the Information and Library Studies Department at Loughborough University (Meadows 1992, Meadows & Rowland 1992). Most recently, a follow-up survey by Wilson reported that most LIS schools had networking figuring significantly in their work, and most gave students their own accounts and passwords (Wilson 1994).

As regards CSCW specifically, there has been recognition of its practical and theoretical relevance in the LIS literature.

> The idea of CSCW is still a new one in Library and Information Science. In connection with the implementation of CMC systems such as electronic mail, however, it seems to be a most promising one that deserves to be taken into consideration in theory as well as practice (Clausen 1991).

As Bannon and Schmidt (1991) illustrate, the label CSCW has a diversity of perspectives and disciplinary backgrounds. Although the UK government's CSCW programme is substantially aimed at development of special-purpose groupware products, a recent update drew attention to the Internet and the 'Information Super Highway' (Department of Trade & Industry 1995), and included e-mail and general-purpose conferencing products within the scope of groupware.

At present, CSCW is probably most strongly otherwise associated with the Human Computer Interaction (HCI) community. As Meadows (1990) has pointed out, however, HCI can be regarded as an extension of the user studies that have long formed a key part of information work. Likewise, Anthony's checklist of IM activities (Anthony 1982) in table 2.11 - which can be interpreted either in terms of printed or electronic media - clearly offers a good recipe for the management of organizational CMC and CSCW activities.

Checklist of Information Management functions

- Monitor current and long term organizational objectives.
- Study organization's communication and identify individuals who are catalysts in the innovation process.
- Provide a corporate memory.
- Provide information subsystems to meet particular and often temporary needs.
- Be capable of tapping a wide range of external information sources.
- Repackage and reformat information to meet the needs of different levels of user.
- Monitor the information function to ensure that it is in tune with the objectives and needs of the organization.

Table 2.11. Anthony's checklist of Information Management functions.

2.9 Studies of acceptance and use of CMC

Research findings on acceptance and use inform much of the preceding area of implementation. Rice and Borgman (1983) have argued that CMC has influenced not only theory development, but also research and evaluation methodologies. Particularly in the study of social networks, it has advantages over observational and self-reporting methods. As advantages they list: ability to automate data collection; unobtrusive collection of accurate data; availability of full census and network data; longitudinal data; capability of setting up automated experiments. Against this they cite the disadvantages: extensive data management is required; potential privacy and ethical issues; questions of meaning of network data without content information (Rice 1990).

Much of the literature about user acceptance and determinants of use has been produced from the New Jersey Institute of Technology, particularly from a decade of operational trials of the Electronic Information Exchange System (EIES) developed by Murray Turoff. These trials began in 1977 with up to ten groups in longitudinal studies of usage and impacts. Hiltz (1984) found that the strongest predictor of level of use was subjects' expected use, measured in a pre-use questionnaire. However, this measure also correlated positively with the number of known colleagues participating in each subject's group, leading Hiltz to conclude that expectations of increased communication with existing colleagues led to greater use of the EIES.

NJIT researchers (Hiltz & Johnson 1989, Hiltz & Johnson 1990, Hiltz 1992) have concluded that in studies of CMC systems it should not be assumed that usage alone, or subjective satisfaction alone, are adequate measures of successful implementation. In a study of users of four CMC systems (Hiltz 1988), three components of acceptance of CMC systems - use, subjective satisfaction, and perceived benefits - were found to be only moderately interrelated. (Examples of benefits include, increased productivity, career advancement, improved access, useful information and contacts, etc). Four major theoretical approaches to studying the acceptance and diffusion of computer technology and its impacts on society are identified:

- technological determinism (characteristics of the system).
- the social-psychological approach (characteristics of the users).
- the human relations school (characteristics of the groups and organizations within which systems are implemented).
- the interactionist approach (a range of social and organizational influences interact).

Technological determinism

From the perspective of technological determinism, characteristics of the hardware-software system determine user behaviour and the degree of success of the computer application. The acceptance or success of a system is assumed to be largely unidimensional and determined by functionality and human factors design considerations (Goodwin 1987). Thus, for example, if employees make use of a computer system, it may be defined by management as successful. However, Kerr and Hiltz (1982, p.58) perceive amount of use of a CMC system as an inadequate measure.

> Hours of use is not a completely valid measure of acceptance of computer-mediated communication systems. Ideally one would supplement the amount of use as an indicator with subjective ratings of a system's acceptability and potential benefits.

Conversely, Hiltz and Johnson (1989) note than lack of use cannot be equated with 'rejection'. The user may have no task or reason for using the system, or may lack information about what the system might do for them and how to operate it, or may not have convenient access.

Kling (1980) identifies 'system rationalists' as those who tend to believe that if a computer system is well designed, then it will be used, and if it is being used, then users must like it, and it must therefore be having the intended beneficial impacts. Mowshowitz identifies a parallel category, the 'technicist', who defines the success or failure of particular computer applications in terms of systems design and implementation (Mowshowitz 1981).

Social-psychological approach

Many social analyses of computing emphasize a psychological or 'individual differences' approach in predicting human responses to new technology. Relevant characteristics of the individual might include, for example, gender, age, personality-type, and pre-use expectations, beliefs, skills and capabilities (Zmud 1979).

Human relations school

The human relations approach focuses on organizational members as individuals working within a group setting (Rice 1984). The most important determinants of behaviour are seen to be the small groups of which an individual is part. In an educational context, user training and support, existing ties among group members, leadership or teaching styles, and interactions among class members would be the most crucial determinants of acceptance of a new communications technology.

Interactionist approach

The interactionist approach (Markus 1983), adopted by Hiltz (1992) for the evaluation of a 'virtual classroom', is an eclectic model, which assumes that no one of the previous three perspectives alone would be expected to account fully for differences, but rather all three would contribute, and interactively, to form a complex system of determinants. Mowshowitz would term this a 'pragmatic' approach, which assumes that use made of computers is determined in part by social and organizational settings (Mowshowitz 1981).

2.10 Gender differences in CMC acceptance and use

There is a fairly well-established literature of gender differences with regard to computing which may perhaps usefully inform the newer area of gender differences in CMC. However, this existing literature about computing may quite well be either irrelevant, or indeed oppositional, to the particular area of gender in CMC, and some cautions should be noted.

Clearly a case can be made that CMC is a form of computing, since it involves the use of computing devices and computer networks. However, purists or traditionalists might take a 'harder' view of computing. This might argue that computing involves its hardware, and a knowledge of how it works, and of how computers are programmed and software is engineered. The kinds of technical skills and abilities in logic and reasoning involved in this view of computing have typically, or stereotypically, been associated with males. On the other hand, the use of CMC as a form of computing requires little of these aptitudes. It could be argued that the most advantage-conferring aptitudes for the successful use of CMC are abilities to co-operate, and to use language to compose writing which is then operationalized through typing skills. Such aptitudes are generally associated more with females than with males.

2.10.1 Gender differences in computing

A literature survey by Brosnan and Davidson (1994) concluded that, despite a number of inconsistencies in the research literature, there appeared to be strong cumulative evidence that females are generally more likely to possess higher levels of computer anxiety than males and to experience more negative attitudes towards computers.

There is a gender stereotype of males being better disposed towards computing than females (Siann *et al.* 1988). Boys find computers more 'enjoyable', 'special', 'important' and 'friendly' than girls do (Levin & Gordon 1989). It is also widely held that, on average, girls have less computer experience than boys do (Zubrow 1987). Boys are more likely than girls to have access to, and use, a computer in their home or a friend's home (Hess & Miura). Girls are less likely to own computers (Harvey & Wilson 1985), to have access to them at home (Fife-Schaw *et al.* 1987), or to make use of them at school (Vasil *et al.* 1987).

From a case study of men and women on applied information technology courses at Leeds Metropolitan University, Clegg and Trayhurn (1999) also confirm that the striking difference between males and females in their research was the high level of home computer use among the men. Only three out of eleven women had experience with home computers and only one mentioned playing games. By contrast, only four out of sixteen males did not have such experience. The authors note that for the women in their study, first experiences were overwhelmingly associated with clerical and administrative tasks, and this can mean they bring different views of the capacities of computers derived from networked systems in complex organizations, rather than PC experience. Yet there remains an association of computer games with real computing, while word processing retains its link with the previous technology of typing. Thus, what counts as computing experience is socially framed in a gendered discourse, and it is Clegg and Trayhurn's (1999) conclusion that work is required more in the theorisation of computing, than of gender in computing.

Durndell *et al.* (1995) also note that women seem to have little practical difficulty in using computers for word processing, stock control or financial transactions, in offices, building societies, banks, etc. However, females seem to have a more pragmatic view of computers, and compared to males, are more likely to view them as useful tools rather then objects with intrinsic interest (Siann *et al.* 1990). Durndell *et al.* (1995) note a tendency that, while some females express anxiety when first encountering computing, the same females do not regard their own sex as being, in general, less capable than males at computing. The authors credit Sanders (1987) with having coined the "We can, I can't" syndrome to describe this finding. In a study into why even those females who may feel reasonably confident of their potential ability at computing may nevertheless not be drawn to it as a discipline, Lightbody and Durndell (1993) have coined their own "I can, but I don't want to" syndrome.

Females have been found to have more negative attitudes toward computers (Dambrot 1985), and to be less confident in their use of computing (Culley 1988) than males when they enter universities. Durndell *et al.* (1987) found that on entry to a Scottish institute of higher education, across computer science courses and courses with either a high or low IT content, males knew significantly more about computers than females. There is a view that this difference in experience accounts for the gender difference in computing attitudes, though studies controlling for varying levels of experience differ in their findings. For example, Wilder *et al.* (1985) found gender differences among college freshmen in attitudes reflecting familiarity and confidence with computers to persist even after experience was controlled.

Conversely, in a study of undergraduates, Shields (1986) found experience to be significantly related to positive attitudes to computing, and that gender did not account for a significant amount of variance beyond that explained by experience. A middle ground between these views might be that computer experience diminishes previously existing gender differences in attitudes towards computing (Siann *et al.* 1990). Comber *et al.* (1997) suggest that the success or otherwise of early computer experience may be a crucial determinant of confidence in girls.

It has been found that an effective teaching strategy in engaging females in the use of computers involves the structuring of collaborative learning experiences. It has been suggested that collaboration may be a preferred working and learning context for girls (Sheingold *et al.* 1984). Software games in which school children were required to play cooperatively appealed more to girls than to boys, as did teacher-structured collaborative activities (Hawkins 1985). If women and girls who express anxiety about computers are introduced to computing in a supportive atmosphere, their confidence increases and their anxiety dissipates, though their interest in computing does not necessarily increase (Stockdale 1987).

As regards CMU students, Zubrow (1987) reports that the results of a study of freshman students do not support a claim of gender differences for confidence and positive affect toward computing, that only at the beginning of college did gender make a significant improvement in the explanation of students' confidence, and that by the end of the freshman year this effect had disappeared. Anderson (1987) reports that across a large number of attitude and behaviour measures, the only gender differences were that male students knew more programming languages and used a PC for more hours a week - an average of 5.93 hours - than did female students, who averaged 2.79 hours.

2.10.2 Gender differences in CMC

With few exceptions, early research on CMC systems omits gender, tending to focus on the efficiency of the technology based on cost, acceptance of interface, organizational ability, general acceptance, group participation, etc (Hiltz & Johnson 1989, Hiltz & Turoff 1985). If it does address gender, this is not confined to CMC specifically, but to differences noted in attitude to computer programming, general usage, or background of the technology in its entirety. Turkle (1984) argues that the present social construction of computing and computers fits a male-oriented 'analytical' model of reasoning. However, subsequent research has shown increasing interest in the equalising environment promised in principle by CMC, and the extent to which it can in reality diminish gender inequalities.

Yates (1993) presents a gender analysis of a data obtained from students on the Open University course DT200, *Introduction to Information Technology: Social and Technological Issues* during 1990. (This is the same course and dataset, except in having been for the 1989 cohort (Open University 1990), which is in part reported above in **2.6.3** and from which some attitude statements were adopted for the present study, as noted in **3.6.3** below.) For the 1990 cohort, Yates reports no substantial gender difference in the amount of time spent using the CMC system for DT200. Both males and females were more likely to contact students than staff. Both genders agreed that CMC was depersonalizing, and that it made interpersonal interaction more difficult. Neither gender was conclusive about whether or not CMC increased personal assertiveness, but women were less likely to perceive CMC as equalizing participation. Both males and females thought CMC worse than face-to-face tutorials as a means of getting course-related help, or for socialising. Neither gender demonstrated a clear majority regarding CMC as a means of intellectual exchange. Yates concludes that while there is no great difference in women's usage of CMC, despite having to overcome more initial difficulties than men, there is no evidence that women have any greater preference for CMC than men. However, Yates suggests that, given the weight of research demonstrating women's negative perceptions of computers, this finding represents an opportunity and what must now be asked is how CMC can best be utilized to support male and female distance education needs. Yates later (1997) questions the 'democratic theory of CMC' and the ideology of online equality proposed by some early research on the characteristics and effects of CMC. However, he concludes that although the realities of inequalities based around gender and computing are real and must not be ignored, CMC offers possibilities of constructing gender identities which escape the more fixed forms of 'real life'.

Matheson (1992) presents a somewhat pessimistic analysis of the implications of using CMC for women. She argues that, rather than offering the socially neutral medium often supposed, heightened self awareness in CMC can work to make communicators highly responsive to social context cues, and perhaps liable to invoke stereotypes. As a result, women may not only be perceived and responded to as less credible due to stereotype expectations, but may also feel and react with less confidence. However, she proposes that the establishment of women's networks would be beneficial to women who have chosen to, or have to, work in the home. The benefits identified are the reduction of workplace isolation and the increased possibility of unionizing to protect employment rights.

Selfe and Meyer (1991) have suggested that computer-mediated exchanges of written discourse may encourage females to express their ideas more and may thus be a forum for them to learn to more freely and openly exchange ideas. A study by Hiltz *et al* (1982) found that females were consistently more satisfied with CMC and speculated this may be because females tend to be better typists, have better verbal skills and also appreciate the opportunity to "have their say" in a medium where they cannot be shut out of active roles by dominant males. They also suggest a typical M:F ratio of 5:1 as a pleasant working environment for females. However, Herring (1993) has explored gender differences in participation in e-mail discussion lists, and reports that while CMC promises democracy and equality of participation, dominance by males was in fact observed. Likewise, Rogers *et al.* (1994) warn that computer conferencing can become male dominated because females can often be less confident about expressing their views in a public forum. Kramarae and Taylor (1993) note the promise of democratic networked discourse, but that in reality men monopolize the talk, use more assertive messaging behaviour, and may harass women. They suggest that universities should adopt policies to change the structure of networked interaction on campuses, setting etiquette guidelines and monitoring behaviour.

From a study at the University of Texas, Gregory (1997) suggests that male students tend to assume the same roles they do when communicating face-to-face in traditional classroom settings, and that male monopolization of CMC may have limited the involvement of female students. Studies of gender interaction in traditional classroom setting in schools and colleges suggest that males are given greater access to academic discourse and tend to dominate classroom talk in terms of time speaking, turns taken, and engagement with the teacher (Spender 1982, Sadker & Sadker 1984). Sadker and Sadker (1985) found that boys spoke on average three times as much as girls, and other studies have suggested that, at college level, the differential is greater and that male domination makes the classroom climate a 'chilly' one for women (Hall & Sandler 1982).

The Advanced Learning Technology programme at Lancaster University has made use of CMC for tutorial support and to facilitate learner interaction since 1989. The part-time distance learning programme combines short residential periods with home or work-based independent study, potentially leading to an MSc In IT and Learning (Goodyear 1994, Steeples *et al.* 1994). The Lancaster researchers have noted benefits to several classes of learners who might be disadvantaged or excluded in face-to-face sessions. These include those with hearing impairments, students whose first language is not English, and students who may lack the confidence to speak in traditional seminars. Another Lancaster initiative, the Cooperative Learning and Development Networks (CLDN) pilot project ran from November 1993 to May 1994 (Steeples *et al.* 1996). The participants were a group of twelve professionals from public and private sectors, with equal numbers of males and females, including a large proportion of women managers. The majority of the women were managers, and the majority of the men were in technical roles. The pilot was based on a number of premises, including that women managers are a geographically-dispersed and isolated group, and secondly that generally women's preferred way of working is more cooperative than competitive. It was hypothesized that women might therefore find the culture of a computer conference appropriate to their needs. Findings suggested that CLDN was a good way to share ideas and make contacts. However, the split of participants in terms of gender and roles was reported to have created difficulties. A sense of disempowerment was created for several of the women participants, and their confidence to communicate via CMC was felt to be undermined, by the perceived male dominance of the technology. Nevertheless, Steeples *et al.* (1996) conclude optimistically on the CLDN project. It is noted that in CMC there is equal access to all, and that such a sense of fairness gives confidence, especially to female participants, and that women had been found to do well with CMC. Whereas in face-to-face interactions women are often forced into a facilitation role and may lose turns to speak in conversations, in CMC discourse women are able to express themselves more easily and fully, without interruption. It is suggested that CMC learning environments can be used to positively capitalize on women's team-playing and cooperative skills.

Researchers at the University of Illinois at Urbana-Champaign have expressed concern that, as students are required to communicate increasingly online via CMC, females may be disadvantaged by their lack of familiarity with computers and by ways in which males and females differ in their use of computing (Kramarae & Taylor 1993). At the same institution, Ory *et al.* (1997) conducted a survey of male and female student use of and attitudes about the use of asynchronous learning network (ALN) facilities such as conferencing and the Web and notably report finding few significant gender differences.

> Probably for the first time in years of doing educational research the authors were delighted to complete a study that yielded few significant differences! We found that, for the most part, both males and females made similar use of ALN, had similar (positive) attitudes about their "computer experience", and shared a common desire to take more courses using computers. Few significant differences between genders is encouraging to all who see the potential value of using computers in the classroom but who are also concerned about placing anyone, or any group of individuals, at a disadvantage.

Although these researchers describe their findings as preliminary rather than conclusive, they propose that ALN may even help to correct previous inequalities. The few significant, 'yet small-in-magnitude' gender differences they report are that females: used computers more often for conferencing with the instructor and other students but less often for exploring resources on the Web; found using computers to be slightly more difficult; were less likely to use personal computers in their apartment or residence hall room; reported greater gains in their familiarity with computers after taking an ALN course.

Sproull and Kiesler (1986) studied behaviour in an electronic messaging system in a US Fortune 500 company employing over 100,000 people who sent and received an average of 26 messages per day. No gender differences were found in either accessibility to the electronic messaging system, or in volumes of messages. In a case study of computer conferencing at a US corporation, Zuboff (1988) reports that a conference organized by professional women to discuss career options was monitored by executives in the industrial relations division, and in the legal department. These executives apparently feared the conference would lead to demands for unionization and affirmative action and essentially shut it down. Allen's (1995) case study of a corporate headquarters found that females rated e-mail more highly than males on ease of use, usefulness, efficiency, and effectiveness. Females were also found to rely more on co-workers for learning to use e-mail, than did males.

Gunn *et al.* (1993), using some pilot messaging and system accounting data from the present study, present an analysis showing that males logged 21% more hours using the e-mail system, and produced four times as many message-lines as females. However, for messaging which was course-required, females produced 72% more message-lines. While most attitudes of males towards computing were more positive, females were more positive about the importance of learning to use a computer. It was hypothesized that while males have higher levels of use of CMC, females may have a more goal-orientated approach to CMC and computer-mediated working.

A comparable conclusion is reached by Ford and Miller (1996) from a survey of 117 Sheffield University students who responded to a survey on Internet perceptions and use. They note that males seemed to enjoy browsing the Internet, often with no clear plan, happy to plough through the irrelevant in search of personally interesting (as opposed to work-related) material. By comparison, females tended to use it for work purposes as opposed to personal interest, to use it only when they had to, and to look at items only when they had been suggested to them (as opposed to browsing around).

Another study at Sheffield (Barrett & Lally 1999) similarly found that women tended to be task-oriented, whereas messages from men demonstrated twice as much social exchange as those from women. In an ethnographic study involving 16 first-year distance learning MEd students in the Division of Education at the University of Sheffield during 1995-96, it was found that men also sent more messages than women, and messages which were twice as long. Female students were also described as " ... taking more 'care' than the men to incorporate information and ideas from previous messages in their replies", and in effect listening more carefully to what was being said.

Tannen (1990) argues that males are more likely to perceive computer conferencing as a place to get and give information ('fact-providers'), whereas females see it more as a place to pose questions and come to a consensus of understanding ('consensus-builders'). It has also been suggested that these two styles may come into conflict, if the fact-providing males make the consensus-building females feel inadequate. Hardy (1994) believes the consensus-builders are more likely to flourish and participate in the exchange of ideas in a less judgemental, more nurturing environment.

Blum (1999) collected and analysed data from 149 online messages of students attending a large, US-based higher distance education organization which primarily uses asynchronous CMC-based technology for instruction. (To protect the confidentiality of the distance education organization and its students, the institution was not identified.) The messages were collected from an electronic student forum which was likened to a student union gathering place for a traditional institution. Subjects consisted of adult professionals studying for bachelor and masters degrees. Male and female preferred learning styles, communication patterns, and participation barriers were compared for differences in gender. Results of the messaging analysis suggested that there are gender differences between male and female distance education students which contribute towards an inequitable learning environment. The CMC-based environment was found to support a tolerance of male domination in online communication patterns which effectively silenced female students. Blum concluded that the major findings supported Belenky *et al.*'s (see **2.7** and **2.7.1** above) model of the male 'separated' learning style creating an inequitable learning environment in CMC-based education. It should perhaps be noted that, although Blum reports that professors often directed students to post to the student union forum, this was because they identified it as a more appropriate forum for excessive jokes, technical questions, and general *non-course-related* comments. There must therefore be some question about how similar behaviour might have been in forums which professors monitored or participated in for course-related purposes.

Finally, it may be worth noting a physiological-level gender difference which, it has been suggested, may make females innately more suited to being successful users of CMC. There are certain asymmetries between male and female brains which cause the average performance of males in logical and spatial thinking to be consistently a little higher than females, while females have greater verbal ability (McGlone 1980). In relation to this greater verbal ability, it has been noted that females are better 'networkers' in the social sense.

Chapter 3:

Methodology and methods

3 Methodology and methods

A 'systems contingency' approach was adopted as the most suitable theoretical model for the study, given that it emphasizes that no single variable is likely to account fully for differences in acceptance and use of CMC. This model is reflected in the survey methods used, which gathered data about the three separate components - usage levels; messaging content; and attitudes towards computing and CMC - from three academic cohorts, over a six year period which included a major generational shift in the hardware and software being used.

3.1 Theoretical perspective

The theoretical perspective adopted for the present study is essentially the 'systems contingency' approach described by Hiltz (1992), evolved from what Kling (1980) has called the 'package' approach to the social impacts of computing, and Moshowitz (1981) has termed a 'pragmatic' approach, assuming that the use made of computers is partly determined by the social or organizational contexts of their use. This perspective also corresponds to Markus' (1983) 'interactionist' approach, in which it is recognised that no single variable should be expected to account fully for the acceptance and success of CMC, and that the sets of variables which may be involved are not simply additive, but interact to form a system of determinants.

These 'systems contingency' or 'interactionist' models assume that explanations for the acceptance and use of CMC systems is contingent upon the interaction of the three theoretical perspectives: firstly, psychological, individual differences (characteristics of the users); secondly, human relations (characteristics of the groups using the systems); and thirdly, technological determinism (characteristics of the system). The systems contingency perspective is more than just a combination of the other three, but looks at the interactions between them.

This model was adopted for the present study because, for the various aspects of acceptance and use being surveyed, in most instances all three variables are believed likely to be determinants. And while in some instances the influence of these variables may be separately discerned, their relative importance is undetermined and resistant to separation in the mathematical sense.

3.1.1 Psychological, individual differences perspective

The psychological, 'individual differences' approach to predicting acceptance and use of CMC would typically emphasize characteristics such as, personality types, gender, age, prior experience of CMC, expectations, beliefs, and skills.

For the present study, this approach might predict that attributes or attitudes affecting success might, for example, include relative experience in use of CMC (for example between first and third levels), or that there will be gendered predispositions, or belief that CMC might improve one's education or career prospects, etc.

3.1.2 Human relations perspective

Predictions from the human relations school would be primarily based on a view of users of the system as organizational or group members, rather than as individuals, and where communication is a facilitator of decision making within the organization. In December's (1993a) structured bibliography of CMC he includes under this heading work such as Likert's (1967) on human relations, and Peters' (1982, 1992) on the benefits of empowering people within organizations.

From this perspective determinants in the present study might include, students' interactions with class peers, extents to which students are, or feel, empowered by CMC, and changes to courses, such as structure, size, modularity, etc.

3.1.3 Technologically deterministic perspective

The term 'technological determinism' is sometimes used pejoratively, and related terms such as 'media effects' or 'media characteristics' or 'media evolution' are sometimes preferred for the categorizing of writing emphasizing this perspective, which predicts that characteristics of the hardware-software system itself will primarily determine usage of and benefits from the system.

For the present study, this might include, benefits from CMC relative to conventional communication, the idea of a 'critical mass' (Markus 1987) of participating users, shifting of modality from oral to literate, changes or advances in the user interface, kinds of uses (e.g. for categories of messaging) which were found to be more or less beneficial. Contemporary economic factors in the wider world, such as expanding general access to and familiarity with CMC and its use in recreation and work, might also be influential.

A comparison of modes of staff-student communication flows (a) by traditional methods, and (b) as complemented by the use of CMC, might draw on some of the major historical transitions in computing and control technologies (from offline, batch methods of data processing, to online, interactive processing; from non-adaptive control, to control via cybernetic feedback methods), in senses which are partly metaphorical, but also partly literal.

Traditional educational communication may be considered *periodic* in that it occurs at preset times (timetabled lectures and seminars) whereas the use of CMC in education offers the possibility of a more *continuous*, less space and time-dependent, flow of communication in between such face-to-face meetings.

This distinction may also be compared with the stage in evolution of computing before which most computing was carried out *offline* by the periodic submission of *batch* jobs, and after which most computing involved *online* transaction processing responding to *interactive* users at VDU terminals at times of their choosing. Whereas traditional communication is unidirectional, broadcast from the 'sage on the stage' lecturer at the students in a *non-adaptive* way, the use of CMC creates, or increases, the possibility for formative feedback from students. This may result in *cybernetic* adaptation as the 'guide on the side' lecturer may receive responses from students, and may feed some of this information back into the overall communication process.

Finally, the use of CMC has an effect of shifting communication from an immediate, *oral* mode to a mediated, *literate* mode. While the paucity of 'media richness' and supporting non-verbal cues of CMC has been noted and is self-evident, some beneficial effects from this have also been suggested by studies of the extent of rationality of information processing in orality and literacy (Goody 1987, Ong 1982), both from the removal of the need from an immediate response, and from the fact that mediated response has to be formulated in a more reflective, literate mode (see **2.4** above).

In this comparative characterization of the traditional and CMC-enhanced models of staff-student interaction there has perhaps been some over-polarization of the distinctions. For example, while CMC facilitates convenient one-to-one communication between student and lecturer, it would not be the case that such communication never occurred traditionally. The point here would be, that - as with other instances of the application of new technology - it is not so much that the new technology enables entirely novel things to happen which *could not be done* previously, but rather that it may enable things already done to some degree, to subsequently be done on different scales or orders of magnitude.

These characteristics of CMC offer the potential for enhancing conventional staff-student communication flows in some of the respects identified in the literature review chapter, such as amplification of teacher effort in responding to tutorial enquiries, more flexible provision of course information in a less time-dependent way, empowering students to self-organize to have greater control of their courses, and so on. However, it would be naive - perhaps in the pejorative sense of 'technological determinism' - to assume that these possibilities for the use of CMC will necessarily be as beneficial as optimists would predict, and this is recognised in the overall 'system contingency' or 'interactionist' model adopted here, in which both individual differences of the user, or dynamics of the group are likely to be important co-determinants in actual or perceived success.

3.2 Hardware and access

The 288 students who made up the cohorts whose use and perceptions of CMC was being studied in the three academic years 1989-90, 1994-95 and 1995-96 experienced a generational shift in the hardware and its software interface. The 1989-90 cohort used the Digital Equipment Corporation (DEC) VMS Mail e-mail system on a multiuser minicomputer, whereas the later cohorts used DEC's Pathworks Mail in a client-server architecture, over local area networks.

The equipment in 1990 was a Vax multiuser minicomputer, supporting in principle up to forty-eight simultaneous users. The main concentration of terminals was in the College's Information Technology Centre, a central resource where about 30 terminals were provided for general use by students and staff. The electronic mail software was the widely used Vax MAIL, a standard Vax/VMS utility. Another related Vax facility was a word-processing system named Lex, from Ace Microsystems, which was often used to pre-prepare messages for subsequent sending by e-mail. Over time, the devices used as Vax terminals ranged from the original 'dumb' Syscope VDUs, to BBC microcomputers with VT52 terminal emulation, to PCs with VT100 emulation.

During Summer of 1991, the Vax minicomputer was phased out and a transition made to the client-server architecture of networking in time for academic year 1991-92. By 1994-95 and 1995-96, about 80 networked PCs were provided for public access in IT Centre workshops - probably offering only a marginally better per-capita student-to-workstation ratio than before, taking into account the increase in student numbers, and the uptake of CMC facilities by other students and staff. The main quantitative increase in networking provision was in connecting PCs in staff workrooms to the network. The quality of the user-interface was significantly better, since although the servers were still running the DEC VMS operating system, this was experienced by users as a DOS environment via DEC's Pathworks for DOS product.

3.3 E-mail software interfaces

The transition made to the new DEC Pathworks e-mail system by staff and students at the start of academic year 1991-92 went very smoothly, largely because what was being used was essentially the same VMS Mail software, but with an enhanced user interface. Although Pathworks provided additional options for operating the e-mail system, a user familiar with VMS Mail's command-line operation could, in most instances, use exactly the same commands. Conversely, while a skilled VMS user would probably be able to obtain the same functionality as quickly, and might even assert a preference for its command-line usage, for most users the Pathworks interface was a great improvement, and enabled a faster learning curve.

3.3.1 Command sets and functionality

Figure 3.1 illustrates the respective 'help' screen displays of the earlier VMS Mail and subsequent Pathworks Mail e-mail systems, the former being in the top half of the figure (as is also the case in subsequent figures 3.2 to 3.4). In figure 3.1, the upper VMS Mail help screen more usefully illustrates the commands and functions available from these e-mail systems, and which are typical of most e-mail systems of the time. These typically allow users to do such things as listing directories of e-mail messages in their mailboxes, managing the storage of such messages through a system of 'folders', composing message-text for sending to individual or multiple users, etc.

3.3.2 Comparison of VMS and Pathworks Mail screen displays

Figure 3.1 also provides a starting point for comparing the user interfaces of the two generations of products. The VMS Mail screen is monochrome and with continuously scrolling text. On starting up VMS Mail, the user is simply presented with a **MAIL>** prompt, still visible at the top of the upper screen. By comparison, the Pathworks screen display can display multiple colours (assuming the monitor supports it) and can fix elements of the screen display. Thus for example, where the VMS user interrogating the help utility's hierarchy has a continuously scrolling display, the Pathworks user's screen is able to cascade a series of windows to present the hierarchy of help information.

The message directory displays in figure 3.2 are fairly similar in content, though with the lower, Pathworks one presenting the user with some additional information, such as each message's length in number of lines (rightmost column), not only the name of the current folder (which VMS has top left) but also the number of messages it contains (in the status line third bottom of screen), the current date and time (bottom right), plus an additional three lines of directory listing per screenful.

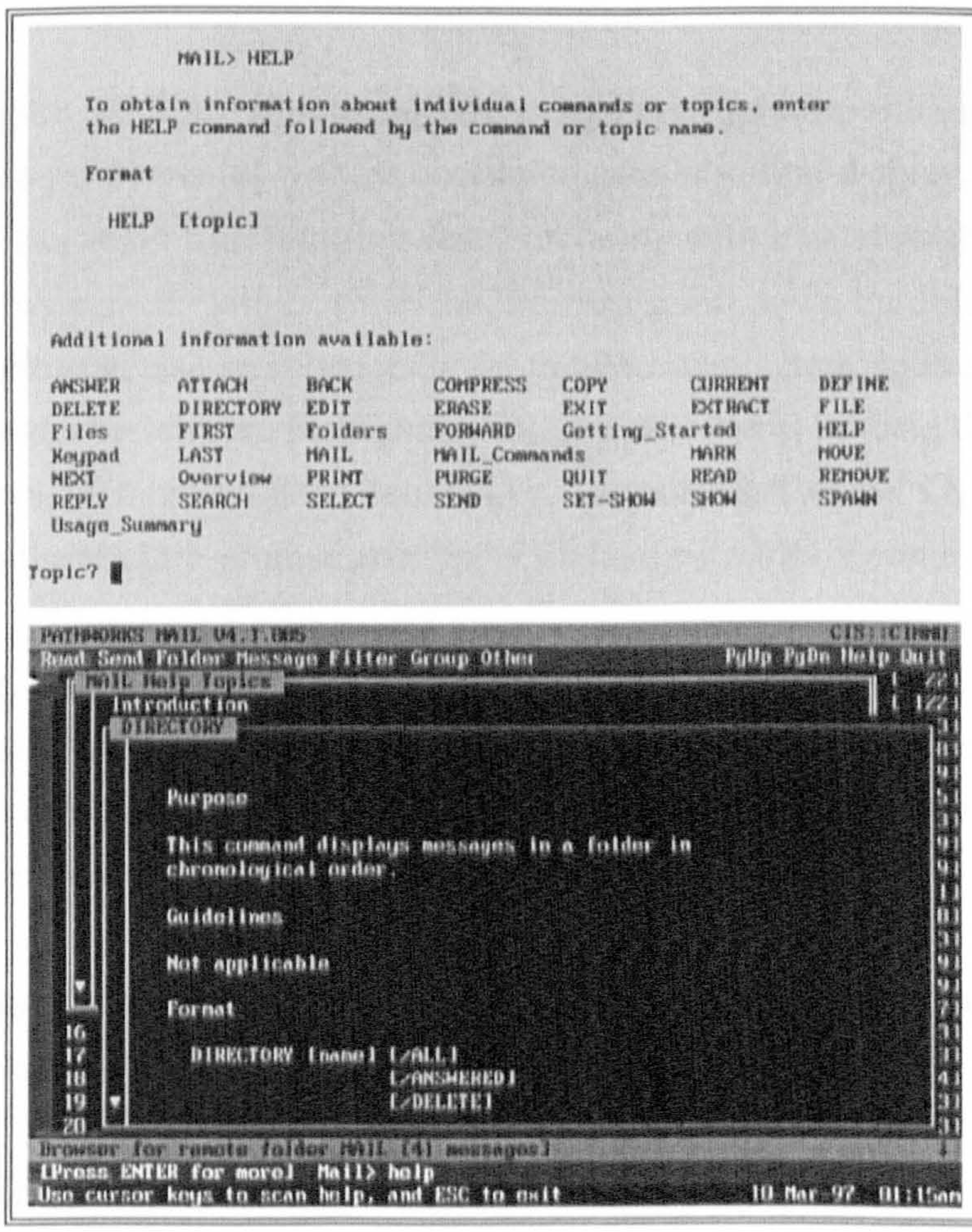

Fig. 3.1. Comparison of VMS Mail and Pathworks Mail 'help' utilities

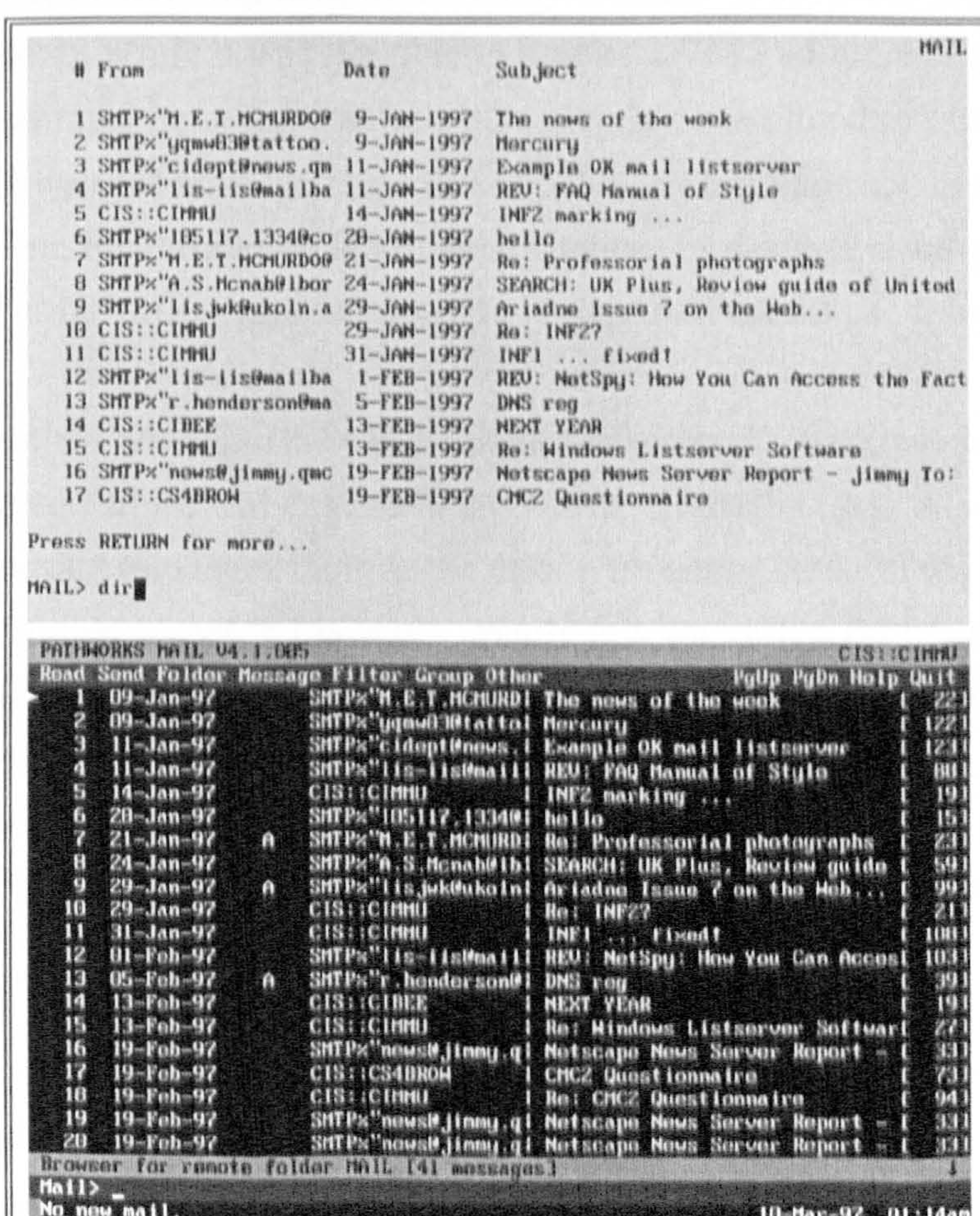

Fig. 3.2. Comparison of VMS Mail and Pathworks Mail message directories

Likewise, in figure 3.3 illustrating comparative listing of folders, although VMS mail in fact lists more per screenful with its double-column scrolling display, the Pathworks one has better user interface features, being with a window overlaid on the previous directory screen, within which the user can scroll down the folder listing. Selection of options is also more versatile for the Pathworks user, so that in this screen, a folder can be selected by highlighting it with a menu-bar and the up and down arrow keys, then pressing the 'return' key. By comparison the VMS Mail user has to return to the `MAIL>` prompt and type a `select` *<folder>* command.

Likewise in the earlier screens illustrating message-directory listings, the VMS user types a message number in order to view the corresponding message text, whereas the Pathworks user can again select using vertical arrow keys, and also other options described in section `3.3.4` below.

3.3.3 Comparison of VMS and Pathworks Mail screen message composition

As the upper screen display of figure 3.4 shows, when in message-composition mode, the VMS Mail user, having addressed the message and given it a subject description, simply types lines of scrolling text, followed by a `ctrl z` keypress to send it, or a `ctrl c` to cancel. While it was possible to invoke a VMS editor, in basic line mode operation as illustrated here, the user was also greatly constrained in flexibility of editing in that it was not possible to go back up the screen to correct errors. In the pre-Pathworks era, this limitation led to extensive use of the Vax word-processing package Lex, for the 'offline' preparation of message text (see `3.4.2` below).

By comparison, the Pathworks user working in the screen in the lower half of figure 3.4 has a full screen editor and can move anywhere within the text. Also, options for replying to incoming messages include the option to 'quote' some of the original message in a response message (as here). While this was still a fairly primitive editor, its ease of use relative to VMS Mail line mode message editing was a great advance in user-friendliness.

3.3.4 Additional Pathworks Mail interface options

The philosophy in initial stages of teaching the newer Pathworks e-mail system to students was to start by getting students to type commands at the `MAIL>` prompt, just as for VMS Mail, with the objective of associating the names of commands with system functionalities.

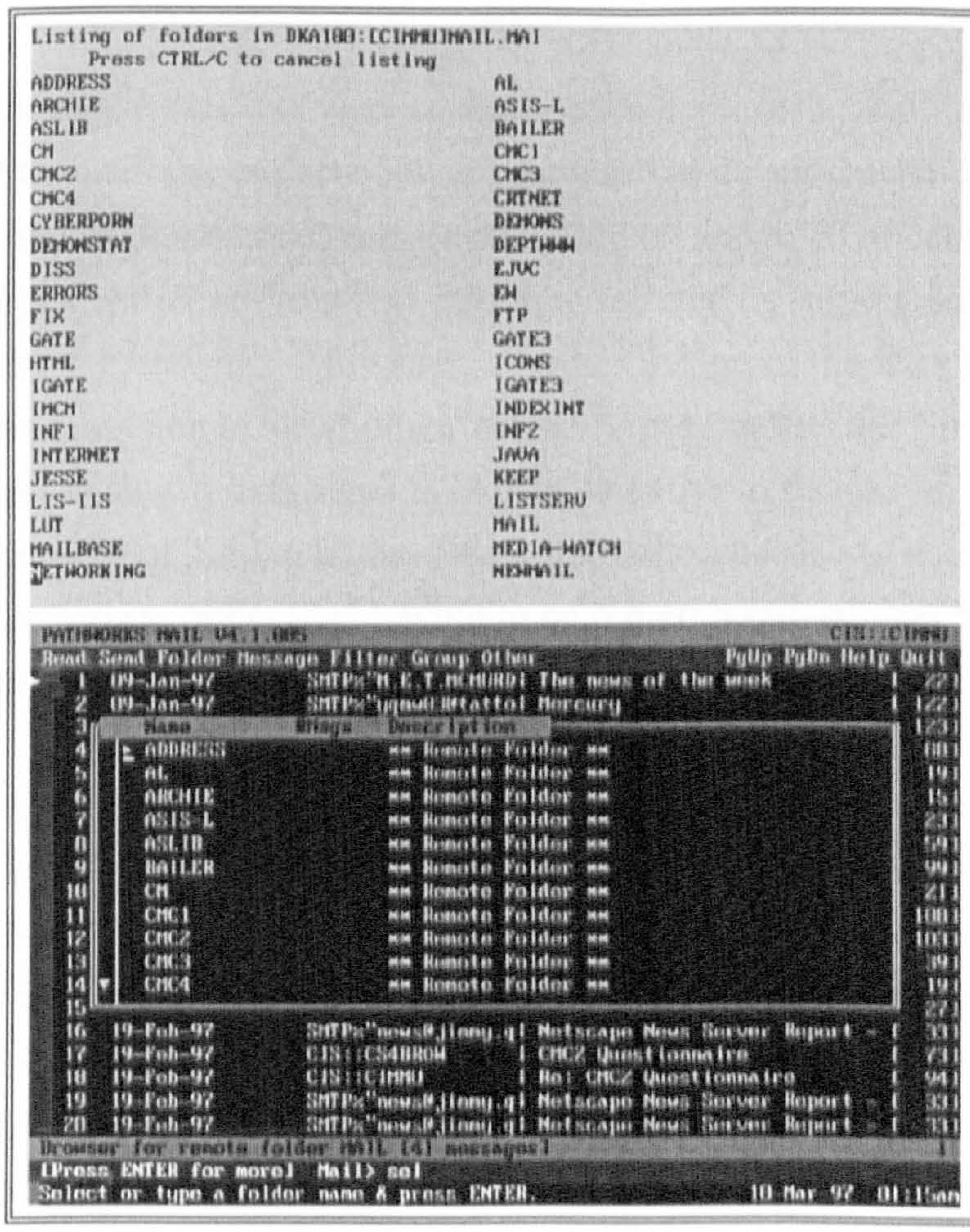

Fig. 3.3. Comparison of VMS Mail and Pathworks Mail 'folders' display

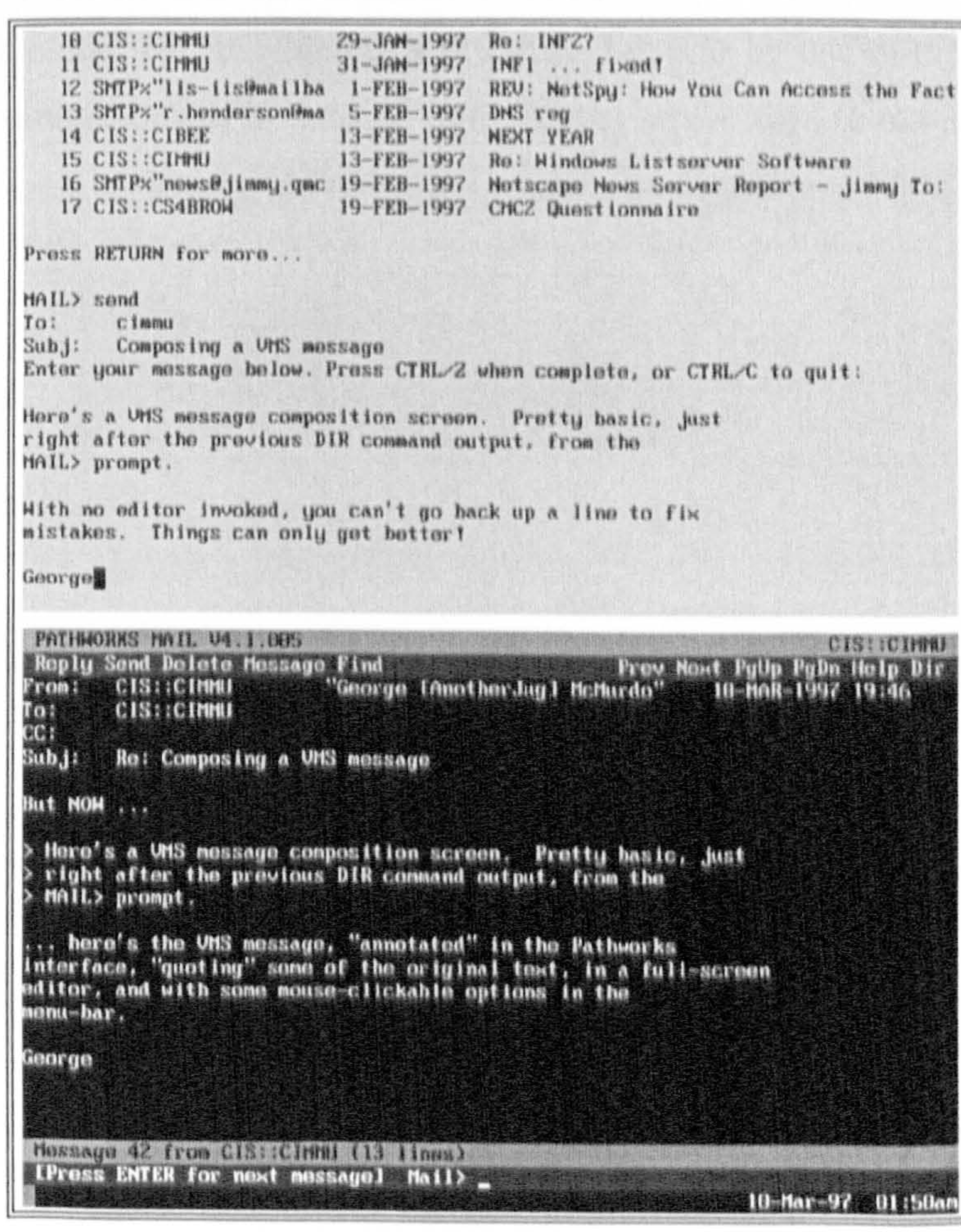

Fig. 3.4. Comparison of VMS Mail and Pathworks Mail message composition and editing

Subsequently, however, students were encouraged to explore the additional options for operating their mailbox, as part of an appreciation of developments in user interfaces. As already mentioned, many options which had to be selected in VMS Mail by typing in some identifying text, could be selected by highlighting by vertical arrow keypresses in Pathworks. However, a further feature of the later Pathworks interface was the provision of 'drop-down' menus to prompt the user for some of the system functions, as shown in figure 3.3. Again - relative to the use of VMS Mail - this had the advantage of putting more of the information needed to use the system right there on the screen, rather than having to be remembered, or read from paper or onscreen documentation.

Finally, a user-interface option supported by Pathworks which offered a link to the upcoming generation of Windows-like graphically-interfaced e-mail software, was the use of a 'mouse' to actuate many functions. For example, all selections made with vertical arrows keys could be made with a mouse. For the drop-down menu options, the menu-bar containing them was sensitive to mouse-clicks, and component options could be actuated by dragging the mouse down to them.

In fact, for some time after the introduction of the Pathworks system, not every PC was equipped with a mouse. The alternative method of actuating the drop down menus of which examples are illustrated in figure 3.5, was by use of the 'Tab' key, followed by combinations of horizontal and vertical arrow keys to navigate across and down.

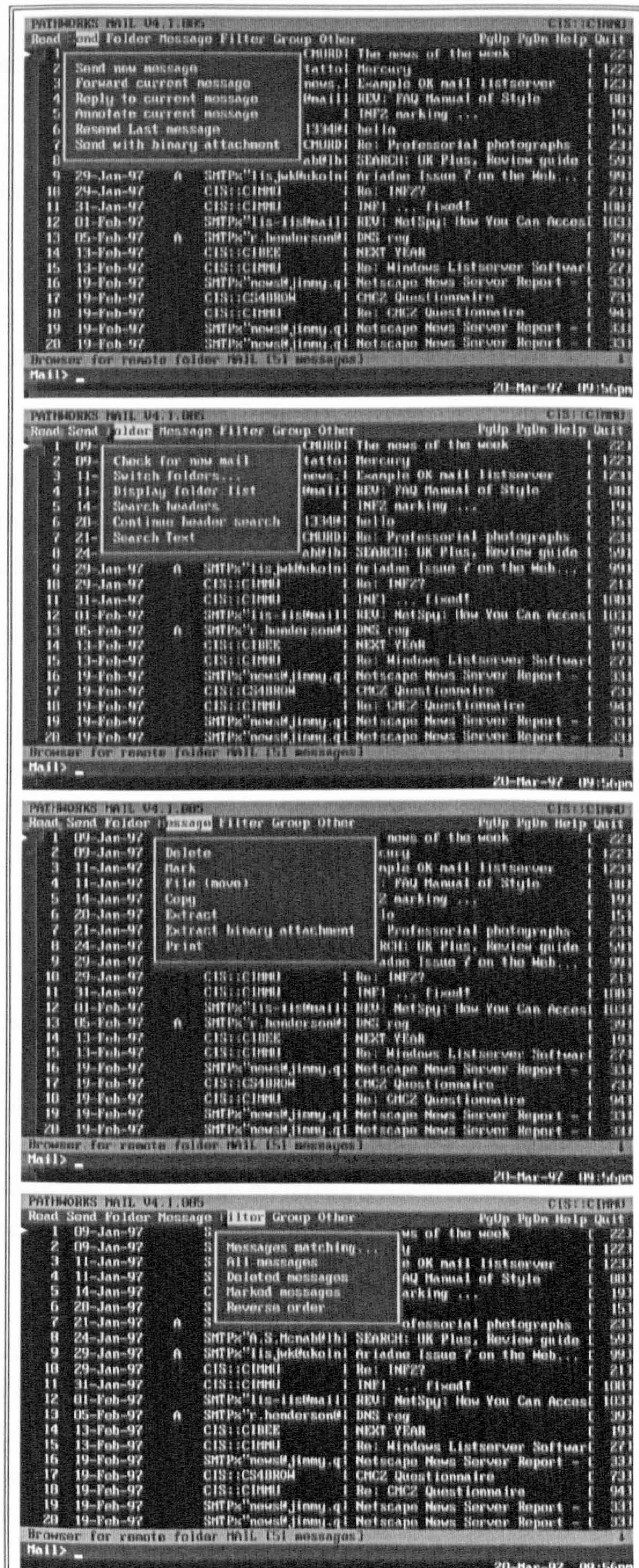

Fig. 3.5. Examples of Pathworks Mail drop-down menu functions

3.4 Other CMC-related systems

While the e-mail systems were the main focus both of use by students and staff, and also of the present study, a number of other CMC-related systems were available which students would have experienced and which would have been indirectly involved in the study.

3.4.1 Vax Phone teleconferencing utility

One CMC-related utility available on the Vax minicomputer, and used quite frequently by many students, but omitted from the present study, was Vax Phone. This was a primitive real-time online conferencing facility which allowed up to six currently logged-on users to 'talk' to one another via their keyboards and screen displays. During a Phone session, screens would be divided horizontally into up to six bands, each identified by a VMS userid, and within which text typed by each user would appear. In the jargon of CMC, this is a 'synchronous' application, and generally not regarded as having the same value and interest as 'asynchronous' applications like e-mail. At the present time, on the Internet, related synchronous 'chat' applications such as Internet Relay Chat (IRC) are quite widespread. Regarded by many as a waste of either, or both, time and bandwidth, they are nevertheless becoming a subject of media study since many people seem to spend considerable amounts of time interacting this way.

3.4.2 Lex word-processing software on Vax minicomputer

A word-processing package called Lex, produced by Ace Microsystems Ltd, was available to all users of the Vax minicomputer. Until the widespread availability of IBM PCs and software, Lex was the preferred word-processing environment for most information students, the alternative being small-scale packages for the BBC microcomputer.

The use of Lex also had some benefits for the Vax Mail user, by providing a powerful text editor which could be used both for the 'offline' preparation of messages to be sent as text files, and conversely as a means of editing files extracted from users' mailboxes to their Vax filespace. In this kind of use, it is quite likely that some users thought of some of the time they spent logged onto Lex as time spent 'using e-mail'.

3.4.3 Jimmy front-end environments

To provide an organized interface to the Vax's CMC facilities, a menu system, anthropomorphized to "Jimmy" (McMurdo *et al.* 1990), was provided. This front-ended a subsystem of Vax DCL menus (McMurdo 1989b), many provided by student projects, and a system of e-mail distribution lists for one-to-many messaging from tutorial group level, to year groups, to entire courses. There was also a document indexing subsystem, based on a specially configured version of Lex, offering Boolean searches of titles assigned to documents.

Again, a single menu interface to all networked CMC services was provided via an update to the "Jimmy" system, with main menus as in figure 3.6 (McMurdo 1997). The concept behind this interface was the provision of a flexible, easily-adaptable, 'low-tech' solution to which modules and utilities could be added as needed. Document retrieval interfaces varied from xBASE programmed indexing, to menu hierarchies, down to standard DOS command line, though supplemented by utilities such as graphics viewers, and some Unix clones, such as **more** for enhanced text-file viewing, and **fgrep** for keyword text-file searching. Approximately 1,800 files were available to users as a DOS networked **J:** drive, of which about 130 were also functional local e-mail distribution lists. Retrospectively, this system can be seen as a local Gopher (McCahill 1992) with its own inbuilt Veronica (Foster 1995) index.

This 'second generation' of the Jimmy interface ran from 1991-92 until academic year 1994-95, when a decline in the management of the general network infrastructure made it increasingly difficult to maintain, and it was withdrawn towards the end of that academic year.

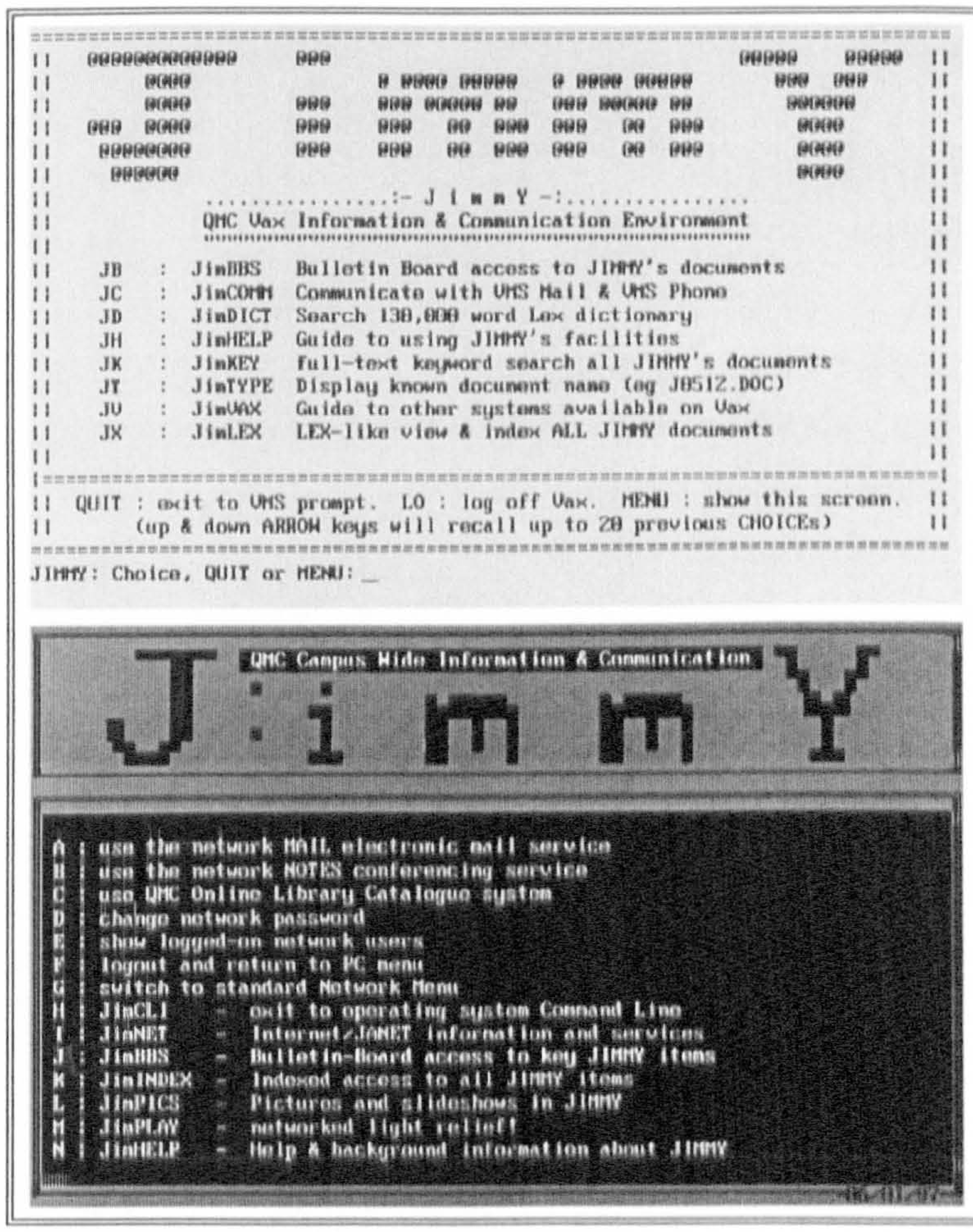

Fig. 3.6. Comparison of VMS and Pathworks 'Jimmy' system main menus

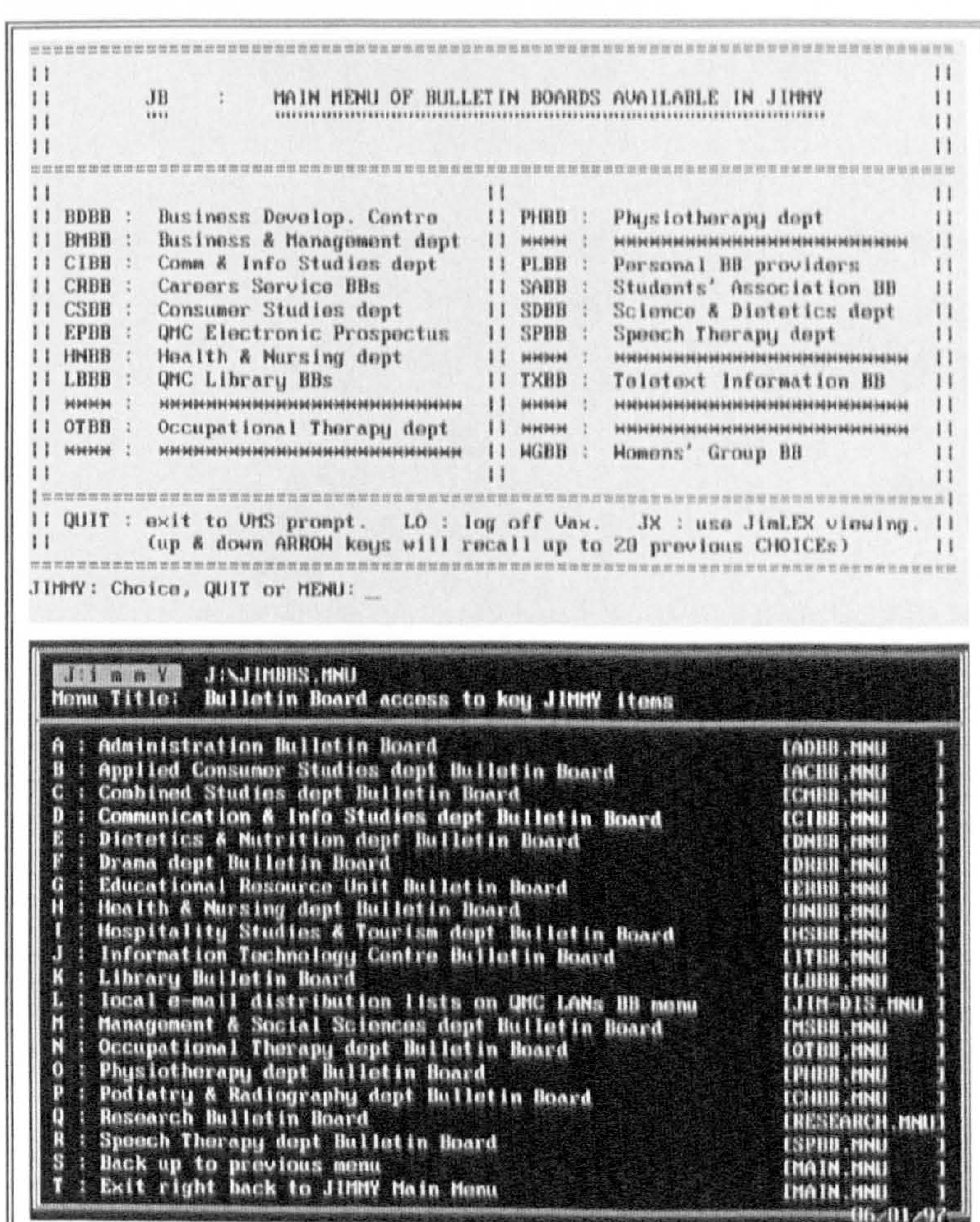

Fig. 3.7. Comparison of VMS and Pathworks 'Jimmy' bulletin boards menus

3.4.4 Initial graphical World Wide Web workshop

For academic year 1995-96 the first computer workshop equipped with directly Internet-connected graphical World Wide Web clients (using version 1.0 of the Netscape browser) became available for the use of the students in the present study. This provision was still rudimentary in a number of ways. There was no integration between the Web and the Pathworks e-mail system, and students had to re-boot PCs between Microsoft TCP/IP networking for the former, and DEC Pathworks networking for the latter. Students had no personal networked filespace available to them when using the TCP/IP networking, and so could not easily use fundamental Web browser features like 'bookmarking' of useful Websites.

Nevertheless, the availability of this provision to the students of the 1995-96 cohort represented a key difference in experience and in working methods from the students of the previous academic year 1994-95.

3.5 Provision of CMC user documentation

User were provided with extensive documentation for the QM CMC systems over the years of the study. These materials were designed in accordance with the concept of the 'command-set pyramid' which underlies common advice that users should be provided with system documentation in a range of completeness.

Thus documentation ranged from multi-page A4 booklets giving fairly comprehensive and detailed information on specialised and perhaps rarely used functions, to single-sheet double-side fan-folded leaflets, down to 'keycard' sized lists of core commands and their descriptions which could be carried in bank and credit-card wallets.

3.6 Survey design and delivery methods

The questions used in the surveys are given in full in **Appendix 1** of this thesis. The questionnaire was divided into three parts for:

- levels and patterns of use of e-mail
- categories of CMC information found useful
- attitudes towards computing and CMC

Although the set of methodological perspectives adopted for the study, and the model of educational communication illustrated above, can be construed as relating in some respect to all of the examples and types of questions asked, and although the 'individual differences' perspective relates to any consideration of sub-divisions of the global population by gender or course-level, some perspectives and aspects of the model relate more particularly and globally to the three types of question.

For the first type of question, about levels and patterns of use, the human relations model, which focuses on users as members of groups, would be the primary perspective. Such questions were aimed at discovering the kinds of matrices of educational communication which may (or may not) be supported by CMC, both between students and staff, and within student populations, both for course-related and less formal messaging. These questions also relate to the hypothesis implicit in the models of traditional and CMC-assisted staff-student communication illustrated above. Whereas the traditional model is the 'broadcast' or 'transmission' model, primarily transferring information from lecturer to student - the CMC-assisted model may open up other channels of communication within the group using the system.

For the second type of question, about categories of CMC information, the human relations perspective may be the most strongly related. The surveyed populations of students have dynamics as groups with particular objectives, and information needs arising from their roles at different stages of their courses. Such dynamics also exist within an organizational context which experienced changes in course size and structure over time.

The third type of questions, about attitudes towards computing and CMC, are more varied in their relationships to the methodological perspectives and the theoretical model. A set of questions on *Opinions about computing* - largely in abstraction from any specifics of the surveyed students' actual use of IT within their courses - may be predicted most strongly by the perspective of technological determinism, particularly from changes in the technology over time, but perhaps also with influence from the perspective of individual differences, such as widely-held view of gender difference in disposition towards computing. A set of questions about CMC, posed in terms of its value for various functions of tutorial meetings, compared with face-to-face meetings, on the *Comparison of CMC with face-to-face tutorials*, may relate most strongly to the human relations perspective due to the implication in these questions of CMC being substituted for face-to-face meetings, and the attendant shift in group dynamic which would thus be entailed. A set of questions about the generally recognised characteristics of CMC - *Attitudes to CMC* - would probably be most strongly predicted by the perspective of technological determinism. Other questions of this third type, about *Present and future use of CMC*, relate more closely to the model of staff-student communication illustrated above, in terms of the potentially beneficial characteristics proposed for CMC-assisted communication, and the extents to which evidence of the perception of these benefits can be found and interpreted in various interactions of the three theoretical perspectives identified for this study.

3.6.1 Questions about levels and patterns of use

The first section of the survey was the shortest and the questions in it were the most straightforward. Firstly, respondents were asked to quantify their amount of weekly e-mail *usage* in terms of both the number of *times* they used it, and the number of *hours* they spent using it. The specific questions asked to obtain this information can be found in **Appendix 1** as questions **1(a)** and **1(b)**.

Next, regarding e-mail messages *received* and found to be *useful*, respondents were asked to indicate whether such messages would mostly be from *lecturers*, or from *other students*, or if the value of these two sources in the provision of useful messages would be *about the same*. In **Appendix 1** this information was asked for in question **2**. An intention here was to test a hypothesis about CMC having a potential peer-support value, as opposed to simply being a lecturer-to-student delivery mechanism.

Finally, within this first section, the intention was to get a picture of the distribution of messages students *sent* to other people - how this broke down, firstly, between messaging as a required *course task* and more self-motivated '*conversational*' messaging, secondly, between messaging to *lecturers* and messaging to *other students*, and thirdly, between messaging *seeking* course-related help and messaging *offering* course-related help. Students were asked to give seven responses estimating their levels of messaging sent to such destinations for such purposes (on a 0 to 5 scale where "0" indicated that such messages were never sent, "1" indicated rarely sent, and "5" indicated often sent). The seven questions asked can be found in **Appendix 1** as questions **3(a)** to **3(g)**.

3.6.2 Questions about categories of information valued

For the second part of the survey, students were asked to score the usefulness to them of various descriptive *categories* of information (on a 1 to 5 scale where "1" was low value, and "5" high). The twenty categories used were as shown in table 3.1, and the corresponding survey questions appear in **Appendix 1** as questions **2(a)** to **2(t)**. This set of categories was arrived at through a combination, partly, of categories of information identified by analyses of simple annual surveys of all users of the electronic mail system, about their perceptions of present provision and wishes for the future (see **4.5** below), and, partly, of pilot categorization of large samples of e-mail messages actually sent via course-related e-mail distribution lists and archived to public document files (see **4.6** below). The category **Photos** was not present in the 1990 survey, as this type of information (scanned photographs of student seminar groups, captioned with names and e-mail addresses) was only feasible after the transition to a DOS network.

Keywords to categories of CMC information

keyword	:	*category descriptions and examples*
Admin	:	administrative - room changes, handouts to collect, coursework deadlines
Advert	:	advertisements for books, accommodation, cars, etc
Career	:	information about jobs, careers, past graduates, recruitment fairs
Comment	:	comments by class members on material presented in class
Discuss	:	extra-curricular discussion - politics, media, etc
Event	:	notice of relevant upcoming events - TV, seminars, guest lectures, etc
Exwork	:	examples of coursework submission or drafts from other students
Feedback	:	feedback from coursework markers
Handout	:	teacher's handouts and lecture notes
Help	:	clarification and advice on coursework from teachers
Outline	:	course outlines, rationales, and lecture plans
Photos	:	captioned pictures of staff and student seminar groups
Preview	:	previews of material to be presented in class - videos, lecture synopses, software, etc
Reading	:	readings lists and subject references
Reps	:	messages from student course-representatives
Resume	:	resume and personal information about other class members
SocMess	:	social messages, about parties, outings, humour, etc
Spec	:	coursework and workshop specifications from lecturers
StudAss	:	information from the Students' Association
System	:	notices and reports from Computer Centre staff

Table 3.1. Categories of CMC information

3.6.3 Questions about attitudes to computing and CMC

For the final part of the questionnaire, four sets of *attitude statements* were presented, for agreement or disagreement, as shown in table 3.2. The first seven of these, about computing in general, were abridged from a study at Carnegie Mellon University (Anderson 1987). The **NotAvail**, **Monitor** and **ExtendUse** questions were devised for the present study, with the remainder adopted from an Open University study (Open University 1990). Both studies were described in the literature chapter. The specific questions asked can be found in **Appendix 1** within questions **3.1**, **3.2**, **3.3** and **3.4**.

In the questionnaires used in the present study the terms 'attitude' and 'opinion' have been used in a somewhat literary way, with the intention of providing respondents with distinguishing variations of headings. Attitude has been defined as an object-evaluation association (Fazio 1986), or at more length, 'a psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour' (Eagly & Chaiken 1993, p.1). While terms such as *attitude*, *belief*, or *opinion* may be used popularly or in literary ways with interchangeable or variable meanings, Cooper and McGaugh (1966) offer definitions or various 'species terms' of the attitude construct. A *belief* is defined as an attitude incorporating considerable cognitive structuring, and is *in* or *about* a stimulus object, whereas an attitude is *toward* an object. An *opinion* is differentiated as being a tentative perceptual set toward stimulus objects or points of view. It is tentative in that the subject reserves the right to reverse himself at a later time with regard to the stimulus object or cognitive organization presently perceived. Eagly & Chaiken (1993, p.52) note, with regard to attitude statements used with scaling techniques, that in most applications these items consist of statements of belief, statements about behaviours or affective reactions towards attitude objects.

Keywords to attitude statements

keyword :	*statement to be agreed or disagreed with*
EasyAccess :	Everyone at QMC should have full and easy access to a computer.
LearnUse :	Almost everyone should learn to use a computer.
LikeAccess :	One of the things I like about QMC is the access I have to computing.
Practical :	I would like to see more practical uses of computers at QMC.
Experiment :	I like to experiment with computer systems.
UseMore :	I would like to use a computer more than I do now.
TooMuch :	There is too much emphasis on computing at QMC.
	How would you compare electronic conferencing with face-to-face tutorial meetings ...
CourseDiff :	... as a means of getting help with course-related difficulties?
Socialize :	... as a means of socializing?
Intellect :	... as a medium for intellectual exchange?
Effective :	... for its effectiveness, in terms of time spent by you?
Particip :	Individuals can participate more equally in electronic than in face-to-face communication.
Depersonal :	Computer communication is depersonalizing.
Assertive :	Computer conferencing encourages individual assertiveness.
LackFeed :	Personal interaction is more difficult with computer communication because of the lack of contextual and verbal feedback.
NotAvail :	It would make little difference to me if CMC facilities weren't available.
Monitor :	Being able to see other students' work helps me self-monitor and improve my own performance.
ExtendUse :	If staff-student ratios rise, it would be desirable to make more extensive use of CMC.
FutureUse :	I would be interested in continuing to use CMC after my course ends.

Table 3.2. Computing and CMC attitude statements used in survey

Odd numbered scales were preferred for these questions, since denying the respondent the choice of a validly neutral answer seemed inappropriate for most of the questions. Scales of five-points were preferred over three or seven-point scales for providing the sensitivity to measure both agreement and strong agreement (or disagreement), while not presenting respondents with a possibly overly-complex choice about their strengths of attitude. Pragmatically, of course, this choice of scale was considerably influenced by those chosen for the Carnegie Mellon (Anderson 1987) and Open University (1990) studies. The former appeared to use five-point scales for all the questions adopted for the present study. The Open University study used varying methods, with odd-numbered scales, though sometimes three-point, sometimes five-point, and sometimes with an additional 'don't know' option.

3.6.4 Methods for delivering the survey questionnaires

The 1990 survey was in the form of a paper questionnaire. It was distributed in mid-May, towards the end of the academic year, to all (at that time) three years of a BA Communication Studies course. Where possible the questionnaire was handed to students in their classes. A follow-up e-mail message was also sent to all the students concerned, explaining the purpose of the survey, and advising that copies of the questionnaires (for those who missed receiving them in class), could be collected from the departmental office, and to which completed questionnaires were to be returned.

For the 1995 and 1996 surveys, it was decided to make completion of the surveys part of an evaluative component for the modules at both levels. It had been optimistically anticipated that this would produce a high return rate. However, this proved to be less the case, apparently due to strategic choices made by students not attempting to pass some modules at first diet, and submitting work only at the retrieval stage. (This issue, which emerged as one 'teething problem' of the introduction of a new modular system, became a matter for consideration by academic standards committees.) It might be considered that this change might have an effect on the results obtained, by encouraging students to give responses they might think would create a favourable impression. However, the assessment specifications emphasized that there were no 'right' answers regarding views or usage levels and that marks would be based only on giving valid answers and on returning the component questionnaires with the correct e-mail methods. Students tend to be quite astute at, and focussed on, perceiving which activities will, or will not, get them marks. More generously, perhaps, they should also be credited with taking at face value that the stated intention of the surveys was to better understand how best to use CMC in their education, and to encourage them to reflect in a hopefully beneficial way on their own use of CMC.

Nonetheless, in 1995 and 1996 the corresponding questionnaire was made available and returned electronically, as part of course activities by the students involved. This occurred during January, at the end of the first semester, and involved first-year students taking an Information Studies module, and students taking a third-level option in Computer-Mediated Communication. Three separate electronic documents, corresponding to the three subsections of the 1990 paper questionnaire, were placed in a public file space. Students responded using their e-mail facilities, inserting each of the three components of the questionnaire into their e-mail editor to text-process their answers and send the completed documents to the author. Electronic mail questionnaires have been criticized for contributing to more extreme response sets than conventional surveys, and eliminating potential computer users who failed to use electronic mail or who mistrusted their ability to answer questions online (Sproull

1986). In a comparison of e-mail with the postal service Kittleson (1995) found that subjects who received a postcard survey were nearly three times more likely to complete and return the survey than subjects who received an e-mail version of the survey. However, in a survey of a random sample of 488 active Free-Net users Anderson and Gansneder (1995) obtained a response rate which exceeded the average rate for mailed questionnaires, with 76% of response returned by e-mail and the rest via conventional mail. However, in the present study it was believed that the method of electronic return of responses would have little effect on response rate or the content of respondents' answers, and that the pros and cons of electronic surveys noted from the literature did not greatly apply. This was because the present survey was within a local computer system, within known and complete populations of users with approximately comparable e-mail skills and access, but for whom the latter electronic method was perhaps more convenient and appropriate than the initial paper-based survey.

3.6.5 Questionnaires as self-report measures

The questionnaires used here depend on subjects self-reporting their behaviour and perceptions. Self-report measures are recognised as having characteristic that make them susceptible to distortion. For example, an individual may be unable to accurately and objectively report his behaviour, or be unwilling to make the effort to respond accurately, or be inclined to contrive responses to create a favourable impression of himself, or to impress or please the tester (Riding & Rayner 1998, p.10).

Conversely, self-report measures such as questionnaires are deemed appropriate in situations where subjects are able to understand the questions asked of them, have sufficient self-awareness to provide the necessary information, and are likely to answer honestly and not deliberately falsify their answers (Henerson *et al.* 1978, p.22).

There are a number of possible approaches to addressing weaknesses of self-reporting. The simplest of these include, for example, assurances that responses will remain anonymous, statements to the effect that 'there are no right and wrong answers', emphasis on the value of honest answers in order to contribute to scientific knowledge or some other desirable outcome, etc (Cook & Sellitz 1964).

An alternative approach which may be possible in some situations is the use of another, objective measure which may provide some cross-validation of the self-reported data. For example, in the present study, although it was unfortunately only minimally available, computer system accounting data about the frequency and duration of e-mail use could be contrasted with students' self-reporting about the levels of this usage.

In the present study the subject-matter of the questionnaires did not seem particularly susceptible to producing responses biased either towards perceived social desirability, or alternatively avoiding of unacceptable responses. Confidentiality and anonymity of responses was assured in the rubric of the questionnaires and in explanatory communications. Likewise, as noted above, it was suggested that there were 'no right answers'. It was also conveyed to students that an intended objective of the surveys was the improvement of the use of CMC in their courses, and to encourage them to reflect beneficially on their own use of it.

3.7 The student population surveyed

Some 288 students were potentially involved in the overall series of surveys, in 1990, 1995, and 1996. Table 3.3 gives the breakdown of the surveyed population over these three years, and also the eventual numbers and rates of returns.

Study population analysis and questionnaire returns

	All years	1995-96	1994-95	1989-90
Overall study population	288	101	110	77
Number of Overall returns	232	87	92	53
Percentage Overall return rate	*81%*	*86%*	*84%*	*69%*
Female sub-population	177	58	64	55
Number of Female returns	143	52	56	35
Percentage Female return rate	*81%*	*90%*	*88%*	*64%*
Male sub-population	111	43	46	22
Number of Male returns	89	35	36	18
Percentage Male return rate	*80%*	*81%*	*78%*	*82%*
Level-1 sub-population	187	69	73	45
Number of Level-1 returns	145	57	60	28
Percentage Level-1 return rate	*78%*	*83%*	*82%*	*62%*
Level-3 sub-population	101	32	37	32
Number of Level-3 returns	87	30	32	25
Percentage Level-3 return rate	*86%*	*94%*	*86%*	*78%*
Female/Level-1 sub-population	129	48	46	35
Number of Female/Level-1 returns	101	43	38	20
Percentage Female/Level-1 return rate	*86%*	*90%*	*83%*	*57%*
Female/Level-3 study population	48	10	18	20
Number of Female/Level-3 returns	42	9	18	15
Percentage Female/Level-3 return rate	*88%*	*90%*	*100%*	*75%*
Male/Level-1 study population	58	21	27	10
Number of Male/Level-1 returns	44	14	22	8
Percentage Male/Level-1 return rate	*76%*	*67%*	*81%*	*80%*
Male/Level-3 study population	53	22	19	12
Number of Male/Level-3 returns	45	21	14	10
Percentage Male/Level-3 return rate	*85%*	*95%*	*74%*	*83%*

Table 3.3. Survey population demographics and return rates

Academic year 1992-93 was the first in which the Communication Studies course had a fourth year, having been validated to offer a classified degree the previous year.

In 1989-90, with very few exceptions, students in the final year would all have progressed through the course from first year. For the latter two years, with the advent of credit accumulation and transfer schemes, modules could include direct entrants at second and third levels.

For the latter two survey years, the third-level students were choosing an optional one-semester module *Computer Mediated Communication 1* whose content was equivalent to a 50% component of a year-long, pre-modular, third-level *Information Studies* syllabus available to the 1989-90 cohort. In the pre-modular period, third-level students had the limited optionality of either taking all four of the available third-level syllabuses, or of alternatively dropping one of these four syllabuses in favour of a dissertation on a subject of their choosing. Therefore, these latter students can perhaps be seen as, to a greater extent, self-selected to be positively disposed towards CMC, since they had a wider range of choice (of single-semester, non-core, optional modules) than had the earlier students.

3.8 Questionnaire data analysis methods

Respondents' answers for each of the three survey years were entered into database files. This facilitated both exploratory interactive queries and also the use of batch report programs to extract summary reports and statistical information.

The database software used was Ashton-Tate Corporation's *dBASE IV* (1990), the current standard for such software. Statistical analysis modules were provided by Bits Per Second Ltd's *dGE* software (1988), likewise the standard of the time for graphing and statistical analysis of dBASE files.

The Student's '*t*' test was used for the testing of significances of differences between pairs of means. The starting assumption for this test is that both populations are normally distributed and have equal variance. In situations where these two requirements are not met, and particularly where sample sizes are small, the use of nonparametric statistical methods based on order relations in sets of data may be advocated (Mendenhall & Beaver 1994, p.593). However, it has also been cautioned that there may be a false impression of 'getting away with something' in the use of a nonparametric technique in preference to one of the classical parametric tests which may have more power (Hays 1970, p.617). It has been noted that while formally the assumptions of population normality and variance homogeneity are essential if '*t*' probabilities are to be exact, in practical situations the test is fairly robust for departures, so long as sample sizes are not small (Hays 1970, p.322).

An exception to the use of the Student's '*t*' test was for one question which required respondents to make a selection from one of three attributes, whereas other survey questions required respondents to assign numerical scores to variables. The Chi-square (χ^2) test provides a method of testing for association between attributes, and it was used as the significance test for this question (see **6.3.1**).

A basic summary of all the resulting data is to be found in **Appendix 2** of this document.

3.9 Qualitative data collection

A final phase of data collection took place in academic year 1999-2000. The intention here was to gather qualitative data to contribute to the overall findings of the thesis, particularly those relating to gender differences.

Qualitative methods are generally seen as appropriate for the pilot phase of a project, or as an adjunct to other methods, as here (Henwood & Nicolson 1995). However, arguments have also been presented that enhanced use of the 'qualitative paradigm' (Henwood & Pidgeon) can redress a possible overemphasis on theory testing, and dominance of the positivist paradigm (Parker 1989). In the particular area of feminist research perspectives an increasing popularity of qualitative techniques has been noted, with the emphasis that males and females may have different experiences which cannot be reduced to a generalizable human perspective (Griffin 1995, Wilkinson 1986).

The subjects for this part of the study were the equivalents of the earlier cohorts. The modules they were studying had undergone a further stage of curricular evolution. The first level module was now named *Computing and the Information Environment*, and the third level module *Website Design and Production.* On the first level module there were 64 female students and 31 male students, and on the third level module 14 females and 9 males.

Computer conferencing was the method adopted for gathering this data. This medium was considered to be both appropriate to the context of the study, and offering possible advantages of objectivity over face-to-face focus group or interview methods. Both modules made use a local newsgroup as their computer conferencing environment. In each newsgroup, a thread was created with the title **CMC awareness discussion**, and nested into this were eight sub-threads corresponding to the main areas in which survey data had been gathered in the three earlier survey years. The initial message in each of these eight sub-threads posed some ideas for the students to reflect on, and then reply to. The titles and text of these eight initial messages can be found within **Appendix 3**, at the beginning of each of its eight sub-sections, the titles being in emboldened font and the message text italicised. This message text was devised with the intention of eliciting comment from students which might - wittingly or unwittingly - shed light on key aspects of the earlier survey findings, particularly regarding gender differences. Students were asked to respond with at least four lines of message text for each of the eight aspects of the discussion.

The conferencing process took place during the first part of December 1999, in the final two teaching weeks of the first semester and was again incorporated as an evaluative component for both modules. The assessment specification again clarified that students would not be marked on their views on, or levels of use of, CMC, but rather on that they reflected upon their use of CMC, produced at least the specified number of message-lines, and posted technically correctly into their newsgroup. In part due to various technical difficulties, possible misunderstandings of what was required, and perhaps other problems some students were experiencing in completing their work for the semester, the numbers of completed sets of newsgroup postings were again fewer than might have been expected for a required course task.

The candidate sets of fully completed postings under each of the eight aspects of interest numbered 34 for first level females, 19 for first level males, 12 for third level females, and 6 for third level males. From these candidate sets, 24 sets were selected as the sample for analysis. The breakdown was that 6 were from first level females, 6 from first level males, 6 from third level females, and 6 from third level males. This sample size was in some respects arbitrary, in that it followed from 6 being the maximum available candidates from the third level male population, due to technical difficulties experienced by the other third level males in posting their responses into the newsgroup. For the remaining three sub-populations sets of 6 were sampled by taking pairs with the highest, lowest, and nearest mean scores in the first semester assessment of the first and third level modules.

The argument for a larger sample applies if the existing set of instances do not appear to have reached *saturation* (Glaser & Strauss 1967, p.61). That is to say, it only makes sense to take more and more instances into account if they provide additional information, or new ideas, or have a purpose in proving generality. If, however, similar instances are seen over and over again, then a researcher may become confident that a category is saturated, and that taking more data into account does not add anything. From inspection of the available candidate sets in the other three sub-populations, this did appear to be the case. It has, however, been noted that it is hard to know systematically when this moment of saturation has arrived, and that most of the time a somewhat arbitrary decision has to be made (ten Have 1999, p.133).

The method for analysis of these messages is in principle the same as for the pilot study content analyses of e-mail surveys of CMC users in 1987-89 (4.4) and of categories of messaging to course distribution lists (4.5). This is the method of thematic analysis, in which texts are analysed to sense the presence of 'themes', and to assign labels or codes to them, and also definitions of those labels (Boyatzis 1998, p.31). The presence, frequency, or intensity of these labels or codes may then be counted or commented upon. However, whereas the pilot studies involved fairly large samples of messaging, analysed quite formally and translated to quantitative data, the smaller sample sizes of the 1999-2000 data lend themselves to a less formal and more interpretative approach.

Chapter 4:

Pilot studies

4 Pilot studies

To provide some quantitative background and context for the main study the results of some pilot studies are presented here. They partly informed some of the methods to be used, and also offer some potential cross-validation for some of the eventual survey data. Some of this information was obtained from automatic logging of students' Vax system usage by the Vax/VMS Accounting utility. The rest was produced by recording and analysis of messaging sent to 'public' course, class, and seminar-group e-mail distribution lists.

In this chapter and later chapters, where the term 'standard deviation' is not rendered in full it is represented by the symbol s. Likewise, the symbol M has been used as the symbolic representation of the arithmetic mean.

4.1 System accounted e-mail use 1987-88 to 1990-91

Figure 4.1 shows the information recorded by the Vax/VMS system Accounting utility, for the elapsed *hours* of use by first and third level students on the course on which the main study is based, for the four academic years from 1987-88 to 1990-91.

This includes the year 1989-90, which is the first of the three years surveyed in the main part of the study reported here, for which a total of 1,747 elapsed hours were recorded.

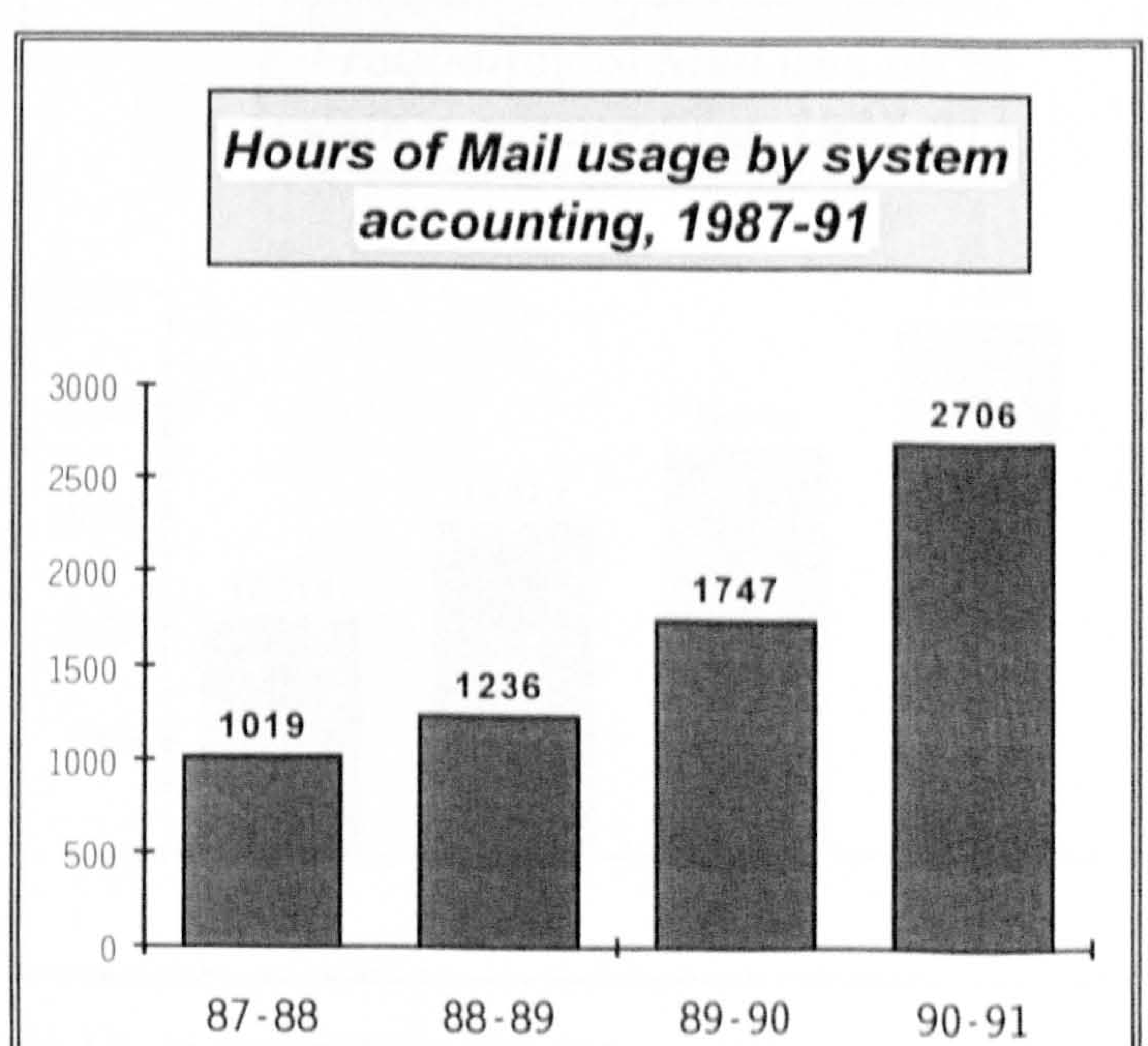

Fig 4.1. Elapsed hours of Vax Mail usage by system accounting 1987-91

As noted earlier by Rice and Borgman (1983) and Rice (1990), although such automatic, system-gathered information may seem attractive to researchers, it may not in fact be as reliable as it might initially appear. For example, the results in figure 4.1, for 'elapsed hours' of use of the Vax/VMS Mail utility, as recorded by the Vax/VMS Accounting utility, measure the length of time from the start of execution of a copy of the Vax Mail 'image', until the user exits from the utility. During that time, the user may, or may not, have actually been making use of the Vax e-mail system. Indeed the user may have temporarily got up and walked away from her terminal. As an extreme example of this, this Accounting data was 'cleaned up' for a small number of evident anomalies where individual users had recorded improbably high levels of elapsed hours. (In such instances the method of correction was to replace the aberrant value with the mean for the remaining members of the sub-population.) Some of these were in the month of December, where users had apparently left themselves logged on over the Christmas vacation. It is possible that the data contains less evident examples of such apparent use, where the terminal may in reality have been unattended by the notional user.

Figure 4.2 shows, for the same four academic years, the Accounting utility's record of the number of *times* the Mail utility was activated by a first or third level student.

For the academic year 1989-90, the first of the three years surveyed in the main study, the Mail system was invoked 18,244 times by students who were part of the present study.

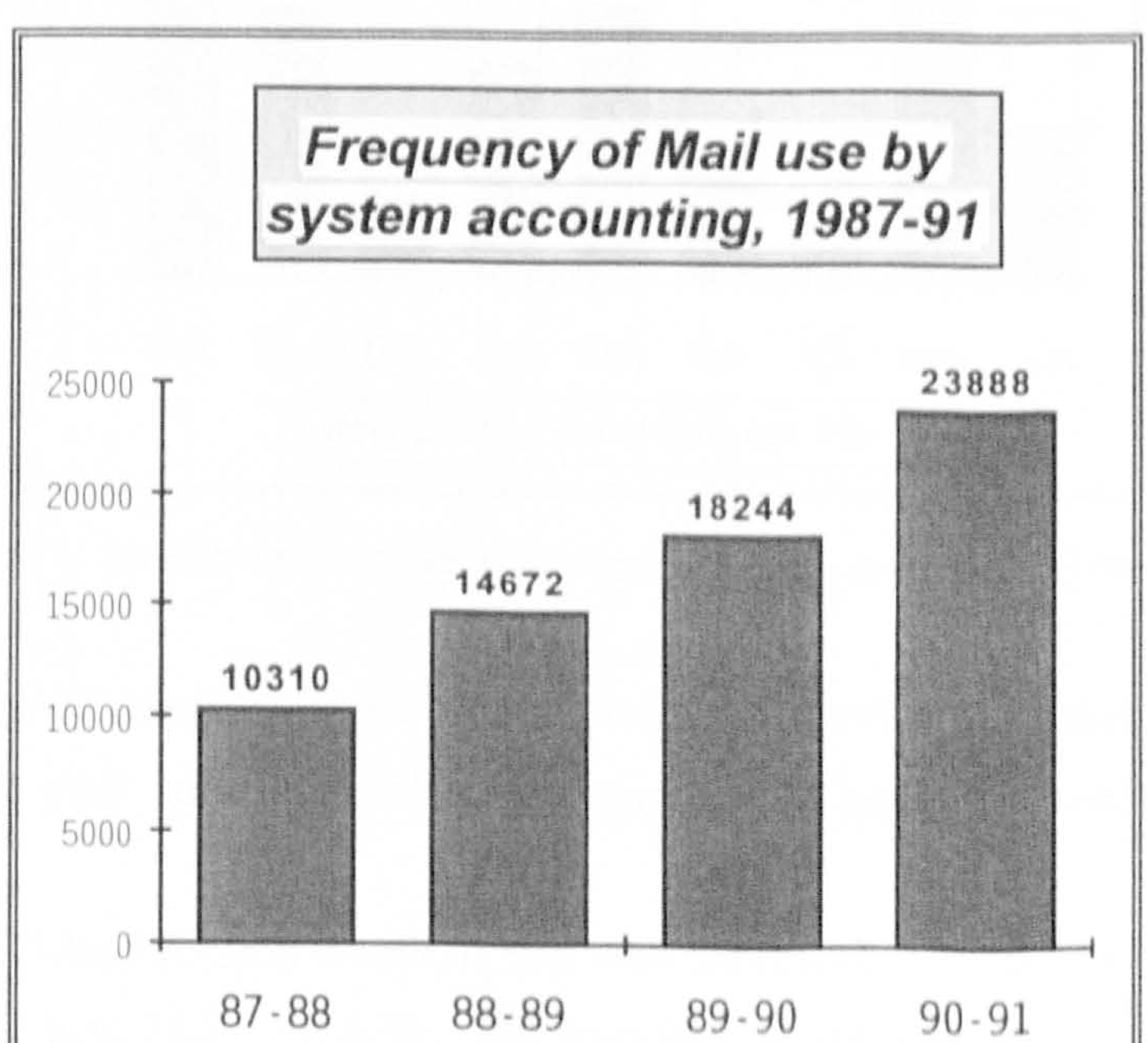

Fig 4.2. Frequency of Vax Mail usage by system accounting 1987-91

Again, such results should be interpreted with some caution. For example, a disciplined user arriving for a fifteen minute session of using e-mail may start the

Mail utility only once, and conduct all her business systematically in that single session. Conversely, a less organised person might spend less time seated at the terminal, yet invoke and exit from the Mail utility several times as various reasons for sending or checking e-mail are thought of. The latter user will appear to be a significantly more frequent user of the Mail system, though in reality their functional usage my be quite similar.

4.2 Female and male students' monthly hours and frequency of e-mail use in 1989-90

Figure 4.3 shows how the 1,747 elapsed hours recorded by the system Accounting utility for the year 1989-90 were distributed over the individual months of that academic year, with drops in usage apparent for the Christmas and Easter holiday periods. It also shows how that usage was made up by gender, by the 55 female students who accounted for a total of 1,216 hours, and the 22 male students who accounted for the remaining 531 hours.

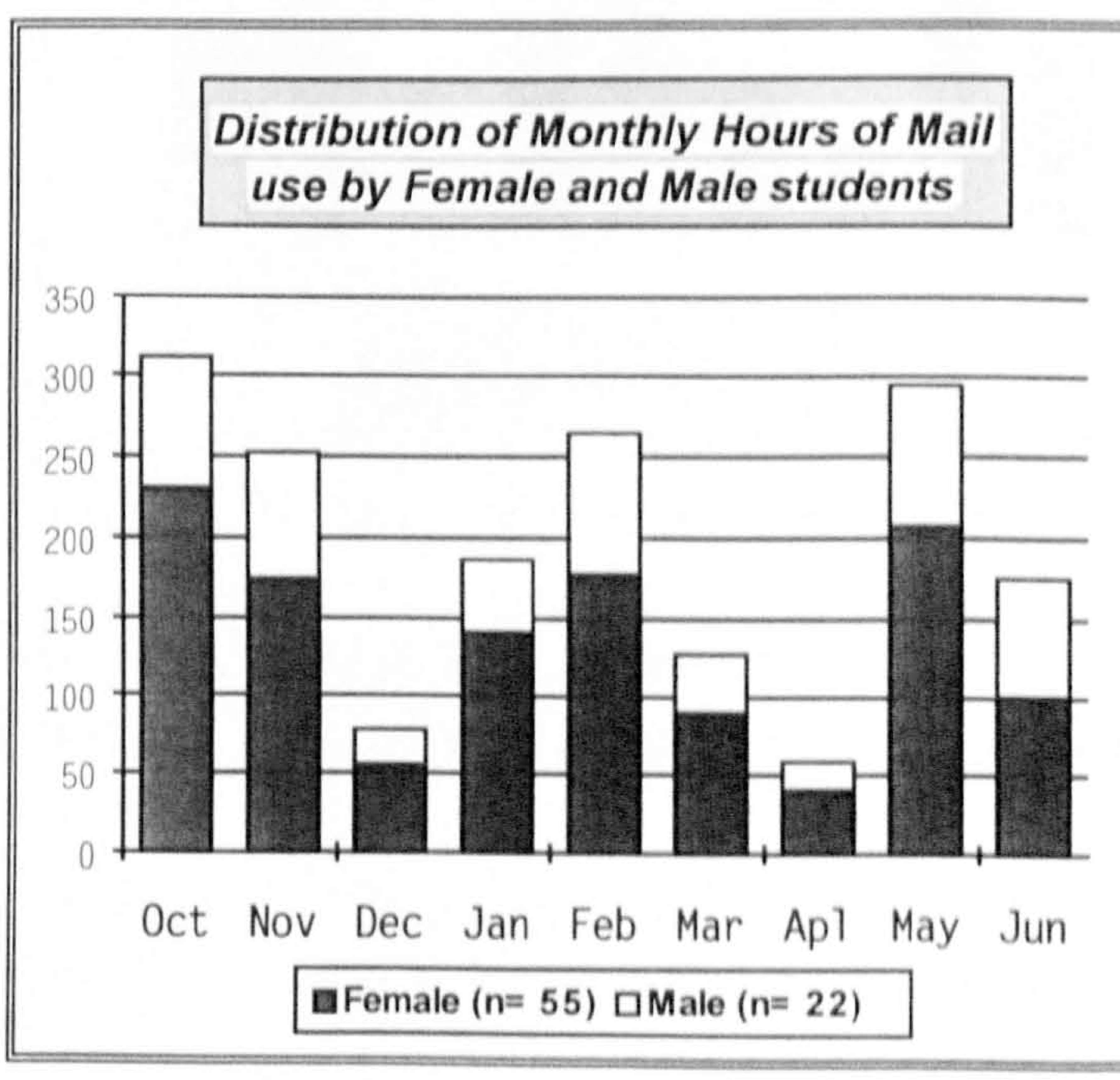

Fig 4.3. Monthly hours of Vax Mail usage by females and males in 1989-90

The mean number of total hours per student was 22.7 (s=15.1), which averaged over a 30-week teaching year, gives a weekly average of 0.76 hours per week.

The average individual female hours of use was therefore 22.1 (s=14.2). The average male hours of use was 24.2 (s=16.9). The average for males is 9.5% higher than for females.

Based on a 30-week teaching year, female students therefore used the e-mail system for an average of 0.74 hours per week, while males used it an average of 0.81 hours per week.

Figure 4.4 shows how the 18,244 times that the Mail utility was used in 1989-90 by students who are part of the present study were distributed over the individual months of that academic year. It also shows the gender breakdown, with the 55 female students accounting for 12,125 times of use, and the 22 male students for 6,119 times.

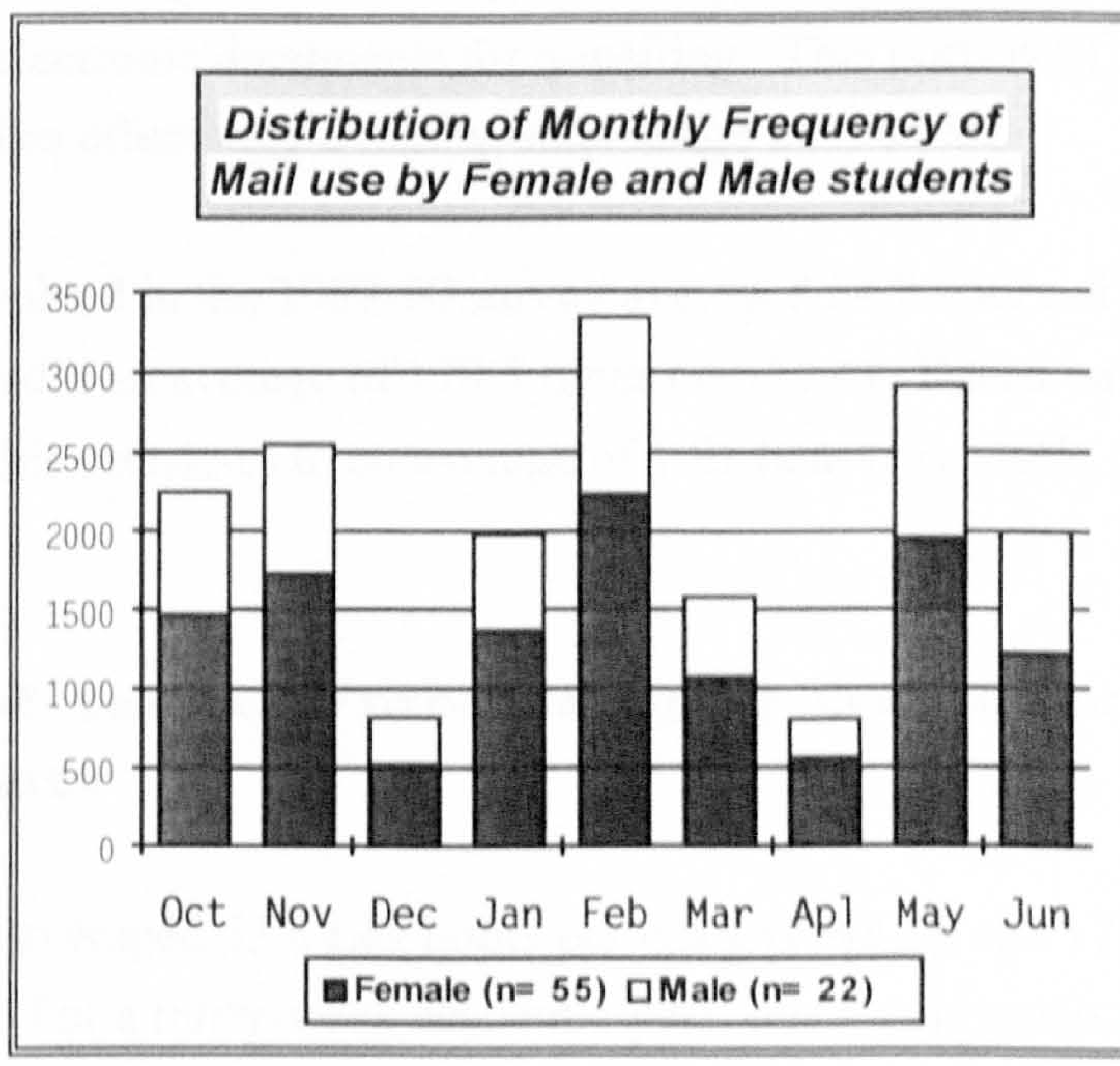

Fig 4.4. Monthly frequency of Vax Mail usage by females and males in 1989-90

The mean frequency of total use per student was 236.9 (s=159.5), which, averaged over a 30-week teaching year, gives a weekly average of 7.9 times per week.

The average individual female frequency of use for 1989-90 was therefore 220.5 times (with a standard deviation of 143.6). For males average number of times of use was 278.1 (with a standard deviation of 187.5). The figure for males is 26.2% higher than for females. Based on a 30-week teaching year, the average weekly frequency of e-mail system use by females was 7.4 times, and for males 9.3 times.

4.3 System accounted use of Vax word-processing software

In 1989-90, although IBM PC compatibles had widely replaced the previous Apple and BBC microcomputers as both standalone machines and also (in the case of the BBC micro) as an alternative Vax terminal through the use of VT52 and VT100 terminal-emulation software, first-year students still received their introduction to word-processing using an Ace Microsystems' product called Lex, which was provided on the Vax minicomputer.

A benefit of this was that Lex could be used to edit ASCII text files which could subsequently be sent as e-mail messages, using Vax Mail, and many students' messages were prepared 'offline' this way. It is therefore perhaps useful to also briefly note the system accounting data for the use of Lex, since - although most first-year students in 1989-90 also used Lex as their primary word-processing system, to produce printed-out assignments - it is probable that a significant part of Lex usage was to produce electronic documents for e-mailing. This portion of Lex usage could thus be regarded as effectively e-mail system usage in 1989-90.

The students involved in the 1989-90 survey averaged 54.2 hours of Lex usage (s=52.8), and used it an average of 179.3 times (s=135.4). Based on a 30-week academic year, this translates to an average of 1.81 hours per week, and 5.0 times per week.

4.3.1 Use of Lex word-processing by female and male students

Female students averaged 53.6 Lex hours per week (s=48.8), and 171.3 times per week (s=123.7). For a thirty-week academic year, this would mean an average of 1.79 hours and 5.7 times per week.

Male students averaged more than three times as many Lex hours, at 55.7 (s=61.5), but only marginally more times of use, at 199.3 (s=159.1). Over thirty weeks, this is an average of 1.86 hours and 6.6 times per week.

4.4 Informal annual e-mail surveys of CMC users in 1987, 1988 and 1989

A simple annual survey of QMC electronic mail users was carried out at the end of academic years 1987, 1988 and 1989, using e-mail as the delivery and response medium. The original aim of this survey was to monitor the perceptions of electronic mail users as to the volume of mail they were receiving, to optimize the trade off between, on the one hand, providing a sufficient volume of mail to encourage regular use of mailboxes, and on the other hand, overloading users. The secondary aim was to identify categories of e-mail messages perceived by users as beneficial, and to generally obtain users' views.

```
From:   CIMMU          "George [Mr Chips] McMurdo"  24-MAY-1988 17:04
To:     @JIMMY:DISCUSS
Subj:   ??? 1988 MAIL User Survey ???

     ????????????????????????????????????????????????????????????????
     ???                                                          ???
     ??? The QMC Electronic Mail  system is a POTENTIALLY useful ???
     ??? educational  tool  for  providing information  and  for ???
     ??? supplementing normal channels  of communication between ???
     ??? lecturers and students.                                  ???
     ???                                                          ???
     ??? However,  the value of any information  system  depends ???
     ??? primarily on how well  it  is  tailored to the NEEDS OF ???
     ??? ITS  USERS.  On the next page of this message there are ???
     ??? 4 basic questions about how YOU use the MAIL system and ???
     ??? how  you feel it could be improved.  Please read  them, ???
     ??? then use the REPLY command to send back your answers.   ???
     ???                                                          ???
     ????????????????????????????????????????????????????????????????

     Q1    HOW OFTEN do you use the MAIL system per week, on average?

     Q2    Do you feel you get TOO MANY or TOO FEW mail messages?

     Q3    Are there kinds of mail information you would like to
           receive, or receive more of?  (eg tutorial information,
           social notices, assignment specifications, humour,
           discussions, opinion surveys, whatever you can think of...)

     Q4    Do you have any other SUGGESTIONS to make MAIL more
           useful to you?

     Please use the REPLY command now and type short answers to these
     4 questions.  Thanks.
```

Fig 4.7. Questionnaire e-mail message sent to all users in 1987, 1988 and 1989

Towards the end of each of the three academic years 1986-87 to 1988-89 an electronic mail message as shown in figure 4.7 was sent to a distribution list `DISCUSS.dis` which defaulted to inclusion of all users of the Vax system unless they had actively requested omission. This message was paginated to display in two screenfuls, so that the recipient got the 'boxed' information section as the first screenful, then the question section as the second screenful. Although more sophisticated ways of editing a response message were possible, by giving a `reply` command while viewing this second screenful, the recipient could easily type in a short response message while still reading the questions.

It is difficult to estimate the true population of this survey. The survey mail message probably arrived in a total of around 1,500-2,000 mailboxes over the three years. However, non-CIS students tended to use electronic mail more intermittently, depending on course activities, and there were increasing constraints of access to scarce resources. It is possible that only an estimated 600-700 users actually viewed the survey messages.

Figure 4.8 shows an example of a response to the message from figure 4.7, using the `reply` command. This automatically generates a message header which displays the sender's username and the destination username, repeats the subject line of the replied-to message, prefixing it with **RE:**, and prompts the user to enter the text of the reply message.

```
From:   CS2ORAN     "Jude [not that obscure] Orange"  25-MAY-1988 11:33
To:     CIMMU
Subj:   RE: ??? 1988 MAIL User Survey ???

          Q1 - Daily, at least once - often more.

          Q2 - 'bout right amount, tho' I get peeved when I get none.

          Q3 - Yup, all those listed, and I would add that I think
               good essays and exam papers ought to be available to
               all via MAIL.

          Q4 - Not off hand. Will set the little grey ones to work on
               this one and get back to you.

          Cheers

          Jude
```

Fig 4.8. Example response message using REPLY command

Over the three academic years a total of 193 responses were received from 164 students and 29 members of staff (some of whom responded to surveys in more than one year). One hundred and twenty-one of those responses were from information students, 71 of which were from female students and 50 from males. For the question about how often the e-mail system was used per week, the three-year average for information students was 6.27 (s=4.83), varying between 5.67 in 1987 and 6.80 in 1988. For female information students the four-year average for the number of times of weekly e-mail use was 4.99 (s=2.77), varying between 4.55 in 1988 and 5.19 in 1989. For males the four-year average was 8.09 (s=6.33), varying between 7.21 in 1987 and 8.63 in 1988.

For analysis of responses about the kinds of information respondents valued, content analysis was used to identify, assign keywords to, and count nineteen categories of e-mail information described in responses. For information students the first five ranked of these accounted for 72% of the keywords counted. These were for tutorial information (20%), coursework specifications (18%), humour (12%), less trivia (12%), discussion of political and other extra-curricular issues (11%).

There was very little difference between rankings by female and male students. Non-information students ranked social messaging first, and then tutorial and coursework specifications 2nd and 3rd. For information students social messaging was their 6th ranked category. For information students, the high ranking of course-goal information (tutorial, specifications) followed then by humour, was interpreted as indicating a sound and balanced approach. The irony that the humour was valued to the same numerical extent that 'less-trivial' messaging was requested was attributed to different senses both of humour, and of what constituted 'junk mail', as Hiltz and Turoff (1985) had noted:

> The popularity of garage sales and flea markets demonstrates how one person's junk can be another person's collectibles. This is also true with information and ideas.

Finally, from this four-year series of informal surveys by e-mail, table 4.1 lists some selected free-text comments from respondents' e-mail messages. The right-justified information in this table is the message date and respondent's Vax username from the e-mail message header. Where a number appears in the username, the respondent was a student, and the number corresponds to the current year of their course. Where there is no number, the respondent was a member of staff. For student usernames, the initial two letters are a course code, `IS` for a diploma in Information Studies, `CS` for a Communication Studies degree, and `AC` for a degree in Applied Consumer Studies. For staff, the initial two letters are a department code, `PH` for Physiotherapy, and `HN` for Health and Nursing. In most cases the final four characters of the username corresponded to the first four letters of the user's surname.

```
"... the main points of a week's lectures might be sent out at the end
of each week, together with reading refs - for those with legit
excuses for skiving!"
                                              IS2CROAL 19-MAY-1987

"I feel that the Mail system could become THE means of communication
in the college ... "
                                               PHSALT 19-MAY-1987

"Personally I feel happier sending written messages than actual
face-to-face contact"
                                              CS1SKEL 21-MAY-1987

"Not really. As it stands it is fairly simple and useful. Trying to be
clever with it might just ruin it"
                                              CS1GILI 26-May-1988

"Outlines of lectures are very useful. Read prior to the class they
allow a much smoother and clearer picture to develop"
                                              CS3AVER 22-MAY-1989

"... essay titles don't get pinched as the do from the noticeboards"
                                              CS3MORG 23-MAY-1989

"Staff do not all use the system, so it becomes an unreliable method
of communication"
                                               PHSALT 25-MAY-1989

"Make it faster and sit on my desk"
                                               PHDURW 26-MAY-1989

"If there was a terminal in my office I would almost be in 7th heaven"
                                                HNMRT 28-May-1989

"... receiving mail messages is a cheery part of the day"
                                              CS1DAVI  1-JUN-1989

"It is nice to read a lot of messages. Even if they don't apply to me
it gives me an idea of what's going on"
                                              AC1MARR  4-JUN-1989
```

Table 4.1. Selected interesting or insightful free-text comments

These can be interpreted optimistically (and in some respects critically) as illustrative of various key ideas associated with the acceptance and use of CMC in education - the identification of beneficial uses; positive responses to social aspects of using CMC; the potential centrality of such a system within the organization; problems of access to facilities; related problems of not having attained a 'critical mass' of users.

4.5 Categories of messaging to course distribution lists in 1986-78 and 1989-90

In anticipation of surveying students about the categories of e-mail they found more or less valuable, it seemed logical to examine some sample of actual messaging, to see what kinds of categories were present. While it would be technically feasible to record copies of any or all e-mail messaging, it is generally regarded as inappropriately intrusive and ethically problematical to monitor private messaging in this way.

However, messaging to course and class e-mail distribution lists was considered to be 'public'. Such messaging was routinely recorded by means of dummy userids with large disk quotas, from which mail messages were only deleted after they had been archived to monthly text files. Such text files were made available in an area of public disk space, where the were generally accessible for reference and for use in text-searching exercises and demonstrations. These monthly archive files for the years 1986-87 and subsequently 1989-90 were printed out and analysed in a number of ways.

Keywords to categories of e-mail messaging to public distribution lists		
keyword	:	*category descriptions and examples*
Admin	:	administrative - room changes, handouts to collect, coursework deadlines
Advert	:	advertisements for books, accommodation, cars, etc
Assist	:	requests for assistance with course-related matters
Career	:	information about jobs, careers, past graduates, recruitment fairs
Comment	:	comments by class members on material presented in class
Discuss	:	extra-curricular discussion - politics, media, etc
Event	:	notice of relevant upcoming events - TV, seminars, guest lectures, etc
Exwork	:	examples of coursework submission or drafts from other students
Failed	:	messages incorrectly sent in some way (eg: empty)
Feedback	:	feedback from coursework markers
Handout	:	teacher's handouts and lecture notes
Help	:	clarification and advice on coursework from teachers
Offer	:	offers of assistance on course-related matters
Outline	:	course outlines, rationales, and lecture plans
Preview	:	previews of material to be presented in class - videos, lecture synopses, software, etc
Reading	:	readings lists and subject references
Reps	:	messages from student course-representatives
Resume	:	resume and personal information about other class members
SocMess	:	social messages, about parties, outings, humour, etc
Spec	:	coursework and workshop specifications from lecturers
StudAss	:	information from the Students' Association
System	:	notices and reports from Computer Centre staff
Test	:	messages just to 'test' something, with no meaningful content

Table 4.2. Categories of e-mail messages

Table 4.2 lists the categories of e-mail information found to be typically present in the messaging analysed, and the keywords used to record them.

Categories of messaging to public distribution lists												
category	Both Years				1989-90				1986-87			
keyword	All	Staff	S *(Rq)*	S *(Nr)*	All	Staff	S *(Rq)*	S *(Nr)*	All	Staff	S *(Rq)*	S *(Nr)*
Admin	289	266	0	23	219	196	0	23	70	70	0	0
Advert	158	14	0	144	151	13	0	138	7	1	0	6
Assist	130	15	0	115	114	14	0	100	16	1	0	15
Career	4	3	0	1	3	3	0	0	1	0	0	1
Comment	152	0	149	3	152	0	149	3	0	0	0	0
Discuss	147	75	0	72	48	23	0	25	99	52	0	47
Event	132	121	0	11	111	100	0	11	21	21	0	0
ExWork	143	0	143	0	98	0	98	0	45	0	45	0
Failed	64	6	3	55	60	3	3	54	4	3	0	1
Feedback	39	36	0	3	23	20	0	3	16	16	0	0
Handout	24	24	0	0	18	18	0	0	6	6	0	0
Help	139	138	0	1	88	88	0	0	51	50	0	1
Offer	40	0	0	40	36	0	0	36	4	0	0	4
Outline	17	17	0	0	12	12	0	0	5	5	0	0
Preview	54	54	0	0	30	30	0	0	24	24	0	0
Reading	71	31	40	0	54	14	40	0	17	17	0	0
Reps	76	4	0	72	42	4	0	38	34	0	0	34
Resume	127	0	126	1	126	0	126	0	1	0	0	1
SocMess	369	36	0	333	320	20	0	300	49	16	0	33
Spec	87	87	0	0	56	56	0	0	31	31	0	0
StudAss	213	0	0	213	192	0	0	192	21	0	0	21
System	30	30	0	0	10	10	0	0	20	20	0	0
Test	6	3	0	3	6	3	0	3	0	0	0	0
Totals	2511	960	461	1090	1969	627	416	926	542	333	45	164

Table 4.3. Categories of messages to course distribution lists for 1986-87 and 1989-90

Table 4.3 provides a breakdown by category and sender of the 2,511 messages recorded in 1989-90 and 1986-87. For messages sent by students, where it was apparent that a message had been sent as part of some required coursework, rather than being sent of the student's own volition, they were recorded as such, and appear in the columns headed 'S *(Rq)*'. Students' messages which did not appear to have been produced as part of some required task appear under the columns headed 'S *(Nr)*'.

The category `SocMess` had the most messages (369), followed by `Admin` (289), `StudAss` (213), `Advert` (158), and `Comment` (152).

4.6 Messaging to course distribution lists by the 1989-90 survey population

Of the 1,969 messages archived from course e-mail distribution lists in academic year 1989-90, a total of 682 were produced by the student populations to be involved in the survey. That is, 64 students from the first (n=45) and third levels (n=19) of the Communication Studies course in 1989-90, of whom 46 were female and 18 male. Each student thereby produced an average of 10.66 (s=7.45) messages to these distribution lists (however many messages were sent privately). For messaging identified as course-required, the average was 6.31 (s=4.80). For messaging identified as not being course-required, the average was 4.34 (s=5.99).

The 46 female students sent 477 of these 682 messages, thus averaging 10.37 per student (s=6.29). The 18 males sent 205, averaging 11.39 messages per student (s=9.76). The average for males is 9.8% higher. For the 404 messages identified as course-required, female students sent 316, an average of 6.87 per student (s=4.71). Male students sent 88 course-required messages, averaging 4.89 per student (s=4.72). The female average is 40.5% higher. For the remaining 278 not-required messages, females sent 161, an average of 3.50 (s=4.14). Males sent 117 messages, averaging 6.50 per student (s=8.78). The male average was 85.7% higher.

4.7 Distribution list message-lines generated by the 1989-90 survey population

Of the 37,356 lines of message-text contained in the 1,969 messages archived from course e-mail distribution lists in academic year 1989-90, a total of 6,739 were produced by 64 of the students to be involved in the 1989-90 survey. Each student thereby produced an average of 105.30 (s=80.15) message-lines to these distribution lists. For messaging identified as course-required, the average was 60.20 (s=48.33). For messaging which was not course-required, the average was 45.09 (s=71.40).

Of these 6,739 lines of messaging, females generated 4,397, an average of 95.59 per student (*s*=63.75). Male students generated the remaining 2,342, averaging 130.11 lines per student (*s*=107.69). The male average was 36.1% higher. Of 3,853 lines messaging identified as course-required, female students accounted for 3,112 lines, averaging 67.65 lines per student (s=48.93). The male students' balance of 741 message-lines gives an average of 41.17 lines per student (*s*=41.02). The average for females is 64.3% higher. Of the remaining 2,886 lines of messaging identified as not course-required, female students sent 1,285 lines, averaging 27.93 lines per student (*s*=42.06). The balance of 1,601 lines sent by males gives an average of 88.94 message-lines per male student (*s*=104.54). The average for contributing males is over three times that for females (318%).

4.8 What was learnt from the pilot data

The pilot data reported here in various ways usefully inform the main study, sketching an outline of trends in e-mail use by the study population and the wider population over time, providing some baseline information, contributing to the development of some analysis methods, and offering some validation of survey results to follow.

The overall picture is of growth in various measures of e-mail usage, transfer of use from the author to other members of staff, identification of some of the main categories of 'public' messaging to course and class distribution lists, and some differences between female and male students, and students at first and third levels.

4.8.1 Data logged by automatic system accounting

It is recognised that results obtained from the automatic logging of computer system data must be interpreted with some caution. However, they clearly have a value in providing some potentially corroborative *objective* measures where a survey is otherwise depending on *subjective* self-reporting of behaviour. In this instance, during academic year 1989-90 the Vax accounting utility recorded the number of times each user activated the e-mail system program and also the duration in elapsed time until the progam was closed down again. Thus the computer system offers an answer of its own to two of the questions students were asked to self-report about, regarding their frequency of e-mail use and their weekly hours of using e-mail.

Use of e-mail by students of the same course and level as the 1989-90 study population, as recorded by system accounting, increased by more than 20% per annum from academic years 1987-88 to 1990-91. In the academic year 1989-90 itself, from the beginning of October 1989 until the end of June 1990, first and third level students of the study population logged an average of 22.7 hours use of the e-mail system, spread over an average 237 separate instances of use.

Of the 1989-90 study population, as recorded by system accounting, males on average used e-mail for 9.5% more hours than females, but 26.2% more instances of use - almost three times more. Another way of perceiving this relationship is that the average female e-mail session is therefore longer than for males.

Of the 1989-90 study population, as recorded by system accounting, first-level students on average used e-mail for almost three times as many hours as third-level students, and more than twice as many times of use. This may be partly attributable to third-level students being more efficient users of e-mail. Conversely, a significant part of first-level students usage arises from learning the e-mail system, particularly in the first months of the academic year.

4.8.2 Informal e-mail surveys of CMC users

The annual informal surveys of College-wide e-mail users conducted towards the end of academic years 1986-87, 1987-88 and 1988-89, whose respondents have been substantially a sample from the eventual study population, have provided insights into students' discourse about e-mail, how they perceive and describe its use. Results from the question about how often per week respondents used the e-mail system provide a baseline for repeating this question in later years, and also a cross-reference to the objective measure of this variable provided by automatic system accounting.

In conjunction with the analysis of samples of e-mail messaging described above, the responses to these surveys have assisted in the development of a typography of categories to describe commonly used, or thought of, kinds of messaging. Regarding weekly use of the e-mail system, the self-reported three-year average for information students was 6.27 times, whereas automatic recording gave a figure of 7.9 times per week. Males self-reported using the e-mail system 62% more times than did females, whereas automatic logging suggested a figure of only 26% more.

4.8.3 Categories of messaging to public distribution lists

A content analysis of samples of *actual* e-mail messaging, to discover and identify which categories were present, in what volumes, and from what sources, was an obvious preliminary to the intended surveys about which categories of information were valued by users. This analysis was the primary source of the categories listed in table 4.2 above.

The category which accounted for the greatest share of messages was **SocMess** (15%), mostly but not exclusively sent by students, followed by **Admin** (12%), mostly but not exclusively sent by staff.

4.8.4 Growth of messaging to public distribution lists

From 1986-87 to 1989-90 the volume of messaging to public distribution lists increased by more than three times, from 542 to 1,969. Messages sent by students increased both in number and in percentage share, while the percentage share from the author decreased relatively, as also did the percentage of messages from other staff.

4.8.5 Messaging by the 1989-90 study population

For all messaging (that is, both messages identified as course-required, and also those not course-required) to public course distribution lists in 1989-90, males on average sent 10% more messages than females. However, for messages identified as course-required, females on average sent 40% more messages than males. (For not-required messages, male students averaged 86% more.)

For the message-lines which comprised this messaging to course distribution lists, males on average produced 36% more than females. However, for course-required messaging, females averaged 64% more lines than males. (For not-required message-lines, males averaged more than three times higher than female students.)

Chapter 5:

Results

5 Results

This chapter presents key data from the questionnaires about reported use and experiences of CMC completed by first and third level students in calendar years 1990, 1995 and 1996, with respect to the corresponding academic years 1989-90, 1994-95 and 1995-96. The data summarized in this chapter may be inspected in detail in **Appendix 2**.

On average, each student used e-mail about once a day, for a total of 3 hours per week. Their reported messaging was fairly evenly balanced between task-orientated uses and more conversational uses. Although lecturers were found to be more useful message sources than fellow students, a substantial proportion rated these sources about the same for providing useful messages.

In terms of the categories of information provided in CMC messaging, fairly straightforward, coursework-focused information, such as handouts, lecture notes, assignment specifications, advice on coursework, and administrative information were valued most highly.

Regarding attitudes to computing and CMC, students appeared postive towards access to computing and about using CMC in subsequent careers, but more neutral about CMC replacing face-to-face contact in education.

Although some evidence of the characteristically reported gender differences towards computing was found, there was also evidence of some such differences reducing or disappearing over time.

5.1 Frequency and hours of e-mail use

Students were asked to estimate how many *times* they used the e-mail system per week on average, and for how many *hours*. The detailed results for these questions can be found in sections **1.1(a)** and **1.1(b)** of the second appendix. Table 5.1 summarizes the mean estimates and standard deviations for 1990, 1995 and 1996, and also the overall means for those three sets of results. (The sample sizes for these three years, and their breakdowns by level and gender, are as reported in table 3.3 in section **3.7**.)

Tables similar in format to table 5.1 are used throughout this chapter. The leftmost column contains a keyword used to identify the variable being measured, and also corresponds either exactly or very closely to the database field used to store the survey data. The next pair of columns provide the mean and standard deviation values for these variables, averaged over the three years of the main study. The remaining three pairs of columns provide the mean and standard deviation values for the individual years.

Frequency and hours of weekly e-mail system use								
category keyword	Three Year Means		1996		1995		1990	
	mean	*s*	mean	*s*	mean	*s*	mean	*s*
NumMail	6.71	*(5.2)*	6.18	*(4.9)*	7.32	*(5.6)*	6.62	*(5.2)*
MailHours	3.04	*(2 6)*	2.76	*(2.5)*	4.89	*(4.2)*	1.47	*(1.2)*

Table 5.1. Frequency and hours of e-mail use

The overall mean weekly frequency of use was 6.71 times per week, with an overall mean weekly hours of use of 3.04. The results obtained suggest that while the number of accesses remains between once and twice per day for all three cohorts, the number of hours of usage has increased substantially since 1990.

This might also be expressed by saying that the mean length of a session (viz. weekly hours divided by frequency) has grown considerably, from 0.22 hours (or 13 minutes) in 1990, to 0.67 hours (or 40 minutes) in 1995, and 0.44 hours (or 27 minutes) in 1996. Globally, the mean session length would be 0.45 hours (or 27 minutes).

5.1.1 Frequency and hours of e-mail use by female and male students

Tables 5.2 and 5.3 show the reported frequency and elapsed hours of e-mail use, firstly for female students, and secondly for male students. For female students the overall mean weekly frequency of use was 5.45 times, for a mean of 2.98 hours per week. The corresponding figures for male students were 8.79 times per week, and for 3.15 hours.

Female students' frequency and hours of weekly e-mail system use								
category keyword	Three Year Means		1996		1995		1990	
	mean	*s*	mean	*s*	mean	*s*	mean	*s*
NumMail	5.45	*(3.4)*	4.77	*(2.4)*	6.35	*(5.0)*	5.23	*(2.8)*
MailHours	2.98	*(2.5)*	2.67	*(2.8)*	4.88	*(3.9)*	1.39	*(0.7)*

Table 5.2. Female students' frequency and hours of e-mail use

Male students' frequency and hours of weekly e-mail system use								
category keyword	Three Year Means		1996		1995		1990	
	mean	*s*	mean	*s*	mean	*s*	mean	*s*
NumMail	8.79	*(6.7)*	8.29	*(6.6)*	8.76	*(6.1)*	9.33	*(7.4)*
MailHours	3.15	*(2 8)*	2.90	*(2.0)*	4.92	*(4.7)*	1.64	*(1.8)*

Table 5.3. Male students' frequency and hours of e-mail use

Overall, male students' reported frequency of use is 61.3% higher than female students', and male students' reported hours of use is 5.7% higher than females'. The mean length of female students' e-mail sessions is thus 0.55 hours, or 33 minutes, while for male students the mean session duration is 0.36 hours, or 22 minutes.

Figure 5.1 illustrates these results, showing that in all instances males overall report greater frequencies, and longer weekly hours of use.

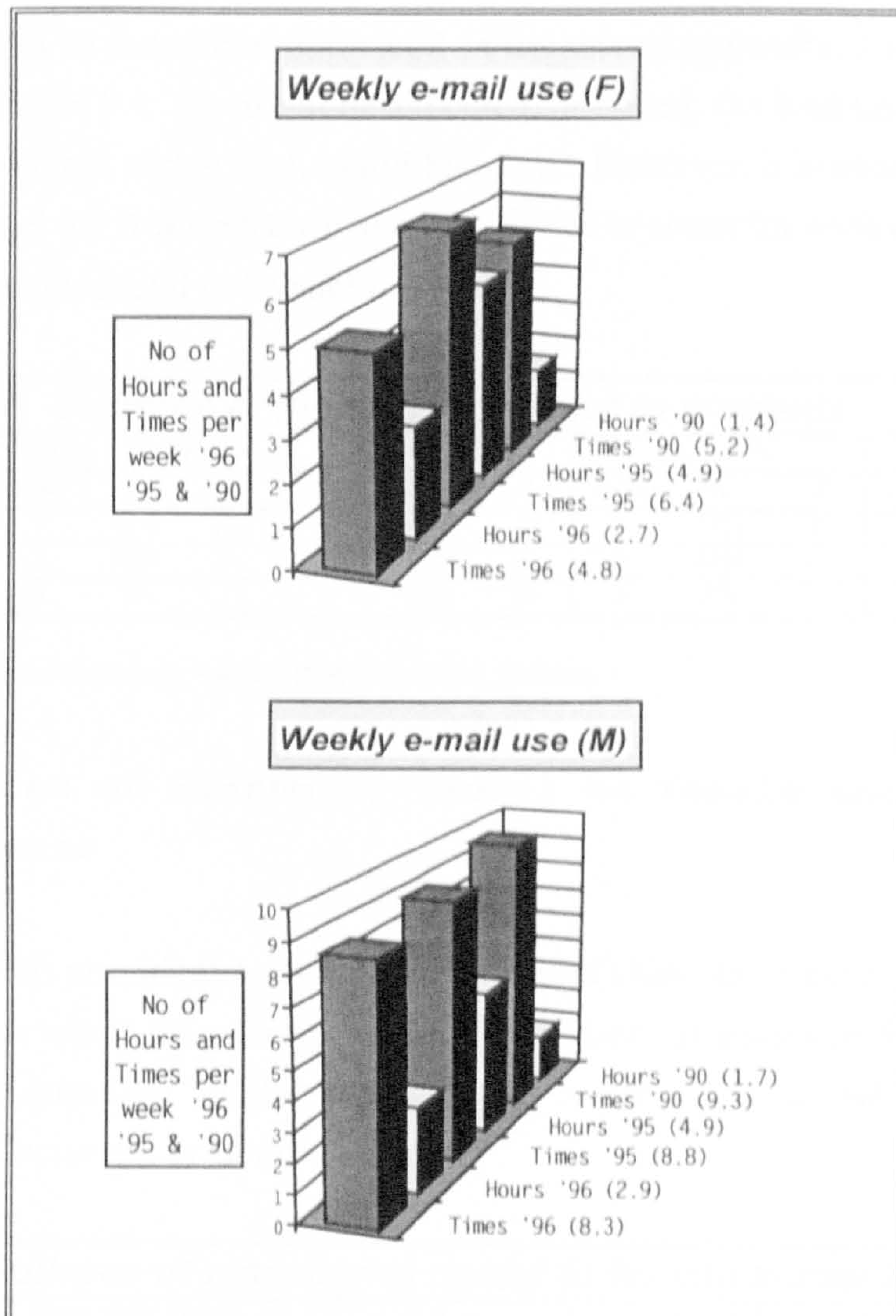

Fig. 5.1. Female and male Times and Hours of use of e-mail in 1996, 1995 and 1990

However, there are noteworthy gender differences between course levels, with evidence of narrowing and even reversal of the overall gender differences by the time students have reached third level.

For third level students, male students' reported frequency of use (M=9.08) is only 31% higher than female students (M=6.96). By contrast, for first level students, males students' reported frequency of use (M=8.75) is 81% higher than for first level females (M=4.81).

First level males report weekly hours of usage (M=2.95) which is 15% higher than for female students (M=2.56). But at third level, the hours of use reported by females (M=4.26) is higher than for males (M=3.64), by 9%.

5.2 Sources of messaging useful to students

Students were also asked to indicate the sources of messages they found to be more useful - (a) lecturers, (b) other students, (c) about the same. The detailed results for this questions can be found in section **1.2** of the second appendix, and these are summarized in table 5.4. As might be expected, or hoped, the **Lecturers** category is ranked first, overall and in each individual year. However, it is also noteworthy the **AboutSame** and the **OtherStudents** combined account for 46% of the choices of sources of messages found to be useful.

Sources of messaging useful to students												
category keyword	Three Year Means			1 9 9 6			1 9 9 5			1 9 9 0		
	rank	%	*N*	rank	%	*N*	rank	%	*N*	rank	%	*N*
Lecturers	1	54%	*127*	1	56%	*49*	1	52%	*49*	1	55%	*29*
AboutSame	2	39%	*91*	2	32%	*28*	2	46%	*44*	2	36%	*19*
OtherStudents	3	7%	*17*	3	12%	*10*	3	2%	*2*	3	9%	*5*

Table 5.4. Distribution of message sources found useful by students

5.2.1 Sources of messaging useful to female and male students

Tables 5.5 and 5.6 provide the gender breakdown of students' evaluation of sources of useful messages, where they chose one out of the three categories in the left column, in answer to the question, "*Of the mail messages you find most useful, are most from other students, lecturers, or about the same?*".

Sources of messaging useful to female students												
category keyword	Three Year Means			1 9 9 6			1 9 9 5			1 9 9 0		
	rank	%	*N*	rank	%	*N*	rank	%	*N*	rank	%	*N*
Lecturers	1	52%	*76*	1	54%	*28*	1	51%	*29*	1	54%	*19*
AboutSame	2	42%	*60*	2	40%	*21*	2	46%	*26*	2	37%	*13*
OtherStudents	3	6%	*8*	3	6%	*3*	3	3%	*2*	3	3%	*3*

Table 5.5. Distribution of message sources found useful by female students

Sources of messaging useful to male students												
category keyword	Three Year Means			1 9 9 6			1 9 9 5			1 9 9 0		
	rank	%	*N*	rank	%	*N*	rank	%	*N*	rank	%	*N*
Lecturers	1	56%	*51*	1	60%	*21*	1	53%	*20*	2	56%	*10*
AboutSame	2	34%	*31*	2	20%	*7*	2	47%	*18*	1	33%	*6*
OtherStudents	3	10%	*9*	3	20%	*7*	3	0%	*0*	3	11%	*2*

Table 5.6. Distribution of message sources found useful by male students

Overall, and in each year, the ranking of useful message sources is the same for female and male students, although in 1996 males scored the **AboutSame** and **OtherStudent** categories equally. Overall, males chose the **AboutSame** category 8% more than females did, and distributed this differential equally to the **Lecturers** and the **OtherStudents** categories.

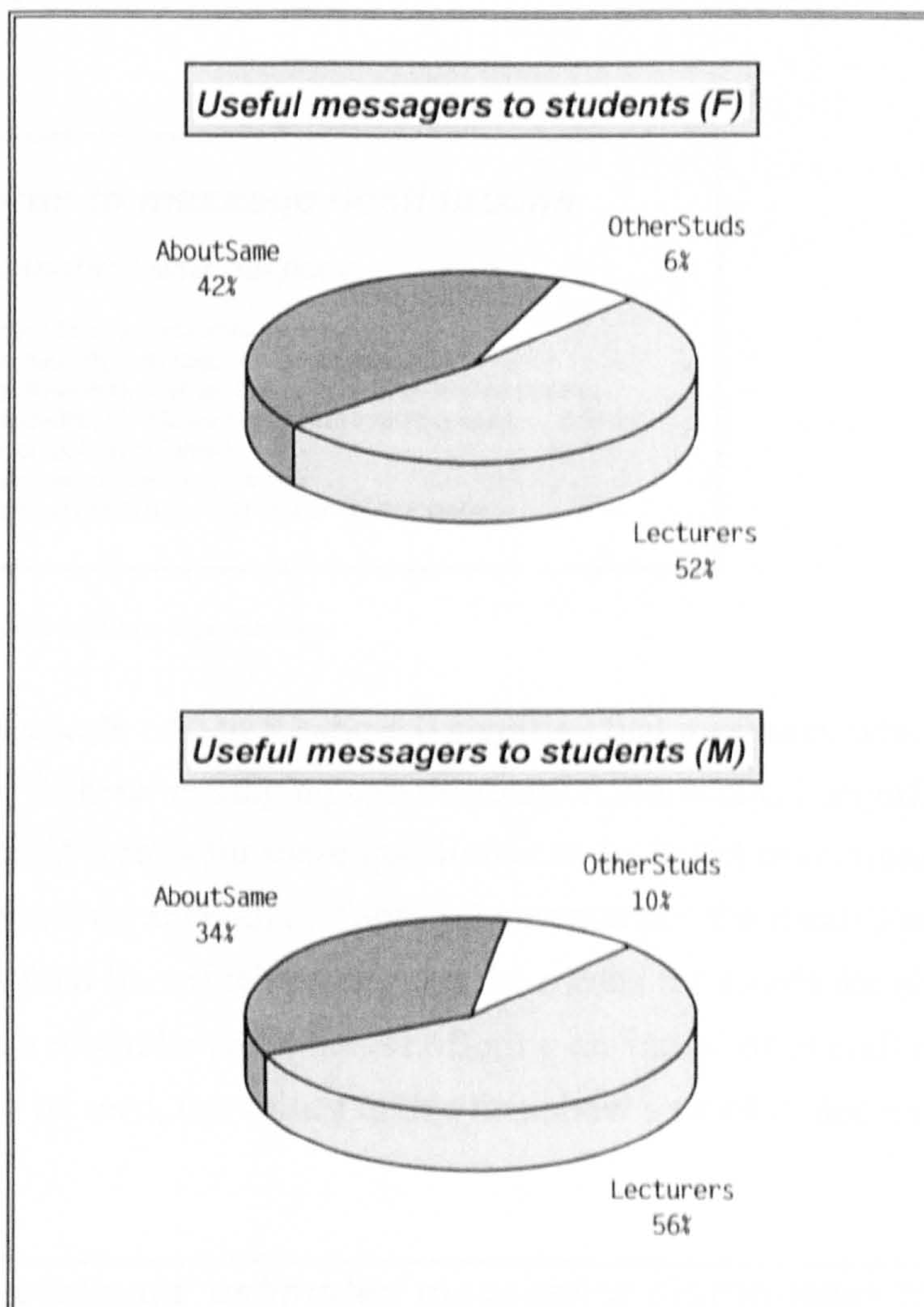

Fig. 5.2. Sources of useful messages to female and male students 1990-1996

Figure 5.2 illustrates these results for the three survey years combined.

On inspecting for gender differences between levels, it is notable how similar the results for males at first and at third levels are to the global results for male students as listed in table 5.6. For the ranked categories **Lecturers**, **AboutSame** and **OtherStudents** the overall results for first level students were 56%, 33% and 11%. The comparable values for third level male students were 56%, 35% and 9%.

By contrast, the equivalent values for first level female students were 48%, 47% and 5%. This can be compared with results for third level female students of 64%, 29%

and 7%, indicating a substantial shift from the **AboutSame** category to the **Lecturers** category in females' perceptions of who sends them useful messages.

5.3 Destinations of students' messaging

To get a picture of where students were sending e-mail, they were asked about their levels of messaging to other students and to lecturers, for the categories listed in table 5.7.

Keywords to message destinations

keyword :	*destination and purpose*
StudConv :	other student(s), conversationally
StudTask :	other student(s), as required course task
StudHelp :	other student(s), seeking help with course-related matters
StudOffer :	other student(s), offering help with course-related matters
LectConv :	lecturer, conversationally
LectTask :	lecturer, as required course task
LectHelp :	lecturer, seeking help with course-related matters

Table 5.7. Message destinations and purposes

Scoring was on a scale of 0 to 5, where 0 signified that messages were never sent to that destination. Where messaging to a destination did occur, 1 signified rarely, and 5 often. The detailed results for these questions can be found in sections **1.3(a)** to **1.3(g)** of the second appendix. Table 5.8 summarizes the mean scores and standard deviations. The final line of table 5.8 gives the means for scores for all categories combined, which might be construed as offering an 'index' of overall messaging volume. As can be seen, the values in this line show a trend to decrease from 1990 to 1995 and 1996.

Information students' estimated messaging distribution 1990-1996

category	All Three Years			1996			1995			1990		
keyword	rank	mean	*s*	rank	mean	*s*	rank	mean	*s.*	rank	mean	*s.*
StudConv	1	3.04	*(1.6)*	1	3.30	*(1.4)*	1	3.12	*(1.6)*	1	2.70	*(1.7)*
StudTask	2	2.09	*(1.4)*	2	1.85	*(1.3)*	2	2.03	*(1.4)*	3	2.40	*(1.6)*
LectTask	3	2.03	*(1.3)*	3	1.79	*(1.3)*	3	1.71	*(1.2)*	2	2.60	*(1.4)*
LectHelp	4	1.48	*(1.3)*	4	1.40	*(1.3)*	4	1.45	*(1.3)*	4	1.58	*(1.2)*
StudHelp	5	1.15	*(1.2)*	5	0.99	*(1.1)*	5	1.26	*(1.2)*	5	1.21	*(1.2)*
StudOffer	6	0.83	*(1.0)*	6	0.70	*(0.9)*	6	0.82	*(0.9)*	6=	0.96	*(1.2)*
LectConv	7	0.70	*(1.0)*	7	0.55	*(0.9)*	7	0.59	*(0.9)*	6=	0.96	*(1.1)*
Means		1.62	*(1.2)*		1.51	*(1.2)*		1.57	*(1.2)*		1.77	*(1.3)*

Table 5.8. Students' messaging destinations

In all three years, messaging to other students conversationally (**StudConv**) is the biggest category. The general similarity of the results similar indicates a stability of responses over the five years. However, from 1990 to 1996 there is a 6-8% shift in messaging from lecturers to students, with most transfer from **LectTask** to **StudConv**. Rankings for 1996 and 1995 are identical. In 1990 the ranks of

StudTask and **LectConv** are reversed from the later years. The **LectHelp** category remains static.

The breakdown of messaging between lecturers as destinations or students as destinations can be obtained by combining the three **Lect*** categories and the four **Stud*** categories respectively. Students thus report that about two-thirds (63%) of their messaging is to other students, and about one-third (37%) to lecturers.

Similarly, the breakdown of messaging between 'task' or 'conversational' as purposes can be obtained by combining the pairs of ***Task** and ***Conv** categories. Here, the distribution is about equal, but with marginally more task-oriented messaging (52%) than conversational messaging (48%) reported.

5.3.1 Destinations of female and male students' messaging

Tables 5.9 and 5.10 provide the gender breakdown of the results for students' estimates of their messaging destinations.

Female information students' messaging distribution												
category	All Three Years			1 9 9 6			1 9 9 5			1 9 9 0		
keyword	rank	mean	*s*	rank	mean	*s*	rank	mean	*s.*	rank	mean	*s.*
StudConv	1	3.06	*(1.8)*	1	3.58	*(1.3)*	1	3.00	*(1.6)*	1	2.60	*(1.8)*
StudTask	2	2.10	*(1.7)*	2	2.13	*(1.2)*	2	1.88	*(1.5)*	2	2.29	*(1.7)*
LectTask	3	2.04	*(1.7)*	3	1.85	*(1.4)*	3	1.74	*(1.2)*	3	2.54	*(1.4)*
LectHelp	4	1.47	*(1.5)*	4	1.40	*(1.4)*	4	1.35	*(1.3)*	4	1.66	*(1.3)*
StudHelp	5	1.05	*(1.20*	5	0.98	*(1.2)*	5	1.04	*(1.2)*	5	1.14	*(1.2)*
StudOffer	6	0.70	*(0.9)*	6	0.58	*(0.9)*	6	0.79	*(1.0)*	6=	0.74	*(1.0)*
LectConv	7	0.50	*(0.7)*	7	0.35	*(0.6)*	7	0.42	*(0.7)*	6=	0.74	*(0.8)*
Means		1.56	*(1.3)*		1.55	*(1.1)*		1.46	*(1.2)*		1.70	*(1.3)*

Table 5.9. Female ratings of message destinations

Male information students' messaging distribution												
category	All Three Years			1 9 9 6			1 9 9 5			1 9 9 0		
keyword	rank	mean	*s*	rank	mean	*s*	rank	mean	*s.*	rank	mean	*s.*
StudConv	1	3.02	*(1.5)*	1	2.89	*(1.6)*	1	3.29	*(1.4)*	1	2.89	*(1.4)*
StudTask	2	2.10	*(1.3)*	3	1.43	*(1.3)*	2	2.26	*(1.1)*	3	2.61	*(1.5)*
LectTask	3	2.03	*(1.3)*	2	1.71	*(1.2)*	3	1.66	*(1.2)*	2	2.72	*(1.6)*
LectHelp	4	1.48	*(1.2)*	4	1.40	*(1.2)*	4=	1.61	*(1.2)*	4	1.44	*(1.1)*
StudHelp	5	1.31	*(1.1)*	5	1.00	*(1.1)*	4=	1.61	*(1.0)*	7	1.33	*(1.3)*
StudOffer	6	1.05	*(1.0)*	6	0.89	*(0.9)*	6	0.87	*(0.8)*	5=	1.39	*(1.3)*
LectConv	7	1.03	*(1.3)*	7	0.86	*(1.2)*	7	0.84	*(1.2)*	5=	1.39	*(1.4)*
Means		1.72	*(1.2)*		1.45	*(1.2)*		1.73	*(1.1)*		1.97	*(1.4)*

Table 5.10. Male ratings of message destinations

From tables 5.9 and 5.10 it can be seen that, overall, female and male students ranked the categories of message destinations in the same order.

Taking the values in the final line as an overall index of messaging volume, it can be seen from the means for all three years combined that the value for males (1.72) is 10.3% higher than the value for females (1.56). However, on inspecting the means for individual years it can be seen that for males the values decline progressively from 1990 to 1996, with the most recent year's value lower than for females. For females, there is a drop from 1990 to 1995, but this is followed by a rise in the 1996 survey.

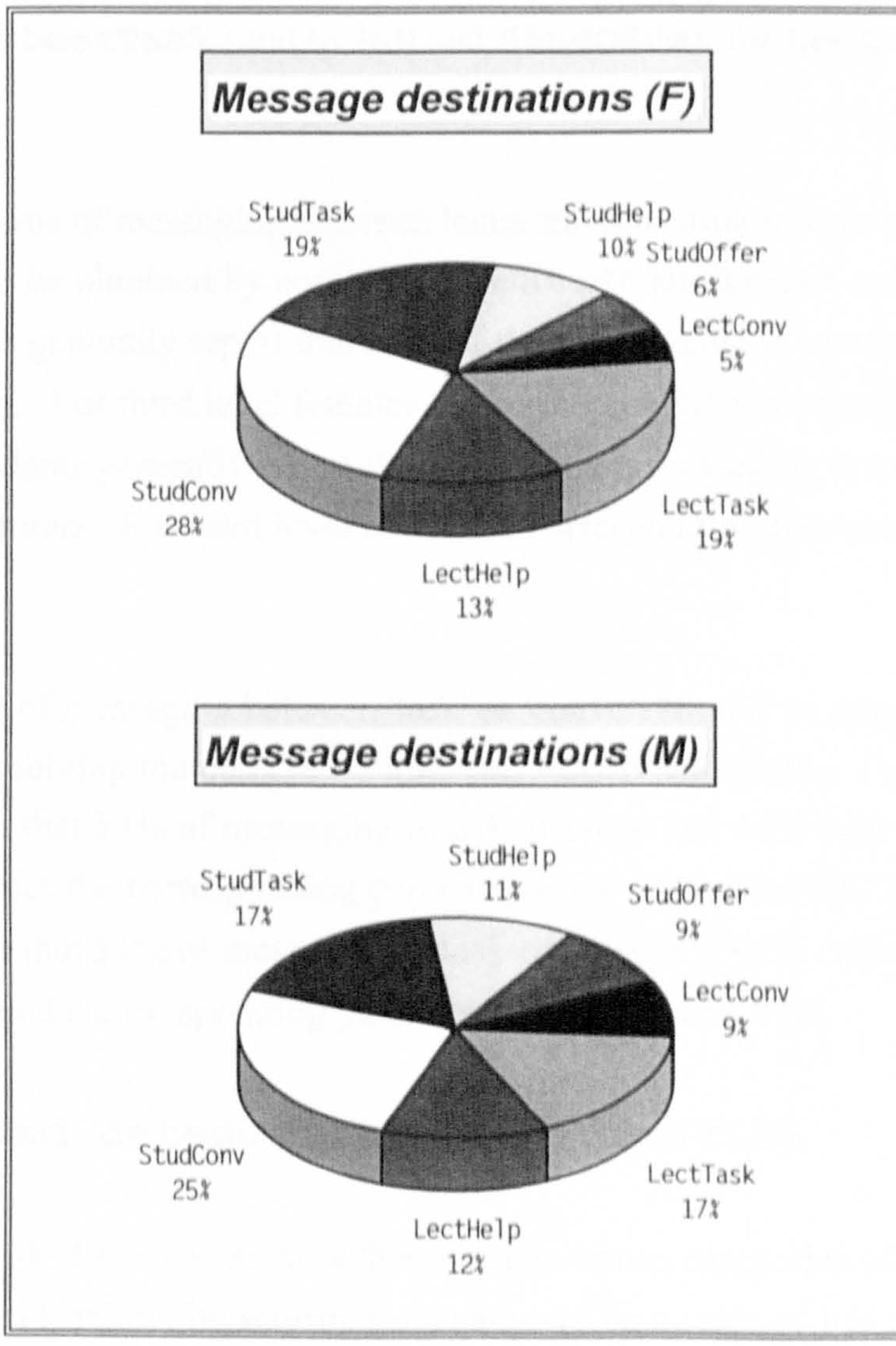

Fig. 5.3. Female and male students' message destinations

Figure 5.3 depicts these results for female students and males students for the three survey years combined, illustrating the close similarity in the reported distribution of messaging by female and male students.

Inspecting gender differences between course levels, similarity of reported distribution of messaging is also to be found, though with consistent distinctions between first and third levels.

For example, at third level the corresponding percentages to those shown in figure 5.3 are, for **StudConv**, females 24% and males 21%, for **StudTask**, females 18% and males 17%, for **StudHelp**, females 10% and males 10%, for **StudOffer**, females 6% and males 9%, for **LectConv**, females 6% and males 11%, for **LectTask**, females 19% and males 17%, and for **LectHelp**, females 17% and males 15%.

Overall ranking of these destination categories is again identical for third level female and male students, but different from the ranking by gender generally. The differences are that third level students of both gender swap the rankings of **StudTask** for **LectTask** (2nd to 3rd) and **StudOffer** for **LectConv** (6th to 7th).

Again breakdowns of messaging between lecturers as destinations or students as destinations can be obtained by combining the **Stud*** and **Lect*** categories. Female students generally report that 63% of their messaging is to other students, and 37% to lecturers. For third level females the corresponding percentages are 58% and 42%. Male students generally report that 62% of their messaging is to other students, and 38% to lecturers. For third level males the corresponding percentages are 57% and 43%.

The breakdown of messaging between 'task' or 'conversational' as purposes can be obtained by combining the pairs of ***Task** and ***Conv** categories. Female students generally report that 54% of messaging is task-oriented and 46% conversational. For third level females the corresponding percentages are 56% and 44%. Male students generally report that 51% of messaging is task-oriented and 49% conversational. For third level males the corresponding percentages are 52% and 48%.

5.4 Valued categories of information

Students were asked to indicate how they valued various categories of information (as listed in table 5.11 below) by scoring each category on a scale of 1 to 5, where 1 signified low value and 5 high value.

keyword :	*category descriptions and examples*
Admin :	administrative - room changes, handouts to collect, coursework deadlines
Advert :	advertisments for books, accommodation, cars, etc
Career :	information about jobs, careers, past graduates, recruitment fairs
Comment :	comments by class members on material presented in class
Discuss :	extra-curricular discussion - politics, media, etc
Event :	notice of relevant upcoming events - TV, seminars, guest lectures, etc
Exwork :	examples of coursework submission or drafts from other students
Feedback :	feedback from coursework markers
Handout :	teacher's handouts and lecture notes
Help :	clarification and advice on coursework from teachers
Outline :	course outlines, rationales, and lecture plans
Photos :	captioned pictures of staff and student seminar groups
Preview :	previews of material to be presented in class - videos, lecture synopses, software, etc
Reading :	readings lists and subject references
Reps :	messages from student course-representatives
Resume :	resume and personal information about other class members
SocMess :	social messages, about parties, outings, humour, etc
Spec :	coursework and workshop specifications from lecturers
StudAss :	information from the Students' Association
System :	notices and reports from Computer Centre staff

Table 5.11. Categories of CMC information

The detailed results for these questions can be found in sections **2 (a)** to **2 (t)** of the second appendix. Table 5.12 below lists how students valued the categories of information described in table 5.11, ranked by their overall mean scores for the three years. There is considerable consistency between the three survey years, with an overlap in eight out of the top ten.

category	Three Year Means			1 9 9 6			1 9 9 5			1 9 9 0		
keyword	rank	mean	*s*	rank	mean	*s.*	rank	mean	*s.*	rank	mean	*s.*
Handout	1	4.56	*(0.8)*	2	4.45	*(0.9)*	1	4.60	*(0.8)*	3	4.62	*(0.7)*
Spec	2	4.47	*(0.7)*	4	4.33	*(0.9)*	4	4.32	*(0.8)*	1	4.75	*(0.5)*
Help	3=	4.45	*(0.8)*	3	4.35	*(0.8)*	3	4.35	*(0.9)*	2	4.66	*(0.6)*
Admin	3=	4.45	*(0.8)*	1	4.49	*(0.8)*	2	4.47	*(0.8)*	6	4.40	*(0.8)*
Reading	5	4.16	*(0.9)*	6	4.00	*(1.0)*	6	3.89	*(1.0)*	4	4.60	*(0.8)*
Feedback	6	4.15	*(1.0)*	5	4.08	*(1.1)*	7	3.79	*(1.3)*	5	4.57	*(0.7)*
Outline	7	4.05	*(1.0)*	7	3.86	*(1.0)*	5	4.11	*(1.0)*	8	4.18	*(1.0)*
ExWork	8	3.59	*(1.1)*	8	3.79	*(1.0)*	8	3.76	*(1.2)*	15	3.21	*(1.0)*
Event	9	3.56	*(1.0)*	10	3.28	*(1.1)*	9	3.46	*(1.2)*	10	3.94	*(0.9)*
System	10	3.50	*(1.1)*	9	3.56	*(1.1)*	10	3.37	*(1.2)*	13	3.56	*(1.1)*
Preview	11	3.48	*(1.0)*	12	3.08	*(1.0)*	12	3.07	*(1.1)*	7	4.28	*(0.9)*
Reps	12	3.27	*(1.0)*	15	2.77	*(1.0)*	13	2.88	*(1.2)*	9	4.17	*(0.9)*
SocMess	13	3.26	*(1.2)*	11	3.27	*(1.2)*	11	3.33	*(1.2)*	16	3.19	*(1.1)*
StudAss	14	3.09	*(1.0)*	13	2.84	*(1.0)*	15	2.76	*(1.1)*	12	3.68	*(1.0)*
Career	15	2.98	*(1.2)*	16	2.60	*(1.1)*	16	2.51	*(1.2)*	11	3.82	*(1.2)*
Comment	16	2.88	*(1.0)*	14	2.81	*(1.0)*	14	2.80	*(1.0)*	18	3.02	*(1.1)*
Advert	17	2.59	*(1.1)*	18	2.28	*(1.1)*	18	2.36	*(1.0)*	17	3.13	*(1.1)*
Discuss	18	2.56	*(1.0)*	19=	2.03	*(0.9)*	19	2.26	*(1.0)*	14	3.38	*(1.1)*
Resume	19	2.31	*(1.0)*	17	2.48	*(1.0)*	17	2.37	*(1.0)*	19	2.08	*(1.1)*
Photos	20	2.05	*(1.1)*	19=	2.03	*(1.0)*	20	2.07	*(1.1)*	n/a	n/a	*(n/a)*
Means		3.47	*(1.0)*		3.32	*(1.0)*		3.33	*(1.1)*		3.85	*(0.9)*

Table 5.12. How students valued categories of information

The final line of table 5.12 provides a mean of the means for all categories combined, which might be construed as offering an index over time of the extent to which such

CMC information as a whole is valued. As can be seen, this index decreases over time, being at its highest in the 1990 survey.

5.4.1 Categories of CMC information valued by female and male students

Tables 5.13 and 5.14 show the results obtained firstly from female students, and secondly from male students, of their estimated value of the categories of CMC information represented by the keywords in the left column.

Ranking of CMC information categories by female students												
category keyword	Three Year Means			1 9 9 6			1 9 9 5			1 9 9 0		
	rank	mean	*s*	rank	mean	*s.*	rank	mean	*s.*	rank	mean	*s.*
Help	1	4.58	*(0.7)*	2	4.53	*(0.7)*	2	4.51	*(0.8)*	2	4.71	*(0.8)*
Handout	2	4.57	*(0.7)*	3	4.49	*(0.8)*	1	4.63	*(0.6)*	3	4.58	*(0.8)*
Spec	3	4.52	*(0.6)*	4	4.43	*(0.7)*	4	4.40	*(0.7)*	1	4.74	*(0.5)*
Admin	4	4.48	*(0.8)*	1	4.61	*(0.7)*	3	4.44	*(0.8)*	6	4.40	*(0.8)*
Feedback	5	4.23	*(0.9)*	5	4.29	*(0.8)*	8	3.77	*(1.3)*	4	4.63	*(0.7)*
Reading	6	4.22	*(0.9)*	6	4.20	*(0.8)*	6	3.91	*(1.0)*	5	4.55	*(0.9)*
Outline	7	4.16	*(0.9)*	7	4.02	*(0.9)*	5	4.16	*(1.0)*	8	4.31	*(0.9)*
ExWork	8=	3.68	*(1.0)*	8	3.92	*(1.0)*	7	3.89	*(1.1)*	15	3.23	*(1.0)*
Event	8=	3.68	*(1.0)*	10	3.51	*(1.0)*	9	3.49	*(1.1)*	10	4.03	*(0.8)*
Preview	10	3.56	*(0.9)*	12	3.12	*(0.9)*	12	3.18	*(1.0)*	7	4.37	*(0.8)*
System	11	3.52	*(1.2)*	9	3.82	*(1.1)*	10	3.39	*(1.3)*	14	3.35	*(1.1)*
Reps	12	3.41	*(1.0)*	15	2.88	*(0.9)*	13	3.16	*(1.2)*	9	4.20	*(0.8)*
SocMess	13	3.33	*(1.1)*	11	3.41	*(1.1)*	11	3.37	*(1.1)*	16	3.20	*(1.0)*
StudAss	14	3.12	*(1.0)*	13=	2.92	*(1.0)*	15	2.72	*(1.0)*	12	3.71	*(1.0)*
Career	15	3.02	*(1.2)*	16	2.65	*(1.1)*	16	2.49	*(1.2)*	11	3.91	*(1.2)*
Comment	16	2.95	*(1.1)*	13=	2.92	*(1.1)*	14	2.88	*(1.0)*	18	3.06	*(1.1)*
Advert	17	2.64	*(1.0)*	18	2.41	*(1.0)*	18	2.35	*(1.0)*	17	3.17	*(1.0)*
Discuss	18	2.56	*(1.0)*	19	2.20	*(0.9)*	20	2.12	*(0.9)*	13	3.37	*(1.2)*
Resume	19	2.27	*(1.0)*	17	2.49	*(1.0)*	17	2.40	*(1.0)*	19	1.91	*(0.9)*
Photos	20	2.18	*(1.0)*	20	2.14	*(0.9)*	19	2.21	*(1.0)*	n/a	n/a	*(n/a)*
Means		3.53	*(1.0)*		3.45	*(0.9)*		3.37	*(1.0)*		3.86	*(0.9)*

Table 5.13. How female students valued categories of information

Ranking of CMC information categories by male students												
category keyword	Three Year Means			1996			1995			1990		
	rank	mean	*s*	rank	mean	*s.*	rank	mean	*s.*	rank	mean	*s.*
Handout	1	4.55	*(0.8)*	1	4.40	*(1.0)*	1	4.55	*(0.9)*	2=	4.71	*(0.6)*
Admin	2	4.41	*(0.9)*	2	4.31	*(0.9)*	2	4.53	*(0.9)*	6	4.39	*(0.8)*
Spec	3	4.38	*(0.8)*	3	4.17	*(1.0)*	3	4.18	*(0.9)*	1	4.78	*(0.4)*
Help	4	4.25	*(0.9)*	4	4.09	*(1.0)*	4	4.11	*(1.0)*	4	4.56	*(0.6)*
Reading	5	4.10	*(0.9)*	6	3.71	*(1.2)*	6	3.87	*(0.9)*	2=	4.71	*(0.6)*
Feedback	6	4.01	*(1.1)*	5	3.77	*(1.3)*	7	3.81	*(1.3)*	5	4.44	*(0.8)*
Outline	7	3.87	*(1.1)*	7	3.63	*(1.2)*	5	4.03	*(1.1)*	9=	3.94	*(1.1)*
System	8	3.48	*(1.07)*	9=	3.17	*(1.2)*	10	3.34	*(1.1)*	9=	3.94	*(0.9)*
ExWork	9	3.44	*(1.2)*	8	3.60	*(1.0)*	8	3.54	*(1.3)*	15=	3.17	*(1.2)*
Preview	10	3.40	*(1.1)*	9=	3.17	*(1.1)*	12	2.92	*(1.2)*	7=	4.11	*(0.9)*
Event	11	3.38	*(1.0)*	12	2.94	*(1.1)*	9	3.42	*(1.0)*	11	3.78	*(0.9)*
SocMess	12	3.16	*(1.3)*	11	3.06	*(1.3)*	11	3.26	*(1.4)*	15=	3.17	*(1.3)*
Reps	13	3.06	*(1.0)*	15	2.60	*(1.1)*	17	2.46	*(1.0)*	7=	4.11	*(0.9)*
StudAss	14	3.05	*(1.0)*	13	2.71	*(0.9)*	13	2.82	*(1.1)*	13	3.61	*(1.0)*
Career	15	2.91	*(1.2)*	16	2.54	*(1.2)*	15	2.53	*(1.3)*	12	3.65	*(1.2)*
Comment	16	2.76	*(1.0)*	14	2.66	*(0.8)*	14	2.68	*(1.0)*	18	2.94	*(1.1)*
Advert	17	2.51	*(1.2)*	18	2.09	*(1.1)*	18	2.37	*(1.2)*	17	3.06	*(1.4)*
Resume	18	2.40	*(1.2)*	17	2.46	*(1.1)*	19	2.32	*(1.1)*	19	2.41	*(1.3)*
Photos	19	2.38	*(1.0)*	19	1.89	*(1.0)*	20	1.87	*(1.1)*	n/a	n/a	*(n/a)*
Discuss	20	2.14	*(1.1)*	20	1.80	*(0.9)*	16	2.47	*(1.2)*	14	3.39	*(1.0)*
Means		3.38	*(1.0)*		3.13	*(1.1)*		3.25	*(1.1)*		3.84	*(1.0)*

Table 5.14. How male students valued categories of information

Taking the values in the final lines of tables 5.13 and 5.14 as indices of the extent to which such CMC information as a whole is valued, it can be noted from the means for all three years combined that the mean for females (3.53) is 4.43% higher than that for males (3.38). Moreover, in each individual survey year, this mean is higher for females than for males. For males, the mean declines in each survey year from 1990 to 1996. For females, there is a drop from 1990 to 1995, but this is followed by a rise in the 1996 survey.

The overall ranking of categories by female and male students is fairly similar, and for 15 out of the 20 categories, there is either no difference or else a difference of only one position. The greatest differences are for the category **Help**, which females ranked three positions higher than did males, and for the category **System**, which male students ranked three places higher than did females.

5.5 Opinions about computing

As a measure of their opinions about computing in the curriculum generally, students were asked to score their strength of agreement or disagreement with the seven attitude statements listed in table 5.15, again using a five-point scale where 1 signified strong disagreement and 5 strong agreement.

Keywords to attitude statements used in questionnaire

keyword	*statement to be agreed or disagreed with*
EasyAccess	Everyone at QMC should have full and easy access to a computer.
LearnUse	Almost everyone should learn to use a computer.
LikeAccess	One of the things I like about QMC is the access I have to computing.
Practical	I would like to see more practical uses of computers at QMC.
Experiment	I like to experiment with computer systems.
UseMore	I would like to use a computer more than I do now.
TooMuch	There is too much emphasis on computing at QMC.

Table 5.15. Attitude statements used in survey

The detailed results for these seven questions can be found in sections **3.1(a)** to **3.1(g)** of the second appendix. Table 5.16 below summarizes the results for the attitude statements from table 5.15, for the survey years 1996, 1995 and 1990. Note that, for the asterisked variable **TooMuch**, which corresponds to question for which a negative answer is required to indicate a positive attitude, for the purposes of calculating the means in the final row, the *difference* from 6 is used instead.

Information students' opinions about computing 1990-96

category	Three Year Means		1996		1995		1990	
keyword	mean	*s*	mean	*s*	mean	*s*	mean	*s*
EasyAccess	4.59	*(0.8)*	4.80	*(0.6)*	4.70	*(0.8)*	4.28	*(1.0)*
LearnUse	4.43	*(0.8)*	4.76	*(0.5)*	4.45	*(0.9)*	4.09	*(1.1)*
LikeAccess	3.86	*(1.1)*	4.08	*(1.0)*	3.80	*(1.2)*	3.70	*(1.2)*
Practical	3.60	*(1.0)*	3.69	*(0.8)*	3.58	*(1.0)*	3.53	*(1.1)*
Experiment	3.35	*(1.2)*	3.61	*(1.1)*	3.18	*(1.4)*	3.25	*(1.2)*
UseMore	3.38	*(1.2)*	3.64	*(1.0)*	3.45	*(1.2)*	3.06	*(1.3)*
TooMuch *	2.23	*(1.0)*	1.94	*(0.9)*	2.39	*(1.1)*	2.35	*(1.0)*
Means	3.86	*(1.0)*	4.09	*(0.8)*	3.82	*(1.1)*	3.65	*(1.1)*

Table 5.16. Opinions about computing

Thus, for all seven statements, for all three survey years, students appear to have an overall positive view of the use of computing and access to computers. In terms of mean scores, the most strongly held view was that there should be universal access to computing resources (**EasyAccess**). The next strongest view was that everyone should learn to use a computer (**LearnUse**), followed by agreement that access to computing is appreciated (**LikeAccess**). The most neutral view was about liking to experiment with computer systems (**Experiment**).

5.5.1 Female and male opinions about computing

Tables 5.17 and 5.18 list the mean results for the first seven attitude statements from table 5.16, about opinions about computing, for female students and male students respectively.

Female students' opinions about computing								
category	Three Year Means		1 9 9 6		1 9 9 5		1 9 9 0	
keyword	mean	s	mean	s	mean	s	mean	s
EasyAccess	4.62	(0.7)	4.85	(0.6)	4.80	(0.6)	4.20	(1.0)
LearnUse	4.50	(0.8)	4.81	(0.5)	4.39	(0.9)	4.29	(0.9)
LikeAccess	3.93	(1.0)	4.21	(0.8)	3.80	(1.1)	3.77	(1.0)
Practical	3.54	(1.0)	3.60	(0.8)	3.50	(1.0)	3.51	(1.1)
Experiment	3.18	(1.1)	3.50	(1.0)	2.98	(1.3)	3.06	(1.1)
UseMore	3.23	(1.1)	3.40	(0.9)	3.39	(1.2)	2.91	(1.3)
TooMuch *	2.26	(1.0)	1.96	(0.9)	2.46	(1.1)	2.37	(0.9)
Means	3.82	(1.0)	4.06	(0.8)	3.77	(1.0)	3.62	(1.0)

Table 5.17. Female students' opinions about computing

Male students' opinions about computing								
category	Three Year Means		1 9 9 6		1 9 9 5		1 9 9 0	
keyword	mean	s	mean	s	mean	s	mean	s
EasyAccess	4.57	(0.9)	4.74	(0.6)	4.53	(1.1)	4.44	(1.0)
LearnUse	4.31	(0.9)	4.69	(0.6)	4.53	(0.8)	3.72	(1.3)
LikeAccess	3.75	(1.3)	3.89	(1.3)	3.81	(1.3)	3.56	(1.4)
Practical	3.69	(1.0)	3.83	(0.9)	3.69	(1.0)	3.56	(1.2)
Experiment	3.63	(1.2)	3.77	(1.0)	3.50	(1.4)	3.61	(1.3)
UseMore	3.62	(1.3)	4.00	(1.1)	3.53	(1.3)	3.33	(1.4)
TooMuch *	2.16	(1.1)	1.91	(1.0)	2.28	(1.2)	2.29	(1.1)
Means	3.92	(1.1)	4.14	(0.9)	3.90	(1.2)	3.70	(1.2)

Table 5.18. Male students' opinions about computing

Note that for the calculation of the mean of the means in the final lines of these tables, in order to reflect an overall score for *positiveness* (or *negativeness*) of opinion, the values used for **TooMuch** are the reverse, on a five-point scale, of those displayed. Thus, for the three-year scores in the left-most columns 3.74 is used in place of the displayed 2.26 for females, and 3.84 used in place of the displayed 2.16 for males. This is because the wording of the corresponding attitude statement required a negative response to indicate a positive opinion, and vice versa.

For the first three statements, represented by the keywords **EasyAccess**, **LearnUse** and **LikeAccess**, mean scores for females are higher (and therefore more positive) than those for males. This is also the case for the variable **TooMuch**, for which a negative answer indicates a positive attitude. For the other three statements, represented by the keywords **Practical**, **Experiment**, **UseMore** and, mean scores for males are higher. Overall, and in all three individual years, the means of the mean scores are higher for males than for females, as also are the standard deviations for males, however.

For the seven variables summarized in tables 5.17 and 5.18, over the three survey years, there are 6 instances out of the 21 where the mean value for females shows greater positiveness towards CMC than does the corresponding value for male students. These are for **EasyAccess** in 1996 and 1995, **LearnUse** in 1996 and 1990, and **LikeAccess**,in 1996 and 1995. In the remaining 15 instances, the means for male students indicate greater positiveness.

However, when the corresponding results are inspected for students at third level, there is a balance in positiveness in terms of higher and lower means values. Females are more positive in 10 instances, and males are also more positive in 10 instances, and in one instance (**EasyAccess** in 1996) the means are equal at two decimal places. Third level female means are more positive for **EasyAccess** in 1995, **LearnUse** in all three years, **LikeAccess** in 1996 and 1995, **Practical** in 1996 and 1990, **Experiment** in 1996, and **UseMore** in 1995.

5.6 Comparison of CMC with face-to-face tutorials

Students were posed a group of attitude statements to assess how they compared CMC with face-to-face tutorial meetings corresponding to the group of four statements in table 5.19 below.

Keywords to attitude statements used in questionnaire	
keyword :	*statement to be agreed or disagreed with*
	How would you compare electronic conferencing with face-to-face tutorial meetings ...
CourseDiff :	... as a means of getting help with course-related difficulties?
Socialize :	... as a means of socializing?
Intellect :	... as a medium for intellectual exchange?
Effective :	... for its effectiveness, in terms of time spent by you?

Table 5.19. Attitude statements used in survey

The detailed results for these four questions can be found in sections **3.2(a)** to **3.2(d)** of the second appendix. Responses for the survey years 1996, 1995 and 1990 are summarized in table 5.20 below. The overall trend visible here is that students appear to find face-to-face tutorials preferable to CMC.

category keyword	Three Year Means mean	*s*	1996 mean	*s*	1995 mean	*s*	1990 mean	*s*
CourseDiff	2.43	*(0.9)*	2.41	*(0.9)*	2.51	*(1.0)*	2.36	*(0.9)*
Socialize	2.09	*(0.9)*	2.08	*(0.9)*	2.14	*(1.0)*	2.06	*(0.9)*
Intellect	2.98	*(0.9)*	3.18	*(0.9)*	3.07	*(0.9)*	2.70	*(0.9)*
Effective	2.72	*(0.9)*	2.92	*(0.8)*	2.73	*(0.8)*	2.51	*(0.9)*
Means	2.56	*(0.9)*	2.65	*(0.9)*	2.61	*(1.0)*	2.41	*(0.9)*

Table 5.20. Comparison of CMC with face-to-face tutorials

This is most strongly expressed with regard to electronic tutorials as a means of socializing (**Social**) however, rather than as a means of getting help with course difficulties (**CourseDiff**), or effectiveness in terms of time spent (**Effective**).

The most neutral view is about CMC as a medium for intellectual exchange (`Intellect`) where the 1995 and 1996 cohorts are in fact marginally positive.

5.6.1 Females' and males' comparisons of CMC with face-to-face tutorials

Tables 5.21 and 5.22 list the mean results for the four attitude statements in table 5.19, about comparing the medium of CMC with face-to-face meetings for tutorials, for female students and male students respectively.

Female students' comparison of CMC with face-to-face tutorials								
category	Three Year Means		1 9 9 6		1 9 9 5		1 9 9 0	
keyword	mean	*s*	mean	*s*	mean	*s*	mean	*s*
CourseDiff	2.43	*(0.9)*	2.46	*(0.9)*	2.46	*(1.0)*	2.37	*(0.9)*
Socialize	2.10	*(0.8)*	2.02	*(0.8)*	2.18	*(0.9)*	2.09	*(0.8)*
Intellect	2.96	*(0.8)*	3.10	*(0.8)*	3.05	*(0.8)*	2.74	*(0.8)*
Effective	2.69	*(0.8)*	2.92	*(0.7)*	2.66	*(0.9)*	2.49	*(0.9)*
Means	2.55	*(0.9)*	2.63	*(0.8)*	2.59	*(0.9)*	2.42	*(0.9)*

Table 5.21. How females compared of CMC with face-to-face tutorials

Male students' comparison of CMC with face-to-face tutorials								
category	Three Year Means		1 9 9 6		1 9 9 5		1 9 9 0	
keyword	mean	*s*	mean	*s*	mean	*s*	mean	*s*
CourseDiff	2.41	*(1.0)*	2.34	*(0.9)*	2.57	*(1.0)*	2.33	*(1.1)*
Socialize	2.09	*(1.0)*	2.17	*(1.0)*	2.09	*(1.1)*	2.00	*(1.0)*
Intellect	3.00	*(1.1)*	3.31	*(1.0)*	3.09	*(1.1)*	2.61	*(1.1)*
Effective	2.77	*(0.8)*	2.91	*(0.8)*	2.83	*(0.9)*	2.56	*(0.8)*
Means	2.57	*(1.0)*	2.68	*(0.9)*	2.65	*(1.0)*	2.38	*(1.0)*

Table 5.22. How males compared CMC with face-to-face tutorials

Results for gender overall appear somewhat balanced in this section of the survey. For the four variables summarized in tables 5.21 and 5.22, over the three survey years, there are six instances where the mean score for male students is less positive towards CMC than is the mean for females, and six instances where the reverse is the case. For female students, these are for `CourseDiff` in 1996 and 1990, for `Socialize` in 1995 and 1990, for `Intellect` in 1990, and for `Effective` in 1996.

However, looking at the gender results for third level students, females appear the more positive on balance. In only four out of the twelve instances of variables do the means of third level males appear more positive. These four are for `Socialize` in 1996 and 1990, and for `CourseDiff` and `Effective` in 1995. (The mean for `Effective` in 1990 is equal at two decimal places for female and male students at third level.)

5.7 Attitudes towards CMC

Students were posed a group of statements to assess their attitudes towards some of the generally recognised characteristics of CMC, corresponding to the four statements in table 5.23.

Keywords to attitude statements used in questionnaire		
keyword	:	*statement to be agreed or disagreed with*
Particip	:	Individuals can participate more equally in electronic than in face-to-face communication.
Depersonal	:	Computer communication is depersonalizing.
Assertive	:	Computer conferencing encourages individual assertiveness.
LackFeed	:	Personal interaction is more difficult with computer communication because of the lack of contextual and verbal feedback.

Table 5.23. Attitude statements used in survey

The detailed results for these four questions can be found in sections **3.3(a)** to **3.3(d)** of the second appendix, and the results for the three survey years are summarized in table 5.24 below. These questions might be said to test the extent to which students did, in fact, perceive CMC to have the characteristics commonly attributed to it. Note that, for the asterisked variables **Depersonal** and **LackFeed**, wwhich corresponds to questions for which a negative answer is required to indicate a positive attitude, for the purposes of calculating the means in the final row, the *difference* from 6 is again used instead.

Attitudes towards CMC								
category keyword	Three Year Means		1 9 9 6		1 9 9 5		1 9 9 0	
	mean	*s*	mean	*s*	mean	*s*	mean	*s*
Particip	3.15	*(1.2)*	3.44	*(1.0)*	3.05	*(1.3)*	2.96	*(1.2)*
Depersonal *	3.37	*(1.1)*	3.17	*(1.2)*	3.55	*(1.1)*	3.40	*(1.1)*
Assertive	3.27	*(1.0)*	3.21	*(0.8)*	3.26	*(1.1)*	3.35	*(0.9)*
LackFeed *	3.68	*(1.0)*	3.57	*(0.9)*	3.55	*(1.1)*	3.91	*(0.9)*
Means	2.84	*(1.1)*	2.98	*(1.0)*	2.80	*(1.2)*	2.75	*(1.0)*

Table 5.24. Attitudes towards CMC

Of this group of questions, the strongest agreement was with the statement that personal interaction is more difficult with CMC due to a lack of contextual and verbal feedback (**LackFeed**). The most neutral statement was that individuals can participate more equally in CMC (**Particip**).

5.7.1 Female and male students' attitudes to CMC

Tables 5.25 and 5.26 list the mean results for the four attitude statements in table 5.23 above, about some of the generally agreed chracteristics of CMC, for female students and male students respectively.

Female information students' attitudes towards CMC								
category	Three Year Means		1996		1995		1990	
keyword	mean	*s*	mean	*s*	mean	*s*	mean	*s*
Particip	3.03	*(1.0)*	3.21	*(0.9)*	2.95	*(1.2)*	2.94	*(1.0)*
Depersonal *	3.41	*(1.1)*	3.17	*(1.2)*	3.50	*(1.1)*	3.57	*(1.0)*
Assertive	3.25	*(0.9)*	3.08	*(0.8)*	3.36	*(1.0)*	3.32	*(0.9)*
LackFeed *	3.70	*(0.9)*	3.62	*(0.9)*	3.63	*(1.0)*	3.86	*(0.8)*
Means	2.79	*(1.0)*	2.88	*(1.0)*	2.80	*(1.1)*	2.71	*(0.9)*

Table 5.25. Female students' attitudes towards CMC

Male information students' attitudes towards CMC								
category	Three Year Means		1996		1995		1990	
keyword	mean	*s*	mean	*s*	mean	*s*	mean	*s*
Particip	3.33	*(1.2)*	3.77	*(1.0)*	3.23	*(1.3)*	3.00	*(1.4)*
Depersonal *	3.29	*(1.1)*	3.17	*(1.1)*	3.63	*(1.1)*	3.06	*(1.0)*
Assertive	3.30	*(1.1)*	3.40	*(0.9)*	3.11	*(1.2)*	3.39	*(1.1)*
LackFeed *	3.65	*(1.0)*	3.51	*(1.0)*	3.43	*(1.2)*	4.00	*(0.9)*
Means	2.92	*(1.1)*	3.12	*(1.0)*	2.82	*(1.2)*	2.83	*(1.1)*

Table 5.26. Male students' attitudes towards CMC

Looking at results for gender overall, male students appear more positive towards CMC in this section of the survey. For the four variables summarized in tables 5.25 and 5.26, over the three survey years, there are only three instance where the mean score for male students is less positive towards CMC than is the mean for females. These are for **Depersonal** and **Assertive** in 1995, and for **LackFeed** in 1990. (The mean for **Depersonal** in 1996 is equal at two decimal places for female and male students.)

However, at third level the overall balance of positiveness is reversed, with third level female students again appearing more positive than third level males in seven out of the twelve instances of variables scored, these being for **Particip** in 1996 and 1990, for **Depersonal** in 1995, for **Assertive** in all three years, and for **LackFeed** in 1990.

5.8 Present and future use of CMC

A final group of four attitude statements asked students about their views on present and future use of CMC, as in table 5.27 below.

Keywords to attitude statements used in questionnaire

keyword	:	*statement to be agreed or disagreed with*
NotAvail	:	It would make little difference to me if CMC facilities weren't available.
Monitor	:	Being able to see other students' work helps me self-monitor and improve my own performance.
ExtendUse	:	If staff-student ratios rise, it would be desirable to make more extensive use of CMC.
FutureUse	:	I would be interested in continuing to use CMC after my course ends.

Table 5.27. Attitude statements used in survey

The detailed results for these four questions can be found in sections **3.4(a)** to **3.4(d)** of the second appendix. Table 5.28 summarizes the results obtained for this section of the surveys. Note that the asterisked variable **NotAvail** corresponds to a statement which requires disagreement from the respondent to indicate a positive attitude (i.e. that it would make little difference if CMC facilities were not available). For the purpose of calculating the means in the final row, the *difference* from 6 is therefore used for this variable.

Present and future use of CMC								
category	Three Year Means		1996		1995		1990	
keyword	mean	*s*	mean	*s*	mean	*s*	mean	*s*
NotAvail *	2.38	*(1.1)*	2.26	*(1.2)*	2.48	*(1.2)*	2.40	*(1.0)*
Monitor	3.72	*(1.0)*	3.60	*(0.9)*	3.90	*(1.0)*	3.66	*(1.1)*
ExtendUse	3.71	*(0.9)*	3.70	*(0.8)*	3.66	*(1.0)*	3.77	*(0.8)*
FutureUse	4.01	*(1.0)*	4.24	*(0.9)*	3.97	*(1.0)*	3.81	*(1.0)*
Means	3.76	*(1.0)*	3.82	*(1.0)*	3.76	*(1.1)*	3.71	*(1.0)*

Table 5.28. Mean responses about present and future use of CMC

These final four questions are more pragmatically about students' perception of the value of CMC to them during their education, and about subsequent interest in using it vocationally.

5.8.1 Female and male views on present and future use of CMC

Tables 5.29 and 5.30 list results for the final four attitude statements, described in table 5.27 above, about present and future use of CMC, for female students and male students respectively.

Female students' views about present and future use of CMC								
category	Three Year Means		1996		1995		1990	
keyword	mean	*s*	mean	*s*	mean	*s*	mean	*s*
NotAvail *	2.47	*(1.1)*	2.23	*(1.1)*	2.61	*(1.2)*	2.57	*(1.0)*
Monitor	3.62	*(1.0)*	3.48	*(0.9)*	3.85	*(1.1)*	3.54	*(0.9)*
ExtendUse	3.58	*(0.8)*	3.40	*(0.8)*	3.64	*(0.9)*	3.69	*(0.7)*
FutureUse	3.90	*(0.9)*	4.10	*(0.9)*	3.86	*(0.9)*	3.74	*(1.0)*
Means	3.66	*(1.0)*	3.69	*(1.0)*	3.69	*(1.0)*	3.60	*(0.9)*

Table 5.29. Female students' views about present and future use of CMC

Male students' views about present and future use of CMC								
category keyword	Three Year Means		1 9 9 6		1 9 9 5		1 9 9 0	
	mean	*s*	mean	*s*	mean	*s*	mean	*s*
NotAvail *	2.22	*(1.1)*	2.31	*(1.2)*	2.29	*(1.1)*	2.06	*(1.0)*
Monitor	3.88	*(1.1)*	3.77	*(0.9)*	3.97	*(1.0)*	3.89	*(1.3)*
ExtendUse	3.92	*(0.9)*	4.14	*(0.7)*	3.69	*(1.2)*	3.94	*(0.9)*
FutureUse	4.18	*(0.9)*	4.46	*(0.6)*	4.14	*(1.0)*	3.94	*(1.0)*
Means	3.94	*(1.0)*	4.02	*(0.9)*	3.88	*(1.1)*	3.93	*(1.1)*

Table 5.30. Male students' views about present and future use of CMC

Male students appear notably more positive towards CMC in this final section of the survey. For the four variables summarized in tables 5.29 and 5.30, over the three survey years, there is only one instance (**NotAvail** in 1996) where the mean score for male students is less positive towards CMC than is the mean for females. For the overall three-year means male students appear more positive towards CMC for all four variables.

Examination of the corresponding results at third level reveals some narrowing of the overall gender difference, with three instances out of the twelve where the means for third level female students is the more positive. These are for **NotAvail** in 1996 and also in 1995, and for the **FutureUse** variable in 1996. Also for the overall three-year mean for **NotAvail** third female students (M=2.19) appear more positive towards this aspect of CMC than third level males (M=2.36), since their lower mean value indicates less agreement that *It would make little difference to me if CMC facilities weren't available.* Third level males remain the more positive in the other three variables.

5.9 Qualitative data

The results of the qualitative data gathering exercise, sampled as outlined in **3.9** above, can be found in **Appendix 3** and its eight sub-sections.

Each sub-section begins with the emboldened title and italicised text of the message posed to students with the intention of eliciting light-shedding comment.

The remainder of the first page of each sub-section is a table in which comment text from first level female students and first level male students appears in the left and right columns respectively. The second page in each sub-section presents the comment text for third level students. Throughout this appendix students are identified by three-part hyphenated codings such as ***F1-1-m***, ***F3-6-1***, ***M3-4-m***, etc. In these codings the first two parts identify the student. Thus ***F1-1*** is the female first level student number 1, and ***M3-4*** is male third level student number 4. The final letter identifies the category by which they were sampled from the available sets of responses, according to being of the pair having the high (**-*h***), low (**-*l***), or mean (-***m***) score for their first semester assessments for their respective modules. The comment text itself has been justified into single paragraphs for each student's eight responses, to have a uniform appearence. Otherwise it is exactly as the students typed it.

Chapter 6:

Analysis

6 Analysis

The results presented in the preceding chapter, about CMC use by information students at Queen Margaret University College (QM) during academic years 1989-90, 1994-95 and 1995-96 - surveyed in calendar years 1990, 1995 and 1996 - to some extent confirm previous results, predictions from the literature, stereotypes of computer use, and to some extent offer some new findings.

Before proceeding to the analysis of these results, it might be useful to consider an overview of the various factors that might have affected student use over the years.

Table 6.1 lists some such factors, which might be seen to fall into broad categories for (a) course size, structure and curricula, which might have affected students' perceptions of the value of some uses of CMC, (b) usability of and access to technology, which might have affected students' abilities to learn to operate, and to be able to make use of, CMC systems, and (c) external influences, which might have affected students' perceptions of CMC, both in terms of its immediate utility, and its subsequent viability as working tool and environment.

- approximate doubling in course size.
- structural change from integrated syllabuses to modules.
- some modularity-related curricular changes.
- a generational shift in multiuser computing technology.
- balance of increased demand for vs. increased provision of CMC facilities.
- increasing awareness of, and popularity of, the Internet.

Table 6.1. Factors possibly affecting use of CMC over time

Approximate doubling in course size:

In the period between the first academic year surveyed, 1989-90, and the latter survey years of 1994-95 and 1995-96, the numbers of students on courses involved in the surveys approximately doubled. A number of factors contributed to this increase in numbers. Intakes to first year were increased. Numbers at second and third levels were increasingly topped up via direct entry from diploma courses. Whereas the BA Communication Studies course was a three-year ordinary degree in 1989-90, by 1994-95 an honours year had been validated, adding a fourth level to the course.

Structural change from integrated syllabuses to modules:

In 1989-90 the students surveyed were taking a traditional three-term course comprising four year-long syllabuses per year. Optionality was limited to the final year, in which students could either take all four of the syllabuses on offer, or else choose to drop one syllabus and instead undertake a small dissertation on a research topic. In this period there was emphasis on the desirability of achieving and demonstrating integration between syllabuses both within levels and between levels. By the latter survey years, students were taking a course comprising two semesters per year, and in each semester studying six 'short, thin' modules. There continued to be no optionality at first and second levels. However, at third and fourth levels optionality beyond the core modules meant both that students from the same course could be studying increasingly different modules. Such modules could also, in principle, be being taken by students from other courses.

Some modularity-related curricular changes:

These changes may have had less effect on the first-level students than they did for the third-level students. The name of the syllabus or module in which they learned to use CMC remained the same (*Information Studies*), as did its educational objectives, and it remained a compulsory, non-optional element. In 1989-90, third-level students studied CMC in the latter half of a syllabus also named *Information Studies*, which they had the limited optionality of dropping (or alternatively of dropping one of the three other third-level syllabuses) in favour of a dissertation. However, for the latter two survey years, the extent of third-level students' optionality was substantially greater. Also, if they opted to study CMC, they were choosing a module actually named *Computer Mediated Communication.* In the latter survey years, such third-level students may thus have felt more consciously positive towards CMC, since they had made a choice to study a module of that name. They were also statistically more self-selecting. The numbers of third-level students surveyed each year remained fairly stable (32, 37 and 32 in 1996, 1995 and 1990 respectively). However, whereas in 1990 the third-level survey population was 69% of the students eligible to choose to take the *Information Studies 3* syllabus, under the modular system the 1995 and 1996 populations were in principle only 26% and 25% of those eligible to choose *Computer Mediated Communication 1.*

A generational shift in multiuser computing technology:

The *Methodology and methods* chapter described and illustrated the differences in the user interfaces experienced by the 1989-90 user population, and by the latter 1994-95 and 1995-96 populations. The former was almost completely command-driven, sometimes requiring file-transfers between two operating systems. It was certainly more difficult to learn than the later user interface, where onscreen information, drop-down menus, and options for mouse actuation combined to offer a more user-friendly environment.

Balance of increased demand for, vs. increased provision of, CMC facilities:

The question here would be, to what extent might scarceness of access to CMC facilities have been an influence in their use or non-use? Over time, the provision of CMC facilities increased in quantity, but so also did the demand for them. There was not only an increasing number of students in the department of Communication and Information Studies, but also a broadening of demand to - at the time of writing - include students from all courses. At the time of writing, access is becoming problematical. On the one hand, little if any increase in provision has taken place in the last two years. On the other hand, it is virtually *de rigueur* to demonstrate 'Web-based teaching and learning' in courses seeking validation or being quality assessed. At the time of the surveys, however, this new, broad-based demand was still just around the corner. The Web wasn't quite there (at QM anyway), and the CMC systems in use were still the DOS-based precursors to the Windows-based, resource-voracious applications which are also creating problems of PC longevity at the time of writing. The best estimate, therefore, is that access probably remained approximately constant from 1998-90 to 1994-95, and began to become a problem through 1995-96 and later.

Increasing awareness of and popularity of the Internet:

Students surveyed in any of the three years had differing degrees of access to the Internet. Certainly this was absolutely minimal for the 1989-90 students. QM computing still did not have any permanent connection to external networks. Use of the Internet was problematical, via dialup connections, and for a very few students doing final year dissertations. For the latter two years, Internet e-mail was feasible, if still difficult to use. The 1994-95 students had no direct Internet connection available to them, but could use a JANET link for VT100 text-mode connections to Internet-connected hosts. However, a workshop of graphical World Wide Web browsers was as yet unavailable. The 1995-96 students were the first cohort to experience the use of graphical Web browsers, though still with a number of fundamental limitations on what would be considered normal Internet access.

However, the focus of the surveyed students' use of CMC, and likewise the focus of the surveys of this use, was on the production and consumption of internal information - what might currently be termed the 'intranet' aspect. However, by the time of the latter two years, the Internet, its use for global e-mail, and emergence of the World Wide Web, had become a part of the popular culture. As such, the latter students probably had a perception of CMC in which it was much more plausibly a tool for both social interaction and career advancement than might have been the case for the earlier students, when such uses were being proposed to them, but were a less demonstrable reality at that time.

Statistical note on significance of results analysed:

In the interpretation of the significance of the results analysed hereafter the convention has been adopted that results significant at the .01 or 1% level are *highly significant*, results significant at the .05 or 5% level but not at the .01 or 1% level are *probably significant*, while results significant at levels larger than .05 or 5% are *probably not significant* (Spiegel 1972, p.174).

6.1 Levels of e-mail use 1989-90 to 1995-96

The students surveyed on average reported using the e-mail system with a frequency of 6.7 times per week - which, for a five day week might be loosely expressed as being between once and twice per day - and for about 3 hours per week. The proportion of students reporting this frequency of usage - that is between 5 and 10 times per week (assuming a five day week, although there were some periods of six and seven days per week access to IT facilities) - is 51% overall (49.4%, 43.2% and 60.4% in 1996, 1995 and 1990 respectively).

6.1.1 Frequency of e-mail use

The reported frequency of using e-mail between once and twice per day has remained fairly stable over the survey period. Differences between any two of the three survey years are probably not significant. Based on pilot accounting information for 1989-90, which recorded a mean frequency of 7.9 times per week for using the e-mail system (averaged over a 30-week year), and the survey results for the same year, where students reported a mean frequency of 6.6 times per week, students under-estimated the number of times they used the e-mail system by a margin of 11.9%.

6.1.2 Hours of e-mail use

Conversely to the stability of frequency of *times* of e-mail use, however, for the number of *hours* per week duration of use reported differences between any two of the survey years *is* highly significant. For example reported hours per week is only about half the global average for the year 1989-90, though data which may relate to this are noted below. The figures for weekly durations of e-mail use in 1995-96 show significant decline from the previous year 1994-95. Based on pilot accounting information for 1989-90, which recorded a mean for weekly duration of e-mail usage of 0.76 hours (over a 30-week year), and the survey results for the same year, where students reported a mean of 1.47 hours per week, students over-estimated the number of hours during which they used the e-mail system by 93.4%.

However, a possible explanation for this disparity lies in the nature of the user-interface in 1989-90. At that time, when a Vax minicomputer supported the VMS e-mail system, the Lex word-processing software was used extensively in conjunction with the e-mail system for CMC and CSCW activities, due to (a) the limitations of the standard VMS Mail editor, and (b) the inconvenience of transferring DOS text files prepared offline to the VMS environment, using Kermit protocols to send and receive between one or other operating system. It is therefore possible or likely that students may have thought of some sessions during which they were logged onto the Vax, and in fact clocking up accounted hours of Lex usage in the 'offline' preparation of e-mail messages, as being related instead to the use of the e-mail system.

This would also offer some explanation for the apparently large increase in weekly hours of usage from the level for 1989-90, to the levels for 1994-95 and 1995-96. In the former year, students were using the Vax minicomputer and terminals. In the latter two years, the transition had been made to LANs and PCs. For the QM students, the average estimated weekly duration of use of Lex in 1989-90 was 1.2 hours. A significant part of this should probably be combined with the 1.47 hours shown in table 5.1 for 1998-90 hours of e-mail use to give a ratio of hours-to-times more comparable to the figures reported in 1995 and 1996. However, this may also imply that the time was used less efficiently in the earlier year, perhaps related to the poorer interface then.

6.1.3 Gender differences in levels of e-mail use

Male students report using e-mail for marginally more hours than female students, but with a substantially higher frequency of times of using e-mail. The average male student's reported session lasts 22 minutes, compared with females' 33 minutes.

The mean male students' 3.15 weekly hours of e-mail use is 5.7% (8.6%, 0.8% and 18% for 1996, 1995 and 1990) higher than the female students' mean of 2.98 weekly hours. Statistically, these differences t-test to be probably not significant at $p<.40$, $p<.45$ and $p<.25$. However, males' 8.79 times of use per week is 61.3% (73.8%, 38% and 78.4%) higher than female students' 5.45 times per week. For 1996 ($p<.001$) and

1990 (p<.005) these differences are highly significant. For 1995 the difference is probably significant (p<.025).

The proportion of female students reporting usage within a frequency of 5 to 10 times per week (that is, between once and twice per day) was **54.7%** (50%, 45.6% and 68.6%). The corresponding proportion for male students was **44.2%** (48.6%, 39.5% and 44.4%). Overall, the proportion of females reporting greater than 10 times per week was only **5.7%** (1.9%, 12.3% and 2.9%) compared with, for male students, **26.5%** (22.9%, 29% and 27.8%).

This reported pattern of male students being marginally higher on hours, but substantially higher on frequency of e-mail use, is borne out by the system accounting data for 1989-90 (see **4.2** above). In that year, by accounting, male students' recorded weekly hours of usage was 9.5% higher (p<.30) than females, while reported hours were 18% higher (p<.25), that is to say, probably not significantly higher. However, male students' accounted frequency of times of weekly use was 26.2% higher than females' (p<.10), while reported frequency of use was 78.4% higher, which is a highly significant difference (p<.005).

However, when differences between the usage levels reported by first level and third level students are inspected, quite distinct patterns are to be found from the overall results by gender. Broadly speaking, these differences might be said to be greater between first level female and male students, and reduced between third level females and males.

For first level male students, the overall mean reported frequency of use of **8.75** times per week (5.21, 7.17, and 13.88 for 1996, 1995 and 1990) is 81% higher than the first level female students' mean of **4.81** (4.60, 4.64 and 5.20 for 1996, 1995, and 1990.) For 1996, 1995 and 1990 these differences are probably not significant (p<.25), probably significant (p<.025), and highly significant (p<.001) respectively. For third level male students, the overall mean reported frequency of use of **9.08** times per week (10.33, 11.20, and 5.70 for 1996, 1995 and 1990) is only 31% higher than the third level female students' mean of **6.96** (5.56, 10.06 and 5.27 for 1996, 1995, and 1990.) For 1996, 1995 and 1990 these differences are probably significant (p<.05), probably not significant (p<.40), and probably not significant (p<.40) respectively.

For first level male students, the overall mean reported weekly hours of use of **2.95** (2.64, 3.57, and 2.63 for 1996, 1995 and 1990) is 15% higher than the first level female students' mean of **2.56** hours (2.31, 3.78 and 1.58 for 1996, 1995, and 1990.) For 1996, 1995 and 1990 these differences are probably not significant (p<.25), probably not significant (p<.40), and probably significant (p<.05) respectively. For third level students, however, it is the overall mean reported weekly hours of use of female students **4.26** (4.39, 7.25, and 1.14 for 1996, 1995 and 1990) which is higher, by 9%, than the third level male students' mean of **3.64** hours (3.07, 7.00 and 0.85 for 1996, 1995, and 1990.) Although statistically for 1996, 1995 and 1990 these differences are probably not significant ($p<.20$), probably not significant ($p<.45$), and probably not significant ($p<.20$) respectively, the reversal is noteworthy.

6.1.4 Key points about levels of e-mail use

- Typical student e-mail usage is between once and twice per day, for about 3 hours per week.
- Male students use e-mail for marginally more hours than female students, but over a significantly greater number of sessions.
- By third level males continue to use over a greater number of sessions, though not significantly so, but females now use for marginally more hours.

6.2 Sources of messaging useful to students

The message sources about which students were surveyed, and the variable names associated with them for data processing purposes, are listed in table 6.2.

Keywords to useful message senders

keyword		*sources of useful messages*
Lecturers	:	most useful messages are from lecturers
OtherStudents	:	most useful messages are from other students
AboutSame	:	about the same

Table 6.2. Senders of useful messages

From table 5.4, the overall statistic of 46% for the **AboutSame** and **OtherStudents** variables combined may be noteworthy for its implication of a significant student self-support aspect to their use of CMC.

6.2.1 Gender differences in valuing message sources

A different test of significance was required for this question, since it required respondents to make a selection from one of three attributes, whereas other survey questions required respondents to assign numerical scores to variables. The Chi-square (χ^2) test provides a method of testing for association between attributes, and it was used as the significance test for this question. One of the commonly accepted assumptions for the applicability of the χ^2 test is that expected values in every cell must be at least five. However, it has been found that, providing only a few cells have expected values of less than 5 (say only one cell in five), a minimum value of 1 is allowable (Kalton 1966, p.38). For some individual years, the cells for **OtherStudents** fall below this standard, and so the test was also applied to pooled results for all three years.

For the individual years 1996, 1995 and 1990, the association between gender and valued message sources was found to be respectively probably significant ($p<.05$), and probably not significant ($p<.25$ and $p<.75$). For the pooled results for all three years, the significance of the difference was also probably not significant ($p<.50$).

It was noted that, on inspecting for gender differences between course levels, results for first level and third level male students showed remarkably little change. By contrast, results for first and third level female students showed a substantial shift from the **AboutSame** category to the **Lecturers** category. Although for female students the association between course level and valued message sources is statistically probably not significant ($p<.25$), there is evident stability in this trend over the three survey years. Percentage values for first level females choice of the categories **Lecturers**, **AboutSame**, and **OtherStudents** (with values for individual years 1996, 1995 and 1990 in brackets) are respectively 48% (47%, 49%, 50%), 47% (47%, 49%, 45%) and 5% (7%, 3%, 5%). For third level females this consistent shift from **AboutSame** to **Lecturers** can be seen in the corresponding values of 64% (89%, 56%, 60%), 29% (11%, 39%, 27%) and 7% (0%, 6%, 13%).

6.2.2 Key points about sources of messaging useful to students

- Valuing of messaging *not* from lecturers suggests a significant self-support aspect to students' use of CMC
- Whereas male students' pattern of valuing message sources remains similar from first to third level, third level female students value messaging from lecturers more.

6.3 Destinations of students' messaging

The messaging destinations about which students were surveyed, and the variable names associated with them for data processing purposes, are listed in table 6.3.

Keywords to message destinations

keyword :	*destination and purpose*
StudConv :	other student(s), conversationally
StudTask :	other student(s), as required course task
StudHelp :	other student(s), seeking help with course-related matters
StudOffer :	other student(s), offering help with course-related matters
LectConv :	lecturer, conversationally
LectTask :	lecturer, as required course task
LectHelp :	lecturer, seeking help with course-related matters

Table 6.3. Message destinations and purposes

6.3.1 Messaging to lecturers vs. to students

For all three years combined there is a one-third to two-thirds breakdown between messaging to lecturers and messaging to other students. Over time, task-oriented (**LectTask**) and conversational (**LectConv**) messaging to lecturers declines by 7% in total, notwithstanding that the number of lecturers available to send messages to increases. For the **LectTask** variable the difference between the 1990 and 1996 means is highly significant ($p<.001$), as also is the difference for the **LectConv** variable ($p<.01$).

6.3.2 Social vs. task-oriented messaging

Students reported their biggest messaging category to be to other students, conversationally (**StudConv**), with an overall percentage of 28%. This rose from 21% in 1990 to 30% in 1996, the biggest percentage change over time in the categories enquired about. However, a counterbalancing finding is that course task oriented messaging did come out higher than 'conversational' messaging, if marginally so at a ratio of 52 : 48 respectively.

6.3.3 Gender differences in messaging destinations

From tables 5.9 and 5.10, the overall index of male students' messaging of **1.72** (1.45, 1.73, 1.97) is 10.3% higher than that for females of **1.56** (1.55, 1.46, 1.70). Although this could be for messaging to any destination, it happens to be close to the result from the pilot analysis of 1989-90 messaging to public e-mail distribution lists, where male students sent 9.8% more messages than female students (see **4.7.1** above).

Reported conversational messaging to lecturers (**LectConv**) by male students is twice that for female students. Female students are marginally higher overall in reported conversational messaging to other students (**StudConv**), but due to a high score in 1996, since their score is lower than for males in 1995 and 1990.

The reported distribution of female students' messaging between `Lect*` and `Stud*` destinations is 37% and 63% respectively. For male students, the equivalent percentages are 38% and 62%. The distribution of female messaging between `*Task` and `*Conv` destinations is 54% and 46%. For males, the percentages are 51% and 49%.

Gender differences in message destinations between course levels are marginal, though with overall shifts towards lecturer and task-related messaging at third-level. The distribution of third-level female students' messaging between `Lect*` and `Stud*` destinations is 42% and 58%. For third-level males, the percentages are 43% and 57%. The distribution of third-level female messaging between `*Task` and `*Conv` destinations is 56% and 44%. For males, the percentages are 52% and 48%.

The overall index of third-level male students' messaging of **1.78** (1.61, 1.77, 1.97) is only 5.3% higher than that for third-level females of **1.69** (1.74, 1.91, 1.43). It can be noted that, whereas for males globally and at third level, these values have declined progressively over time, this is not the case for females, for whom the 1996 values are higher than for male students.

Instances where means for males are statistically significantly higher than means for females are for males for `LectConv` in 1996 (p<.01), 1995 (p<.025) and 1990 (p<.025), also third level males for `LectConv` in 1990 (p<.01), first level males for `StudConv` in 1995 (p<.025), males (p<.025) and first level males (p<.001) for `StudHelp` in 1995, males (p<.05) and third level males (p<.01) for `StudOffer` in 1990.

Instances where means for females are statistically significantly higher than means for males are for first level females for `LectHelp` in 1996 (p<.05), females for `StudConv` in 1996 (p<.025), females for `StudTask` in 1996 (p<.005).

6.3.4 Key points about students' messaging destinations

- Students' biggest messaging category is, to other students, conversationally.
- However, about half of their messaging is reported to be task-orientated.
- Responses from male students suggests their message-sending levels are 10% higher than those of female students.

6.4 Valued categories of information

The categories of CMC information about which students were surveyed, and the variable names associated with them for data processing purposes are listed in table 6.4.

Keywords to categories of CMC information

keyword		*category descriptions and examples*
Admin	:	administrative - room changes, handouts to collect, coursework deadlines
Advert	:	advertisements for books, accommodation, cars, etc
Career	:	information about jobs, careers, past graduates, recruitment fairs
Comment	:	comments by class members on material presented in class
Discuss	:	extra-curricular discussion - politics, media, etc
Event	:	notice of relevant upcoming events - TV, seminars, guest lectures, etc
Exwork	:	examples of coursework submission or drafts from other students
Feedback	:	feedback from coursework markers
Handout	:	teacher's handouts and lecture notes
Help	:	clarification and advice on coursework from teachers
Outline	:	course outlines, rationales, and lecture plans
Photos	:	captioned pictures of staff and student seminar groups
Preview	:	previews of material to be presented in class - videos, lecture synopses, software, etc
Reading	:	readings lists and subject references
Reps	:	messages from student course-representatives
Resume	:	resume and personal information about other class members
SocMess	:	social messages, about parties, outings, humour, etc
Spec	:	coursework and workshop specifications from lecturers
StudAss	:	information from the Students' Association
System	:	notices and reports from Computer Centre staff

Table 6.4. Categories of CMC information

From the results presented in table 5.6, students appear to value highly *straightforward* types of coursework-focused information such as handouts and lecture notes (**Handout**), assignment specifications (**Spec**), clarification and advice on coursework (**Help**), reading lists and subject references (**Reading**), feedback from coursework markers (**Feedback**), course outlines and lecture plans (**Outline**), and administrative information advising them about course-organization details (**Admin**).

More *esoteric* categories of information made possible by CMC, such as fellow-students' comments on course subject-matter (**Comment**), extra-curricular discussions of politics, media, etc (**Discuss**), and resumé information from other students (**Resume**) were valued less. Advertisement messages (**Advert**) are also rated as low-value. Least valued was the category **Photos**, introduced for the first time in academic year 1994-95 when a generational shift in technology made this a possibility.

6.4.1 Changes over time in valuing categories

An initial noteworthy factor is the comparative overall scoring of these categories from 1990 to 1995 and 1996. While these scores were primarily used to provide relative rankings, it can be seen that most of the categories received a higher mean score in 1990 than in 1995 or 1996. The average means in 1996 and 1995 were 3.32 and 3.33 against the higher average mean of 3.80 in 1990.

The largest displacement in ranking between 1995 and 1996 is of two positions, emphasising the greater similarity between scores for these two years, against the greater differences found between the 1996 and 1990 scores.

Looking at shifts in ranking between 1990 and 1996, the biggest displacement is for examples of coursework from other students (**ExWork**), up seven places from 15th in 1990 to 8th in both 1995 and 1996. The difference between the mean scores assigned by students to this category in 1990 and 1996 is highly significant (p<.001).

Next comes messaging from student course-representatives (**Reps**), falling six places from 9th in 1990 to 15th in 1996. The difference between the mean scores assigned by students to this category in 1990 and 1996 is also highly significant (p<.001).

The categories **Admin**, and **SocMess**, for administrative messaging and for social messaging, rose five positions, from 6th to 1st and from 16th to 11th respectively, though these the differences are probably not significant (p<.30 and p<.40 respectively).

Falling five places are previews of material to be presented in class (**Preview**), down from 7th to 12th, and careers information (**Career**), down from 11th to 16th, and for both these categories the significance of the difference between the mean scores assigned by students in 1990 and 1996 is highly significant (p<.001). System advice messages from Computer Centre staff (**System**) moved up four places from 13th to 9th but with the same mean score. So also did **Comment** messages, from 18th to 14th with the difference between the mean scores in 1990 and 1996 probably not significant (p<.20).

6.4.2 Differences related to gender

By comparison of tables 5.13 and 5.14 it is apparent that female and male students' ranking of categories is quite similar. The greatest difference is only of three rank positions, for the variable **Help** and also for the variable **System**. For 15 of the 20 categories there was either no difference, or of just one position.

The category **Help**, for "*clarification and advice on coursework from teachers*", is ranked 1st overall by female students, but only 4th by male students. The significance of this difference has increased over time, being highly significant for 1996 ($p<.01$), probably significant for 1995 ($p<.025$), and probably not significant for 1990 ($p<.20$).

Overall, males rank **System**, for "*notices and reports from Computer Centre staff*", 8th, whereas females rank it 11th. However, for the individual years, while males scored this category higher with a difference which is probably significant ($p<.05$) in 1990, females scored it only marginally higher ($p<.45$) in 1995 and highly significantly higher ($p<.005$) in 1996.

Overall, and in each individual year - extremely marginally in 1990, but increasingly in the subsequent years - male students' mean value for means for all categories is less than for female students (4.4%; 10.2%, 3.7% and 0.3%), and becoming more so over time. The only instances of male students' mean valuing of categories being higher than females' with statistical significance occur in 1990, for **Resume** by third level males ($p<.01$), and for **System** by males generally ($p<.05$) and by third level males ($p<.025$).

Other instances of female students valuing CMC categories higher than males with statistical significance are from 1995 and 1996. These are for **Admin** by females in 1996 ($p<.05$), **Discuss** by females in 1996 ($p<.025$), **Event** by females in 1996 ($p<.01$), **ExWork** by third level females in 1996 ($p<.025$), **Feedback** by females generally ($p<.025$) and by third level females ($p<.05$) in 1996, **Help** by third level females in 1995 ($p<.05$), **Offers** by third level females in 1995 ($p<.025$), Outline by females in 1996 ($p<.05$), **Reading** by females in 1996 ($p<.025$), and **Reps** by females generally and by third level females in 1995 ($p<.005$)

6.4.3 Key points about valued categories of information

- Straightforward, coursework-oriented and administrative information is valued most.
- A drop in the overall mean for all categories over time may suggest that students have a greater expectation of such information being provided.
- Increases in student numbers, and changes in course structure, may be related to higher valuing of administrative information over time.
- Female students assign higher value to categories of information provided by CMC than do male students.

6.5 Opinions about computing

The seven attitude statements used in this section of the survey were adopted from the previous survey at Carnegie Mellon University (Anderson 1987). They are listed in table 6.5, along with the variable names associated with them for the purpose of data processing.

Keywords for Opinions About Computing

keyword	*statement to be agreed or disagreed with*
EasyAccess	Everyone at QMC should have full and easy access to a computer.
LearnUse	Almost everyone should learn to use a computer.
LikeAccess	One of the things I like about QMC is the access I have to computing.
Practical	I would like to see more practical uses of computers at QMC.
Experiment	I like to experiment with computer systems.
UseMore	I would like to use a computer more than I do now.
TooMuch	There is too much emphasis on computing at QMC.

Table 6.5. Attitude statements for opinions about computing

With the exception of the results for liking to see more practical uses of computers (**Practical**), and for there being too much emphasis on computing (**TooMuch**) - noting that this questions requires disagreement to indicate positiveness - the QM mean scores for this subsection become more positive towards computing in each succeeding year. All are more positive in the final year, 1996, than in the initial year, 1990. With the exception of **Practical**, for which the difference between the latest and earliest mean is probably not significant, all differences between 1996 and 1990 means are either probably significant, or highly significant.

The QM results correspond quite closely to the ones from CMU, with the same ranking of the three strongest areas of agreement. These are, firstly, that everyone should have easy access to computing (**EasyAccess**), secondly, that almost everyone should learn to use a computer (**LearnUse**), and thirdly, that access to computing is appreciated (**LikeAccess**). The average of the differences in percentages of CMU and QM students agreeing with the seven attitude statements discussed below was 5.7%.

6.5.1 Everyone should have access to a computer

On agreement or disagreement with the statement *"Everyone at CMU/QMC should have full and easy access to a computer"*, identified by the variable **EasyAccess**, 88% (the figures for the individual years 1996, 1995 and 1990 being 95%, 94% and 85%) of QM students agreed (that is, agreed or strongly agreed). The difference between the global mean score for this variable for 1996 and for 1990 is highly significant ($p<.001$). For CMU students, the corresponding figure is 6% higher, with 94% agreeing.

6.5.2 Everyone should learn to use a computer

For the statement *"Almost everyone should learn to use a computer"* (**LearnUse**), 85% (96%, 85% and 75%) of QM students agreed. The difference between the global mean score for this variable for 1996 and for 1990 is also highly significant (p<.001). For CMU students, the figure was 2% lower, with 83% of students agreeing.

6.5.3 Valuing access to computing

For the statement *"One of the things I like about CMU/QMC is the access I have to computing"* (**LikeAccess**), 66% (75%, 63% and 60%) of QM students agreed. The difference between the global mean score for this variable for 1996 and for 1990 is probably significant (p<.025). For CMU students, the figure was 1% higher, with 67% of students agreeing.

6.5.4 Wanting more practical uses of computers

For the statement *"I would like to see more practical uses of computers at CMU/QMC"* (**Practical**), 52% (57%, 51% and 47%) of QM students agreed. The difference between the global mean score for this variable for 1996 and for 1990 is probably not significant (p<.20). For CMU students, the figure was 11% higher, with 63% of students agreeing.

6.5.5 Liking to experiment with computers

For the statement *"I like to experiment with computer systems"* (**Experiment**), 45% (55%, 46% and 36%) of QM students agreed. The difference between the global mean score for this variable for 1996 and for 1990 is probably significant (p<.05). For CMU students, the figure was 8% higher, with 53% of students agreeing.

6.5.6 Wanting to make more use of computers

For the statement *"I would like to use a computer more than I do now"* (**UseMore**), 48% (54% 49%, and 40%) of QM students agreed. The difference between the global mean score for this variable for 1996 and for 1990 is highly significant (p<.005). For CMU students, the figure was 3% higher, with 51% of students agreeing.

6.5.7 Feeling there is too much emphasis on computing

For the statement *"There is too much emphasis on computing at CMU/QMC"* (**TooMuch**), 13% (7%, 17% and 10%) of QM students agreed. Note that, as this was a question which required disagreement to indicate a positive attitude towards computing, the overall shift over time from 10% in 1990 to 7% in 1996 is still towards increasing positiveness, if marginally so for this question. However, the difference between the global mean score for this variable for 1996 and for 1990 is highly significant (p<.01). For CMU students, the figure was 9% higher, with 22% of students agreeing.

6.5.8 Gender differences in opinions about computing

Overall, the difference in the mean of the means for this section was only 2.6%, with females having been higher in the first three, and males in the latter four. Looking at the 21 means over the three individual years, females appear more positive towards CMC in 6 instances, compared with 15 instances for male students. However, for third level students there was an exact balance in the number of more positive means for female and male students.

The biggest difference between the overall mean scores for males and females for this section was for the **Experiment** variable, for liking to experiment with computer systems. Overall, 59% (63%, 58% and 56%) of male students agreed, compared with 38% (50%, 37% and 26%) of female students. The significances of the differences between mean scores for 1996, 1995 and 1990 were p<.10, p<.05 and p<.20 - that is to say, probably significant for 1995 but probably not for the survey years before and after. However, it is notable that while over time the male percentages have risen marginally over the three years, female percentages increased by more than 10% per year.

Instances where means for male students are significantly more positive than for females are for third level males for **Practical** in 1995 (p<.05), males and third level males for **Experiment** in 1995 (p<.05), third level males for **Experiment** in 1990 (p<.005), and males for **UseMore** in 1996 (p<.005).

Instances where means for female students are significantly more positive than for males are for third level females for **LikeAccess** in 1995 (p<.025), females (p<.05) and third level females (p<.01) for **LearnUse** in 1990 (p<.05).

6.5.9 Key points about opinions about computing

- Results on opinions about computing were the strongest and most positive of the four attitude sections.
- Results were quite similar to those from CMU, which may reflect a comparable CMC environment by the time of the later study.
- The biggest gender difference is for males wishing to experiment more with computers, though this gap has lessened over time.

6.6 Comparison of CMC with face-to-face tutorials

These results can be compared with those from the survey of Open University DT200 students from which these attitudes statements were obtained (Open University, 1990). The average difference in the percentages of OU and QM students agreeing with the four attitude statements discussed below is 16.5%.

The actual attitude statements posed to students, and the corresponding variable names used in the subsequent data analysis, are listed in table 6.6.

Keywords for Comparing CMC with Face-to-face Tutorials

keyword : *statement to be agreed or disagreed with*

How would you compare electronic conferencing with face-to-face tutorial meetings ...

CourseDiff	:	... as a means of getting help with course-related difficulties?
Socialize	:	... as a means of socializing?
Intellect	:	... as a medium for intellectual exchange?
Effective	:	... for its effectiveness, in terms of time spent by you?

Table 6.6. Attitude statements for comparing CMC with face-to-face tutorials

6.6.1 Getting help with course-related difficulties

For the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a means of getting help with course-related difficulties?"* (**CourseDiff**), 58% (59%, 53% and 62%) of QM students rated electronic tutorials as worse. The percentage of students rating electronic tutorials as better was 13% (14%, 16% and 10%). The overall mean score for this question (2.43) was the third-highest (or second-lowest) within this section. The difference between the global mean score for this variable for 1996 and for 1990 is probably not significant (p<.40).

Of OU students, 71% rated electronic tutorials as less effective, a figure 9% higher than for the QM students surveyed in the corresponding year 1990.

6.6.2 CMC as a means of socializing

For the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a means of socialising?"* (**Social**), 71% (69%, 70% and 73%) of the QM students who responded rated electronic tutorials as worse. The percentage of students rating electronic tutorials as better was 8% (6%, 10% and 8%). The overall mean score for this question (2.09) was the lowest within this section. The difference between the global mean score for this variable for 1996 and for 1990 is probably not significant (p<0.45).

The figure for OU students in 1990 was 13% higher, with 86% rating electronic tutorials less effective.

6.6.3 CMC as a medium for intellectual exchange

For the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a medium for intellectual exchange?"* (**Intellect**), 26% (17%, 25% and 37%) of the QM students who responded found electronic tutorials worse. The percentage of students rating electronic tutorials as better was 29% (37%, 32% and 17%). This question had the highest overall mean for this section (2.98), being the least-negative response from QM students for the four questions comparing electronic with face-to-face modes, and indeed the means for the latter two years become positive. The difference between the global mean score for this variable for 1996 and for 1990 is highly significant (p<0.005).

The figure for OU students in 1990 was 16% higher with 53% of OU students rating electronic tutorials as less effective, the biggest difference from the corresponding QM respondents of 1990.

6.6.4 Effectiveness of time spent using CMC

For the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings for its effectiveness, in terms of time spent by you?"* (**Effective**), 35% (24%, 40% and 42%) of the QM students who responded found electronic tutorials worse. The percentage of students rating electronic tutorials as better was 14% (17%, 18% and 8%). The overall mean score for this question (2.72) was the second-highest within this section. The difference between the global mean score for this variable for 1996 and for 1990 is also highly significant (p<0.005).

The OU students were least negative about the statement, with 46% finding it less effective, 4% more than the QM respondents of 1990.

6.6.5 Gender differences in comparison of CMC with face-to-face tutorials

Overall, the differences in the three-year means are very marginal. None of the three-year means is positive, though `Intellect`, for the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a medium for intellectual exchange?"* for males is neutral. All the others are negative.

`Intellect` is also positive in 1995 and 1996 for both males (3.09, 3.31) and females (3.05, 3.10), with males again more positive, though probably not significantly so ($p<.45$, $p<.20$). Positiveness generally increases over time for both sexes, except for the `CourseDiff` variable, for the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a means of getting help with course-related difficulties?"*. For female students from 1995 to 1996, there is no change for this variable, and for male students it decreases. Likewise, the mean for the `Socialize` variable, for the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a means of socialising?"* decreases for female students from 1995 to 1996.

`Socialize` is the most negatively rated variable, for both males and females, overall and for all individual years.

Looking only at third level results, however, means for male students are higher than females only for `Socialize` in 1996 and 1990, and for `CourseDiff` and `Effective` in 1995. The overall mean for females (2.67) is higher than for males (2.64) and female means are higher in 7 out of the 12 instances for individual years.

In this section there are no instances where means for male students are statistically significantly more positive than for female students. Instances where means for female students are significantly more positive than for males are for third level females for `Socialize` in 1995 ($p<.05$), and for third level females for `Effective` in 1996 ($p<.05$).

6.6.6 Key points about comparing CMC with face-to-face tutorials

- Students were most negative about CMC when comparing it with face-to-face tutorials, of all the attitude statements of the four attitude sections.
- Least negative, and marginally positive, is the attitude towards CMC as a medium for intellectual exchange.
- Greater negativeness of OU students may relate to the quality of their user interface, via slow dialup modems, and their educational context as distance learners.
- By third level, female students are marginally more positive than males about this aspect of CMC, reversing the polarity for gender overall and at first level.

6.7 Attitudes towards CMC

These results can be compared with the OU results, with which they show overall agreement. The OU survey offered respondents three possible answer options, which were 'agree', 'disagree', or 'uncertain'. The OU results can be compared with the QM ones by again conflating the 'strongly' results with agreement or disagreement. The average difference in percentages for OU and QM students agreeing with the four statements discussed below was 11%, which is 5% less than the average difference for the previous section comparing CMC with face-to-face tutorials.

The actual attitude statements posed to students, and the corresponding variable names used in the subsequent data analysis, are listed in table 6.7 below.

Keywords for Attitudes Towards CMC

keyword	:	*statement to be agreed or disagreed with*
Particip	:	Individuals can participate more equally in electronic than in face-to-face communication.
Depersonal	:	Computer communication is depersonalizing.
Assertive	:	Computer conferencing encourages individual assertiveness.
LackFeed	:	Personal interaction is more difficult with computer communication because of the lack of contextual and verbal feedback.

Table 6.7. Attitude statements for attitudes towards CMC

6.7.1 Equality of participation in CMC

For the statement *"Individuals can participate more equally in electronic than in face-to-face communication"* (**Particip**), 56% of OU students agreed, 26% disagreed and 18% were uncertain. For QM students the figure for agreement was 13% lower at 43% (50%, 44% and 36%), but showing increasing agreement over time. For disagreement, the overall QM result was closer at 28% (18%, 34% and 32%). The QM 'neutral' or 'uncertain' result was 29% (32%, 22% and 32%). The difference between the global mean score for this variable for 1996 and for 1990 is highly significant (p<.005).

6.7.2 CMC as a depersonalizing medium

For the statement *"Computer communication is depersonalising"* (**Depersonal**), 59% of OU students agreed, 24% disagreed and 17% were uncertain. For QM students the figure for agreement was second-closest to OU respondents, being 8% lower at **51%** (47%, 55% and 51%) for disagreement **24%** (30%, 16% and 25%), and for neutrality/uncertainty, **25%** (23%, 29% and 24%). The difference between the global mean score for this variable for 1996 and for 1990 is probably not significant (p<.20).

6.7.3 Encouragement of individual assertiveness in CMC

For the statement *"Computer conferencing encourages individual assertiveness"* (**Assertive**), 35% OU students agreed, 32% disagreed, and 33% were uncertain. For QM students the respective figures were **38%** (30%, 45% and 40%), **18%** (15%, 20% and 19%) and **44%** (55%, 35% and 41%). Agreement was only 3% higher than for OU respondents, which is the closest result. However, 14% fewer QM students disagreed with this statement. The difference between the global mean score for this variable for 1996 and for 1990 is again probably not significant (p<.20) level.

6.7.4 Difficulty of personal interaction with CMC

For the statement *"Personal interaction is more difficult with computer communication because of the lack of contextual and verbal feedback"* (**LackFeed**), 79% of OU students agreed, 10% disagreed, and 11% were uncertain. For QM students the figure for agreement was 20% lower at **59%** (54%, 55% and 69%), for disagreement **12%** (13%, 18% and 6%), and for neutrality/uncertainty **29%** (33%, 27% and 25%). This 20% difference in the overall percentages of students agreeing is the largest difference for this section. However, the difference is only 10% when compared with the individual year 1990, which is closest to the time when the OU students were responding to their survey. The difference between the global mean score for this variable for 1996 and for 1990 is probably significant (p<.025).

Over time, the percentage of QM students agreeing with this statement has decreased by 15%.

6.7.5 Gender differences in attitudes to CMC

The overall three-year mean for male students for this section is 4.7% higher than that of female students. Males are also more positive in all of the individual three-year variables. Looking at the overall means for the individual years, in 1996 the mean for male students is 8.3% higher, in 1995 the means are virtually the same (males 0.7% higher), and in 1990 the male students' mean is 4.4% higher.

The biggest difference is in the **Particip** variable, for the statement *"Individuals can participate more equally in electronic than in face-to-face communication"*, where the mean for male students is 9.1% higher overall. However, this difference varies considerably over the three years, being highly significant (p<.005) in 1996, quite marginal in 1995, and again probably not significant in 1990 (p<.45).

The only 3 variables out of 12 in individual years in which female students overall are more positive than male students are **Depersonal** and **Assertive** in 1995, and **LackFeed** in 1990. However, looking at results by gender for third level students, the balance of positiveness is reversed, with third level females more positive in 7 out of the 12 variables scored. These are for **Particip** in 1996 and 1990, **Depersonal** in 1995, **Assertive** in all three years, and **LackFeed** in 1990.

Instances where means for male students are significantly more positive than for female students are for males (p<.005) and first level males (p<.005) for **Particip** in 1996, for males for **Depersonal** in 1990 (p<.05), for males (p<.05) and first level males (p<.025) for **Assertive** in 1996.

In this section there are no instances where means for female students are significantly more positive than for male students.

6.7.7 Key points about attitudes towards CMC

- ☞ QM students indicated a more positive view of the characteristics of CMC embodied in these attitude statements than did OU students.
- ☞ Differences from OU students may also reflect a more theoretical, rather than experiential, view of CMC.

6.8 Present and future use of CMC

The actual attitude statements posed to students, and the corresponding variable names used in the subsequent data analysis, are listed in table 6.8 below.

Keywords for Present and Future Use of CMC

keyword		*statement to be agreed or disagreed with*
NotAvail	:	It would make little difference to me if CMC facilities weren't available.
Monitor	:	Being able to see other students' work helps me self-monitor and improve my own performance.
ExtendUse	:	If staff-student ratios rise, it would be desirable to make more extensive use of CMC.
FutureUse	:	I would be interested in continuing to use CMC after my course ends.

Table 6.8. Attitude statements about present and future use of CMC

6.8.1 Views on on-availability of CMC facilities

For the statement *"It would make little difference to me if CMC facilities were not available"* (**NotAvail**), 63% (69%, 55% and 64%) of QM students disagreed. The percentage of students agreeing with this statement, and thereby expressive of a negative view about the availability of CMC was 17% (16%, 21% and 14%). The overall mean for this question (3.62), reversed to take account of a negative response indicating a positive attitude towards CMC, was the lowest of the four questions in this section. The difference between the global mean score for this variable for 1996 and for 1990 is probably not significant ($p<.25$).

6.8.2 Self-monitoring one's work with CMC

For the statement *"Being able to see other students' work helps me to self-monitor and improve my own performance"* (**Monitor**), 61% (59%, 71% and 54%) of QM students agreed. The percentage of students disagreeing was 11% (13%, 10%, 10%). The overall mean score for this question (3.72) was the second-highest for this section. The difference between the global mean score for this variable for 1996 and for 1990 is also probably not significant ($p<.40$).

6.8.3 Desirability of using CMC more if SSRs rise

For the statement *"If staff-student ratios rise, it would be desirable to make more extensive use of CMC"* (**ExtendUse**), 59% (62%, 55% and 59%) of QM students agreed. Within this section, this question had the least agreement from QM students. However, it was also the question with the most neutral (viz. "3") responses, and the percentage of students disagreeing was only 6% (7%, 8% and 2%), the least disagreement in this section. The overall mean score for this question (3.71) was the third-highest for this section. The difference between the global mean score for this variable for 1996 and for 1990 is again probably not significant (p<.40).

6.8.4 Interest in post-course use of CMC

For the statement *"I would be interested in continuing to use CMC after my course ends"* (`FutureUse`), 71% (85%, 69% and 60%) of QM students agreed. (This question was also adopted from the Open University survey, in which 58% of students responded positively.) Within this section, this question had the most agreement from QM students. The percentage of QM students disagreeing was 6% (4%, 5% and 9%). The overall mean score for this question (4.01) was the highest for this section. The difference between the global mean score for this variable for 1996 and for 1990 is highly significant (p<.005).

6.8.5 Gender differences in present and future use of CMC

For this section, means for male students were more positive than for female students by **7.7%** (8.9%, 5.2% and 9.2%). Female students show greater neutrality than males.

From tables 5.29 and 5.30, the biggest difference in mean score for this section between females and males was for `ExtendUse`, for the statement *"If staff-student ratios rise, it would be desirable to make more extensive use of CMC"*, with overall agreement from **71%** of male students (85%, 63% and 66%) but only **50%** of female students (46%, 59% and 54%). However, although the 1996 difference between means is highly significant (p<.001), the differences for earlier years are probably not significant (p<.45 and p<.20). Also, marginally more male students - **8%** (3%, 15% and 6%) - disagreed, compared with for female students, **5%** (9%, 5% and 0%). Except for the `NotAvail` variable (for the statement *"It would make little difference to me if CMC facilities were not available")* in 1996, male students are always more positive.

Looking at results by gender at third level, however, there are three instances of female means being more positive than males'. These are again for `NotAvail` in 1996, but also in 1995, and for `FutureUse` in 1996. The extent to which overall three-year means for this section for third level male students were more positive than for female students is reduced to **5.0%** (-4.1%, 4.8%, 15.8%), also suggesting a trend over time. Comparing the same overall means for third level male students with the global values for all male students, those of the third level are the higher by **2.0%** (-1.8%, 7.0%, 0.5%). By contrast the overall means for third level females are higher by **4.6%** (11.4%, 7.3%, -5.6%) than the global means for all female students. Again, therefore the profile of third level males remains closer to the global male profile, overall and over time, than do the comparable values for female students.

Instances where means for male students are significantly more positive than for females are for males for **NotAvail** in 1990 (p<.05), for males (p<.001) and first level males (p<.001) for **ExtendUse** in 1996, and for third level males for **FutureUse** in 1990 (p<.05).

Instances where means for female students are significantly more positive than for males are for third level females for **NotAvail** in 1996 (p<.025), and for females for **FutureUse** in 1996 (p<.05).

6.8.6 Key points about present and future use of CMC

- Students' responses were positive towards CMC for all four statements.
- Strongest agreement was towards future use after course completion, which lends vocational validity to the use of CMC.
- Extending use as a response to higher SSRs had least agreement, but also least disagreement.

6.9 Some additional comments by students

The survey questionnaires included invitations to students to offer additional comments. This option was not widely taken up, but sufficiently so for some trends of similar commenting to be identified, and for some more individually insightful comments to be received.

In the earlier years of conducting these and pilot studies, but distinctly less so by the later years, the notable recurring comment from students was a request for more widespread use by members of teaching staff. Conversely - to give them their due - where staff contributed to some of the pilot surveys, a characteristic request was also often for better network access to be provided for them to be able to make use of e-mail. (In 1989-90 and until academic year 1991-92 the Vax minicomputer provided the College's CMC facilities, with the majority of terminal access points being in the central computer workshops. The transition to systems of client-server LANs in 1991-92 also enabled a major expansion in the distribution of network access points to outlying staff offices.)

In the later years (other than complaints about the unreliability of the system at that time) an interesting comment was about usefulness of delivery of course material -

such as lecture previews and outlines - by CMC where students had not been able to attend the timetabled lectures or workshops. Some such comments had always been made, but in the later years there were indications that such failures to attend timetabled sessions were becoming less a matter of oversight or inconvenience, and more a matter of necessity where students were supporting themselves through part-time jobs, or where mature students had family commitments.

6.10 Qualitative data analysis

Some noteworthy differences between genders occur both outwith and across various specific aspects identified by the eight sub-headings below. For example, although this was not directly an area of investigation, it is evident that males frequently talk about technical aspects of the operation of CMC systems, whereas females do little of this.

6.10.1 Levels and patterns of use

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.1**, which contains female and male student messaging in response to questions about the ways they planned, organized, and prioritised the time they devoted to CMC activities.

Females seem to tend to talk about their use more in relation to course work than do males. The contrast is most evident when the discourse of females at both levels is compared with that of third-level males. In the latter group there is little mention of modules, or subject coursework, or lecturers. ***M3-1***, ***M3-3*** and ***M3-5*** entirely omit such language. ***M3-6*** does identify two modules by their codes. ***M3-2*** and ***M3-4*** mention lecturers, and the former speaks of *tasks I have to complete*, which may be assumed to be course-related though this is not explicit.

Among first-level females, only ***F1-4*** does not refer to modules, coursework or lecturers in some way. All third-level females mention such things, the least explicit being ***F3-2***'s *what I plan to do that day*. Among first-level males, one also (***M1-5***) entirely omits such references but among the others references are somewhat fewer and briefer than for first-level females and convey less sense that their CMC usage is within the context of their courses of study.

Several males talk about their use in operational terms, such as how they configure e-mail clients for filtering and automatic checking, and using other e-mail accounts. By contrast, females do little of this.

Half of the males at each level (***M1-1***, ***M1-2***, ***M1-5***, ***M3-1***, ***M3-4***, ***M3-5***) identify e-mail client software (Outlook, Netscape) or providers (Yahoo!, AOL, HotMail) by name. No female student at either level does this.

6.10.2 Useful message sources

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.2**, which contains female and male student messaging in response to questions about the usefulness of kinds of e-mail messages received from lecturers and from fellow students.

There does not appear to be much differentiation by gender or level for responses on this aspect. Both female and male students at both levels say that messages from lecturers are important and likely to be relevant. Likewise, both genders say that messages from other students can also be useful in some cases, but can also be irrelevant and unimportant. Messages from students are most often spoken of as important where they are related to coursework or groupwork.

Two male students (***M3-1***, ***M3-5***) observe that instances where students are senders of useful messages can arise when they forward to a distribution list a response a lecturer has provided to them individually, where the information would be of value to the whole class. Female ***F3-2*** perhaps provides the unifying theory on useful message sources with her observation that *you need to judge the message and not just the source.*

6.10.3 Message destinations

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.3**, which contains female and male student messaging in response to questions about how they felt about e-mailing lecturers on coursework or more conversational matters, compared with fellow students, and about the accessibility of lecturers via e-mail.

At first-level two each of the female students (***F1-2*** and ***F1-6***) and the male students (***M1-4*** and ***M1-6***) express a preference for dealing with lecturers face-to-face, rather than by e-mail. At third level only male student ***M3-3*** expresses this preference. For some of the first-level students, the question about e-mailing lecturers is answered hypothetically, as they have not done this yet. This is not the case at third level.

There is a recurring theme of practicality amongst the majority of respondents of both genders and levels about e-mailing lecturers. This is to do with the varying likelihood of different lecturers checking their e-mail daily or regularly, or to reliably reply to messages.

Some males use some kinds of language not found in the female students messaging on this aspect of CMC usage. This is where messaging to a lecturer is described as legitimate (***M3-1***) or valid (***M3-5***) when it is course-related, as if as a rationalized justification. Secondly, some males describe themselves as 'not having a problem' e-mailing lecturers (***M1-1, M1-2, M3-4***). The former usage is not found female's responses, and the nearest to the latter is perhaps ***F3-3***'s 'feeling extremely comfortable' about e-mailing lecturers. However, the latter is a positive expression, compared with the male students' denial of a negative situation.

There are some themes present in the language of female students, which do not appear in the male responses on this aspect. A number of third level females mention attention given to their communication with lecturers by CMC. Partly this relates to message composition, such as ***F3-1***'s making *more effort towards phrasing it*, and ***F3-4*** being *more inquisitive about what I say and making sure I include everything.* Partly it relates to the wider context of the communication, and avoiding *disrupting the lecturer* (***F3-1***), *disturbing someone in their office* (***F3-5***), and *to arrange time to suit both yourself and the selected lecturer* (***F3-6***).

None of the male students really comment on message composition, the nearest being ***M3-2***'s observation regarding conversational and course-related messages to lecturers, that he makes a point of not doing both in the same e-mail. This is more about content than about how the content is composed.

On the second matter, on expressing some concern for the wider context of the process of communicating with lecturers, the nearest to this among the male students might be ***M3-2***'s observation that e-mail can be faster *if the lecturer is proving difficult to track down*, or M3-3's observation of the usefulness of e-mail *to contact a lecturer who is not in college every day.* However, on this second matter, these nearest male comments can be distinguished as self-serving, relative to intent of the more altruistic content of the female examples.

6.10.4 Valuing CMC categories

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.4**, which contains female and male student messaging in response to questions about the kinds of information delivered via CMC which they found valuable.

Where categories of information are identified, these are mainly course-related - lecture notes, assignment specifications, reading lists, studies, help with tasks, etc. Likewise, most of the responses relate the value of such information to completing course work, module assignments, workshops and tasks.

The instances where this is least the case are the responses of ***F3-1***, ***F3-5*** and ***M3-4***, which neither mention course-related information, or the application of CMC information in their studies.

There do not appear to be distinguishable differences between genders or levels, other than that the responses of third-level students are generally more focussed and specific than those of their first-level counterparts.

6.10.5 Opinions about computing

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.5**, which contains female and male student messaging in response to questions about how important they felt it was to have the opportunity to experiment with new kinds of computer systems, or if the technology was not important so long as it was adequate to get course tasks done.

Although at both first and third levels there are observations about experimenting with computers being less important, there is a consistent difference in the way this is expressed at each level. This relates to the wording of the proposition message, to which students were responding. In this, the alternatives were, firstly that *the important thing is to get ... course-related tasks done*, and secondly that *the technology is not important, so long as adequate for the task.*

At third level, with the exception of the sixth contributor of both genders, all students use wording about *getting the work done*. Even the technicist ***M3-1*** ends on this note. At first level, although female ***F1-3*** provides the archetypal comment that *all I want to concentrate on is getting the tasks completed and frankly I couldn't care less about the technology*, more students equivocate in terms of technology being adequate.

First-level males appear to believe more in the importance of experimenting than do first-level female students, though ***M1-2***, ***M1-5*** and ***M1-6*** make comments about the important thing being that the technology is capable of getting tasks done. Whereas the former pair conclude with this idea, the latter individual begins with the assertion that both are as important. First-level females ***F1-4*** and ***F1-6*** seem the most in favour of experimenting, and do not include comments about technology being adequate, or getting coursework done.

Three of the six third level males mention operating systems, computing platforms, or software packages by their proprietary names (***M3-1***, ***M3-2***, ***M3-6***). No female student does this.

6.10.6 Comparing CMC with face-to-face

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.6**, which contains female and male student messaging in response to questions about how they valuable they found it that in CMC they had the ability to reflect before responding, whereas in face-to-face seminars an immediate response may be required.

The most apparent distinction in this set of responses is between first-level and third-level students. At first-level, with the exception of ***F1-5***, the response are rather one-sided, agreeing that having the ability to reflect before responding is a valuable aspect of CMC. **M1-1** does also make the point that CMC is useful as a complementary medium, in conjunction with interpersonal contact.

By contrast, at third-level, the majority of the responses address both sides of the issue in one way or another. The comments of ***M3-5*** and ***M3-6*** are one-sided, only noting benefits, and ***F3-6*** is perhaps the student who appears to value this aspect of CMC least, though with some equivocation . However, all the others show a clearly better grasp of the relative benefits of CMC and face-to-face communication in different situations, with different lecturers, for matters of varying complexity, for speed of feedback and interaction, etc.

First level males offer some noteworthy observations in this section. With the exception of ***M1-1***, who expresses confidence in his face-to-face ability, they all use wording whereby their valuing of CMC is expressed by a degree of apprehension about face-to-face communication. For example, to perhaps *make a fool* of themselves (***M1-4***, ***M1-6***), use a *confused jumble of words* (***M1-2***), to *say something I don't mean* (***M1-5***), and *embarrassing yourself* (***M1-3***). There isn't really anything comparable from the females. The nearest might be ***F1-3***'s *having to say the first thing that comes into your head*, but if that can be classed as apprehension, it is of a different order from that suggested by the five males who go further in anticipating a negative outcome.

This phenomenon does not really appear at third level. The nearest might be ***M3-3***'s observation that spontaneous face-to-face communication *can be stressful*. However, he then proceeds to objectively note pros and cons of both mediated and unmediated dialogues.

6.10.7 Attitudes to CMC

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.7**, which contains female and male student messaging in response to questions about the proposition that CMC allows greater equality of participation, and the extent that this matched their own experience.

Males appear to agree to a greater extent than females with the proposition about greater equality of participation in CMC, and to have fewer reservations about its use.

The former issue is particularly evident for first level males. ***M1-5*** and ***M1-6*** do not clearly indicate a view on equality of participation, but the other four ***M1-1*** to ***M1-4*** agree fairly straightforwardly. Among the first level females, ***F1-2*** and ***F1-4*** agree in a quite similar way to the first four first level males. ***F1-1*** does not indicate a view. However, the responses for ***F1-3***, ***F1-4*** and ***F1-6*** show a more balanced view and consideration of other factors, such as access to the technology, education and training in its use, and skills in writing and typing.

At third level, such differences are less apparent. The males are less sure about equality of participation in CMC than their first level counterparts. An interesting factor common to the genders in questioning equality of participation is the issue of knowledge, or rather the lack of it. This can be detected in responses from all but ***F3-3***, ***M3-1*** and ***M3-6***. These observations seem to relate to experiences in external specialist discussion lists or groups, and to the latter part of the question put to them, about identifying instances where they have been put off participating. The least reservations about equality of participation seems to be found in the responses of ***F3-1*** and ***F3-3*** among the females, and ***M3-1***, ***M3-2*** and ***M3-6*** among the males.

6.10.8 Present and future use

The qualitative data corresponding to this aspect of CMC use is recorded in **Appendix 3.8**, which contains female and male student messaging in response to questions about how they felt about extending the use of CMC in education, and the factors which most influenced their views.

In this section female and male students talk in varying ways about things like the desirability of CMC replacing or complementing face-to-face teaching, benefits of using CMC, and in some instances identifying co-requisite resourcing and provisions for the use of CMC. On balance, males appear to have fewer doubts about extending the use of CMC in education. However, most of the students - both female and male - mention the importance of retaining teachers and face-to-face contact.

Males ***M1-5*** and ***M3-6*** are the only males who express virtually no reservations about expanding the use of CMC, other than about cost, and that it should be used intelligently. Among the females, ***F1-4*** appears to have the least reservation, other than noting that it should be used as an 'aid to the teacher', and by implication not a replacement.

Female students seem to have more concerns than males about appropriate technology and training being available, particularly at third level. ***F1-3*** talks about help and support being available. ***F3-1*** notes that computers would have to be fully reliable. ***F3-2*** cautions that benefits of CMC are dependent on having, or having access to, the technology. **F3-3** suggests that more computers are required in schools. ***F3-6*** comments on the need for proper training and that information should be of high academic quality. Among males, there is little talk of this type, with the noteworthy exception of ***M3-5***'s concluding observation about the need for restructuring and redefining of education to cope with increased use of technology.

Chapter 7:

Conclusions

7 Conclusions

All students and staff of the Department of Communication and Information Studies at Queen Margaret University College, Edinburgh, have used CMC systematically for more than five years. This has made it possible to carry out detailed studies over time of the impact of CMC on academic users, and of the value they derive from it. Results are presented here of a survey of student use, including levels and patterns of messaging as well as perceptions of, and attitudes towards CMC activities. Some results are compared with related surveys of UK distance learning students using CMC, and of computing use by students at a US local campus. Despite rapid changes in technological capabilities, there appears to be some stability of reactions to CMC, suggesting a positive if cautious view of its extended use as a complementary, rather than replacement, medium for educational communication and information. In most respects, there is little evidence of female students being at a disadvantage in terms of their use of CMC and their views about it. Where some such gender differences are to be found there is some evidence of females 'catching up' over time.

7.1 Summary of study and main findings

In the latter parts of the three academic years 1989-90, 1994-95 and 1995-96, a total of 288 first and third level students were surveyed about their uses of CMC, their valuing of it as a source of various kinds of information, and about their attitudes towards it and its use. These annual surveys were in three parts, covering:

- usage levels, messaging patterns and sources of useful messages
- the extent to which various categories of CMC information are valued
- attitudes towards computing, CMC, and its present and future use

7.1.1 Usage levels, messaging patterns and usefulness

From the first part of the survey, it was found overall that students believed they used the e-mail system an average of 6.7 times per week, for an average of three hours (7.2). Overall, male students reported being higher CMC users than did females, both in frequency and in hours of use. However, by the time students have reached third level differences in frequency of use have narrowed considerably, and third level female students reported more hours of CMC use then third level males.

Students were asked to indicate whether lecturers or other students were the sources of the messages they found the most useful, or if these sources were about the same for usefulness. While 54% of students responded that lecturers were the more useful source, 39% said that lecturers and other students were about the same for usefulness, and 7% said that other students were the more useful sources (7.3). Results for male students at first and third levels were similar to the global results. However, for female students there is a shift towards valuing messaging from lecturers more at third level.

Regarding the destinations of their messaging, students were offered a range of categories for either course task-oriented or else more conversational messaging, and for messaging either to students or else to lecturers, seeking or offering information. It was reported that 52% of messaging was task-oriented against 48% 'conversational', and 66% was sent to other students against 34% to lecturers (7.4).

7.1.2 Valued categories of CMC information

The second part of the survey asked students to rate the value of each of twenty categories of CMC information (7.5). It was found that students more highly valued straightforward, coursework-oriented information such as, lecture notes, assignment specifications, reading lists, and administrative information about course organization. They valued less highly categories such as fellow students' comments on course subject-matter, extra-curricular discussions, and advertisements. It was found that the overall valuing of categories of CMC information had declined over time, and also that female students value categories of CMC information more highly than do male students.

7.1.3 Attitudes towards computing and CMC

The third section of the survey used a series of attitude statements to gather information about students' strength of agreement or disagreement with a series of propositions about their opinions about computing generally, about the comparison of tutorials by CMC rather than face-to-face, about some of the generally agreed characteristics of CMC, and about some specific aspects of their present and potential use of CMC.

Opinions about computing were mostly positive, and becoming more so over time, and for most of the questions significantly, or highly significantly, so over the period of the study (7.6).

For the questions comparing CMC with face-to-face tutorials, responses were mostly negative regarding CMC. However, responses about its use as a medium for intellectual exchange changed highly significantly over the period of the study, from initially being marginally negative, to offering the only CMC-positive results for this sub-section in the latter survey years (7.7).

For the questions about some of the characteristics generally associated with CMC (e.g. is depersonalizing, lacks feedback), there tended to be agreement, though in some cases indicating a significantly more positive perception of CMC over time (7.8).

Attitudes about present and future uses of CMC were positive and remained stable over time, with the exception of a question about post-course use, for which responses became highly significantly more positive over the period of the study (7.9).

Within this final section a particular focus of interest was the comparison of results for the sub-section comparing the effectiveness of electronic conferencing with face-to-face tutorial meetings (7.7), with those from the sub-section on attitudes about present and future use of CMC (7.9). This was because of the contemporary aspiration of the UK (Dearing 1997) and other OECD countries (Ehrmann 1996) to expand their higher education sectors, against a pattern of decreased per-capita funding, based substantially on the extension of the use of new educational communications and information technologies (C&IT). A key factor in the success of this approach will be the viability, in various respects, of substituting or complementing conventional face-to-face tutorial meetings with CMC. These two sets of questions explore some related attitudes to the efficacy of CMC, but with the important distinction that for the former set, CMC or electronic conferencing is posed in direct comparison with face-to-face tutorials, thereby with the probably contentious implication of replacement.

7.1.4 The female and male information student and CMC

Although the average female student reports lower levels of e-mail use than male students - both in hours of use and frequency of sessions - her use may be more organised and task-oriented. As her experience of using CMC increases over the first three years of her course, the female student becomes more positive about various aspects of CMC, relative to her male counterparts. One of these aspects is to report marginally higher hours of e-mail use by third level. She will also find messages from her lecturers more useful by third level, whereas males change little in this respect. She values information provided via CMC higher than her male counterparts, particularly help on coursework. Regarding attitudes towards computing, the female student is more positive about principled issues of access and opportunity. While less positive than males about hypothetically extending the use of CMC in education, she is more positive in valuing the availability of existing CMC facilities.

The average male student uses e-mail for more hours and over a higher number of sessions than the average female, but perhaps in a less well organized way. By third level, however, females have overtaken him in hours of use, though he still uses e-mail with a higher frequency of sessions. The male student changes little over time in how relatively useful he finds messages from lecturers and fellow students. He values CMC information less than female students do, on average, but notably excepting system information from IT centre staff. In attitudes towards computing, he is more positive about practicalities of computer use. At first level he is more positive towards CMC-based seminars than fellow females, but possibly because of apprehensions about face-to-face seminars. Like his female counterpart, he is positive about extending the use of CMC in education, but more so and with fewer reservations.

7.2 Levels of CMC usage

Approximately 50% of the students surveyed reported using e-mail between once and twice per day. This may be an appropriate level of use for students who are 'hot-desking' at public-access workstations, which at some times of years might have to be booked in advance, and managing their time across a combination of academic, social and possibly also part-time working activities. The average frequency of use did not vary significantly over the period of the study, and this stability may be to some extent determined by being part of such a planned work routine. By contrast, the durations of sessions of use might vary more depending on the amount of work to be done, or conversely by limitations on the availability of workstations at which to do such work.

Unlike average frequency of CMC use, average weekly durations of use did vary highly significantly for all three of the survey years. Some explanation of the apparently lower duration of use for the academic year 1989-90 is provided by factoring in the use of the Vax minicomputer's word-processing package, which was used very much as an adjunct to the e-mail system at that time.

To an extent this explanation might plausibly reduce the significance of the difference in average durations of use between 1989-90, when a centralized minicomputer architecture was in use, and the latter years, when the computing architecture had changed to client-server. This would then accommodate better with Anderson's (1987) conclusion from the Carnegie Mellon study, that the equivalent transition, from mainframe to PCs, did not change the way people used computers or the amount of time spent using them. However, the comparison with the subsequent QM cohorts is in any case not simply after such a transition, but also after a period of four or five years in which significant technological changes took place.

In seeking further explanation for why there should have been a 'peak' in academic year 1994-95, followed by a significantly lower average duration of use in 1995-96, the technologically deterministic perspective offers some possible answers. For example, in 1989-90 for most students CMC activities were confined to the QM Vax minicomputer which had no connection to external networks. By contrast, the system of LANs used by the 1994-95 cohort had a JANET (but not Internet) connection which could be used - if somewhat ponderously and requiring rather arcane knowledge - to in principle access most of what was regarded as the 'Internet' of the time. Therefore, a technologically deterministic explanation is that the increased use reported from 1990 to 1995 may simply be accounted for by the fact that, because there was more available to be made use of, more use was made.

Regarding the subsequent fall in 1995-96, this may relate to the switch to using a workshop of PCs with Internet-connected graphical Web browsers. This made it possible to achieve many earlier activities more directly and more quickly, and thus requiring less time, again an explanation from the perspective of technological determinism. Alternatively, however, it may also be a reflection of an increased competition for resources which did not increase over the two-year period 1994-96, with a consequence that fewer PC-hours were available per student seeking them.

7.2.1 Gender differences in levels of use

The broad finding that male students' levels of use are higher than female students' is consistent with predictions from the individual differences perspective, and from the balance of the literature which has addressed gender dispositions towards computing technology (Siann *et al.* 1988), regarding aspects such as anxiety (Brosnan & Davidson 1994), prior experience (Zubrow 1987), familiarity and confidence (Wilder *et al.* 1985), etc.

However, closer inspection of this higher male use reveals a consistent pattern which was not found in the literature. The number of *hours* over which males use e-mail is higher than females, though probably not significantly so. However, the number of *times* - or sessions - over which male students spend time using e-mail is highly significantly higher than females for two of the three survey years, and probably significantly so for the third. Another way of expressing this is to say that males' sessions are shorter, and more frequent than females'. The average male student's reported session lasts 22 minutes, compared with females' 33 minutes, notwithstanding that an individual differences perspective would predict female students to be more likely to have prior typing experience, and thus in principle be likely to require less time to keyboard similar amounts of information.

These gender differences are greater at first level, and reduced by the time students have reached the third level of their studies. By third level, while males still report using e-mail over a higher number of sessions, the size of the difference has halved, and it is now female students who report themselves to be the higher users in terms of hours per week. Session lengths remain comparably different. First and third level males average 20 minute and 24 minute sessions respectively. First and third level female students average 32 and 36 minute sessions.

One interpretation of this might be that the female students are more organized in planning their use of CMC, and require fewer sessions than males to achieve their goals, even when reportedly using over greater numbers of hours, as is the case for third-level female students. Nabi and Bagley (1998) found that skills on which females rated themselves higher than males included team working, time management, planning and organising, and prioritising. In terms of learning styles, this suggestion can be relate to the meta-analysis of Severiens and ten Dam (1998) which found that men score higher on Entwistle's (1981) non-academic orientation, which includes a 'disorganised study methods' scale, for being unable to work regularly and effectively.

Analysis of the qualitative data relating to this aspect of CMC use (**6.10.1**) offers no clear differential information about female and male students frequencies of use or session lengths. However, there are aspects of the discourse which may lend some support to the characterization of males being interested in the medium for its own sake, whereas females see it more as a means towards the end of completing coursework.

Firstly, several males talk about their use of CMC technology in way that no female student does. Examples of this include descriptions of configuring e-mail clients to perform filtering, automated checking for new mail, and use of multiple e-mail accounts. A possibly related distinction, which involves no less than half the male students, with equal numbers at each level, is in the use of product or organizational names to identify e-mail client software and e-mail account providers.

Secondly, although there is more balance in this aspect, there is a clear majority of females over males to be found speaking about their use of CMC in ways that involve references to their academic work, subjects, modules, lecturers, etc. These distinctions fit with the observations of (Siann *et al.* 1990), that females seem to have a more pragmatic view of computers, and compared to males, are more likely to view them as useful tools rather then objects with intrinsic interest.

If these differences in behaviour are further read as meaning that females may be more work-oriented, using more systematically when they needed to, whereas males may enjoy the medium more for its own sake, and personal interest, then this would fit with the findings of and Gunn *et al.* (1993), Ford and Miller (1996) and Barrett & Lally (1999) about the greater task-orientation of females' CMC usage.

7.3 Sources of messaging useful to students

Another marginal difference is to be found in students' estimation of whether lecturers alone were the source of the most useful messages they received (54%), or if lecturers and other students combined were about the same in this respect (46%). While the former figure indicates (as one might hope) that lecturers were the more valued source, the latter figure suggests a significant element of student self-support via the use of CMC. Such use is predicted by the model of CMC-assisted staff-student communication described earlier in **3.1.3**, in which the communication-flows both feed back into communication from the teacher, and also feed information between students. Johnson (1981) had earlier suggested that student-student interaction was a neglected variable in conventionally delivered education. However, staff use is probably also a necessary factor in developing a culture of students using CMC in learning.

7.3.1 Gender differences in valuing message sources

The notable gender difference for this area of the survey is to be found between course levels. For male students, reported sources of valuable message are distributed very similarly at first and third levels. However, comparing responses from first-level females and third level females, there is a substantial shift in distribution from the **AboutSame** category to the **Lecturers** category. Such an effect may be related to findings from the literature that females learning e-mail - which in the context of the present study largely happens at first level - rely more on co-workers (Allen 1995).

The analysis of the qualitative data about message sources (**6.10.2**) revealed no particular gender differences, but offered some further confirmation of student self-support via CMC. The most informative observation was that the message content was more important than the source of the message. Whereas lecturers were expected to be a source of useful messages, students could also be so. Instances where students forward information they personally had received from lecturers, to student e-mail distribution lists exemplify an 'amplifying' use of educational CMC usually expected from lecturers rather than students.

7.4 Destinations of students' messaging

Table 7.1 lists the e-mail messaging destinations about which students were surveyed, and the keywords associated with them for data processing purposes.

Keywords to message destinations

keyword	:	*destination and purpose*
StudConv	:	other student(s), conversationally
StudTask	:	other student(s), as required course task
StudHelp	:	other student(s), seeking help with course-related matters
StudOffer	:	other student(s), offering help with course-related matters
LectConv	:	lecturer, conversationally
LectTask	:	lecturer, as required course task
LectHelp	:	lecturer, seeking help with course-related matters

Table 7.1. Message destinations and purposes

It was found that despite an increase in the number of lecturers using e-mail, and thereby available to send messages to, students' messaging to lecturers for task-oriented (**LectTask**) and conversational (**LectConv**) purposes declined by 7%. Perhaps this can be explained from a human relations perspective, if this increased potential audience had the effect of making students more inhibited in their messaging, relative to earlier stages where CMC was being used within a smaller, closer group of lecturers.

Students report their biggest messaging category to be to other students, conversationally (**StudConv**) at 28% overall, and increasing from 21% to 30% over the period of the study. This finding might initially be taken as confirming administrators' worst fears of CMC resources being put to trivial use. Particularly now that the Internet's World Wide Web has been added to the suite of activities typically available to students within the scope of CMC, some concerns have been expressed that such facilities will be mis-used, recreationally, wasting time and resources that should be devoted to course-oriented work. From that point of view it is perhaps reassuring - if marginally so - to note that students estimated that the proportion of their messaging which was for required course tasks exceeded their more conversational messaging overall, though by 1996 conversational messaging was in fact higher by 1%. In any case, however, it is also usually recognised that in informal modes of conventional scholarly communication there is not a clear demarcation between the social and the academic.

As a methodological issue, it might be considered an error of category (or hubris, perhaps) that the symmetry of response options was not completed to include a **LectOffer**, for e-mailing to a *lecturer, offering help with course-related matters*. On the one hand, from a student's viewpoint it might seem pretentious to be a sender of such messages, and that this was not an appropriate category. On the other hand, from a lecturer's viewpoint, from experience and anecdote, messages are received from students (probably in the **LectHelp** category from the student's viewpoint) which are of help to the lecturer with course-related matters. A characteristic example would be where a single student e-mails a lecturer to query or seek clarification on some matter, which may not have occurred to the lecturer as being problematical. The lecturer is then able to broadcast a message of clarification to all the students concerned. Or, a more prosaic example of a potential **LectOffer** might be where a student offers to be employed as a student demonstrator, as happens.

7.4.1 Destinations of female and male students' messaging

The only gender difference significant over the three survey years was for the **LectConv** variable, male students being more likely than females to e-mail lecturers conversationally.

However, it may be that some more marginal differences have some importance as part of a wider pattern of results and trends. These might include, for example, that females report sending higher proportions of task-related messages than do males, and that the messaging profile of female students at third level suggests narrowing differences, whereas that of males shows little change between levels.

Analysis of the qualitative data about message destinations (**6.10.3**) revealed a number of variations in the ways some female and male students expressed their responses.

A feature present only in the responses of female students was to do with attention given to their communication with lecturers via CMC. This attention related both to care with the composition and phrasing of their messages, and also to an altruistic or empathetic awareness of the effects of the use of the medium on the lecturer being communicated with. Barrett & Lally (1999) also noted females taking more 'care' than males in message composition. The examples of more empathetic forms of messaging from some females fits with the models of Perry (1970, 1981) and Belenky *et al.* (1986) of the gender difference in learning style whereby 'connected' females prefer a mode which is empathetic in nature, where co-operation is stressed rather than competition.

By contrast, the discourse of male students about e-mailing lecturers reveals few concerns of this type, and some evidence of a more self-serving and rationalist view of their CMC use. Some males describe e-mailing lecturers as not being a problem for them, as though anticipating that it might be for some. Others present a logic that legitimates the e-mailing lecturers on course-related matters, perhaps demonstrating Turkle's (1984) view of the male-oriented 'analytical' model of reasoning. Whereas some females were noted to express some awareness of what might be described as human relations effects of their electronic communication with lecturers, males appear more deterministic in their most comparable observations, about the usefulness of CMC to them, perhaps as 'separated' learners (Perry 1970, 1981; Belenky *et al.* 1986) relative to the 'connected' females noted above.

7.5 Categories of CMC information

Table 7.2 lists the categories of CMC information about which students were surveyed, and the keywords associated with them.

Keywords to categories of CMC information

keyword	:	*category descriptions and examples*
Admin	:	administrative - room changes, handouts to collect, coursework deadlines
Advert	:	advertisements for books, accommodation, cars, etc
Career	:	information about jobs, careers, past graduates, recruitment fairs
Comment	:	comments by class members on material presented in class
Discuss	:	extra-curricular discussion - politics, media, etc
Event	:	notice of relevant upcoming events - TV, seminars, guest lectures, etc
Exwork	:	examples of coursework submission or drafts from other students
Feedback	:	feedback from coursework markers
Handout	:	teacher's handouts and lecture notes
Help	:	clarification and advice on coursework from teachers
Outline	:	course outlines, rationales, and lecture plans
Photos	:	captioned pictures of staff and student seminar groups
Preview	:	previews of material to be presented in class - videos, lecture synopses, software, etc
Reading	:	readings lists and subject references
Reps	:	messages from student course-representatives
Resume	:	resume and personal information about other class members
SocMess	:	social messages, about parties, outings, humour, etc
Spec	:	coursework and workshop specifications from lecturers
StudAss	:	information from the Students' Association
System	:	notices and reports from Computer Centre staff

Table 7.2. Categories of CMC information

An overall finding from this section of the survey was that what might be termed *straightforward* types of traditional, coursework-focussed information were valued more highly than what might be termed some of the more *esoteric* types of novel information which it becomes possible to provide via CMC.

Thus, for example, the most highly valued categories were, handouts and lecture notes (**Handout**), assignment specifications (**Spec**), clarification and advice on coursework (**Help**), reading lists and subject references (**Reading**), feedback from coursework markers (**Feedback**), course outlines and lecture plans (**Outline**), and administrative information advising them about course-organization details (**Admin**). By contrast, categories such as fellow-students' comments on course subject-matter (**Comment**), extra-curricular discussions of politics, media, etc (**Discuss**), and resumé information from other students (**Resume**) were valued less. Advertisement messages (**Advert**) are also rated as low-value. Least valued was the category **Photos**, possibly because these were introduced for the first time in academic year 1994-95, or possibly because more easily viewed copies of the same photographs were to be found on departmental noticeboards. The relative success of the former types of messages may perhaps be seen as corresponding to Wilson (1983) and others' recommendation that, when initially promoting and establishing CMC use in an organization, existing categories of information should be identified which can be provided electronically.

7.5.1 Changes over time in valuing categories

Between 1989-90 and 1995-96 the biggest displacement was the **ExWork** category (for examples of coursework from other students) which climbs seven places from fifteenth in the earlier year, to eighth. This shift perhaps reflects a corresponding shift in the nature of the student experience, towards a greater focus on the direct academic goals to be achieved.

Next was the **Reps** category (for messaging from student course-representatives), falling six places from ninth in 1989-90 to fifteenth. Two possibly related reasons for this suggest themselves. Firstly, in 1990 (and before) e-mail had been used particularly effectively for this purpose, and this category may thus be considered to have been provided particularly well in this earlier era. Secondly, it may have a 'human relations' explanation relating to subsequent loss of influence of Student-Staff Consultative Committees and their representatives, for various reasons, such as course size, loss of cohesion, a less paternalistic system, etc.

The categories **Admin** (for *administrative messaging*) and **SocMess** (for *social messaging*) both rose five places, from sixth to first and from sixteenth to eleventh respectively. The increase in valuing of the **Admin** category may be related to the growth of the department's staff and student body over the period, and also the increasing complexity of course-structure and options. Whereas in earlier years informal, personal methods of communication were adequate, they would subsequently become less effective. It may be that the higher value placed on the **SocMess** category is partly due to external events, and the current popularity of the Internet and the use of electronic mail.

Finally, there is an overall trend over time of messaging categories receiving lower absolute scores. This may suggest that students now have a greater expectation of such information being provided for them, and therefore value it less, which may be an explanation from the perspective of technological determinism.

7.5.2 Gender differences in valuing categories

Valuing of categories of CMC information could be said to be little differentiated by gender, since for fifteen of the twenty categories there was either no rank difference, or else a difference of just one position. The greatest difference was of only three positions, for the categories `Help` (for *clarification and advice on coursework from teachers*), and `System` (for *notices and reports from Computer Centre staff*). However, the two variables concerned may be significant in reflecting the possible characteristic gender differences in use of CMC.

Firstly, regarding the `Help` category, this variable can be seen as having special importance (a) because it is ranked *first* by female students, and (b) because the kind of messaging information it is concerned with is clearly so fundamental to the use of CMC in education. It may also relate to the meta-analysis of Severiens and ten Dam (1998) which found that women score higher on Entwistle's (1981) reproduction orientation, which includes a 'syllabus-boundness' scale, for reliance on staff to define learning tasks.

Secondly, the difference for `System` may correspond with the stereotype of male students interest in CMC and computing for the system itself, compared with the relative characterisation of females (who ranked this variable lower) seeing it more as a means to an end (Siann *et al.* 1990).

Finally, looking at overall means, and that these are consistently higher for female students than for male students it might be said that females generally value information provided via CMC more highly than do male students.

The analysis of the qualitative data about CMC categories (**6.10.4**) revealed no particular gender differences, but offered further support for the global finding that students most value coursework-focussed information, about their studies, lectures, and assignment tasks.

7.6 Opinions about computing

Table 7.3 lists the attitude statements used to survey students on their opinions about computing, along with the keywords associated with them, all of which were adopted from the survey at Carnegie-Mellon University reported by Anderson (1987).

Keywords for Opinions About Computing

keyword		*statement to be agreed or disagreed with*
EasyAccess	:	Everyone at QMC should have full and easy access to a computer.
LearnUse	:	Almost everyone should learn to use a computer.
LikeAccess	:	One of the things I like about QMC is the access I have to computing.
Practical	:	I would like to see more practical uses of computers at QMC.
Experiment	:	I like to experiment with computer systems.
UseMore	:	I would like to use a computer more than I do now.
TooMuch	:	There is too much emphasis on computing at QMC.

Table 7.3. Attitude statements for opinions about computing

At first thought it might seem incongruous to compare the situations of students at Carnegie-Mellon University and at Queen Margaret University College, due to the disparity in computer resourcing. The former is recognised as arguably the most computer-intensive campus in the USA, and thereby probably the world. A 1986 *Micro Live* BBC TV programme (BBC 1986) noted that CMU had "three times as many Vaxes as classrooms", while a single Vax was the basis of the QM e-mail system until the transition to LANs in 1992. However, if one firstly discounts the High Performance Computing aspects at CMU, and secondly takes account of the intervening decade's technological cost-reductions and performance-improvements in entry-level computing, the experience at the level of personal computing and CMC may in fact be less dissimilar, as suggested by the results. The mean difference in percentages of CMU and QM students agreeing with the attitude statements was less than 6%. Both communities gave the same ranking to the three strongest areas of agreement, firstly, that everyone should have easy access to computing (**EasyAccess**), secondly, that almost everyone should learn to use a computer (**LearnUse**), and thirdly, that access to computing is appreciated (**LikeAccess**).

7.6.1 Gender differences in opinions about computing

The overall difference in means for this section by gender was less than 3%, females having given higher scores for the first three statements, and males higher for the latter four. The difference in nature between these groups of first three and latter four - or at least the first three of them - might be that the first three are 'policy' and the remaining four 'practice'. The former group might be seen as more influenced by a human relations perspective, and the latter more by a technicist perspective.

The question which produced the greatest difference between males and females was about liking to experiment with computer systems (**Experiment**). If the global results can be seen as confirming the stereotype of males being the ones enthusiastic about experimenting with computers (Siann *et al.* 1988), then the changes over time may indicate that female students are catching up and closing the gap.

It is also noteworthy that whereas for gender results overall, females were the more positive in less than one third of the individual year variables, for third-level students there was a gender equality of positiveness in this respect.

The analysis of the qualitative data on opinions about computing (**6.10.5**) revealed a greater difference between course levels than genders, with third-level students the more likely to talk about getting course work done.

However, there are again some indications of discourses characterizing males as interested in the medium for its own sake, compared with females seeing it as a means to an end, as already noted in **7.2.1** above. It is a female student who says that her concentration is on task-completion and that she *couldn't care less about the technology*. By contrast, a certain masculine caring for the technology, as suggested by Levin and Gordon (1989), is to be found in the way half of the third-level males identify computing systems by proprietary names, whereas no females do this. At first level, although more males than females appear to believe in the value of experimenting with computing for its own sake, two females also express this view quite clearly.

7.7 CMC compared with face-to-face tutorials

Table 7.4 lists the attitude statements used to survey students about the comparative value of tutorials by CMC and by face-to-face meetings, along with the keywords associated with them. These questions were adopted from an Open University study (Open University 1990) of students taking the DT200 course.

Keywords for Comparing CMC with Face-to-face Tutorials

keyword : statement to be agreed or disagreed with

How would you compare electronic conferencing with face-to-face tutorial meetings ...

CourseDiff	:	... as a means of getting help with course-related difficulties?
Socialize	:	... as a means of socializing?
Intellect	:	... as a medium for intellectual exchange?
Effective	:	... for its effectiveness, in terms of time spent by you?

Table 7.4. Attitude statements for comparing CMC with face-to-face tutorials

Responses to the attitude statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a means of getting help with course-related difficulties?"* (**CourseDiff**), remained stable and negative over time. By contrast, responses to the final two survey questions in this section - about effectiveness of time spent, and about intellectual exchange - show significant changes towards reduced negativeness, and even marginal positiveness. This apparent inconsistency of result may be because students see course 'difficulties' as something where face-to-face consultation is needed, and where CMC does not meet their needs.

The statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a means of socialising?"* (`Socialize`), received the most negative response from QM students. This perhaps supports intuition that the aspect of face-to-face tutorials for which CMC is likely to be least good as a substitute is likely to be that of socializing. While 86% of OU students found CMC less effective as a means of socialising, the figure for QM students was 15% lower. However, it is likely that QM students would use CMC differently as a means of socializing, in a complementary rather than replacement way, and to arrange face-to-face social events, and this is borne out by analysis of messaging (McMurdo & Meadows 1996).

Responses to the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a medium for intellectual exchange?"* (`Intellect`), became highly significantly more positive over time. Such a trend would be welcomed by educationalists, since in terms of pure educational objectives, it might be regarded that 'intellectual exchange' is quite a fundamental aspect, if not the primary one. In seeking to explain this apparent trend, reference might be made firstly to the human relations perspective, with particular regard to the idea of a 'critical mass' of users within an organization or sub-group, since, over the period of the study recurring student concerns about partial staff use of CMC diminished as staff networking access improved to become global. Secondly, some explanation may lie with the perspective of technological determinism, in that over the period of the study, and an increasing exposure to wider-world uses of CMC and the Internet, it would become objectively apparent that - despite some 'trivial' uses - the medium was significantly used for intellectual exchange. The biggest difference between QM and OU students was for comparing CMC and face-to-face meetings as a medium for intellectual exchange, where 53% of OU students found CMC less effective against 26% of QM students - the least negative response from QM students.

Responses to the final statement in this section, *"How would you compare electronic conferencing with face-to-face tutorial meetings for its effectiveness, in terms of time spent by you?"* (`Effective`), also became highly significantly more positive over time. These changes may have a fairly literal explanation from the perspective of technological determinism in that more efficient user interfaces, combined with access to more extensive resources, may mean that similar expenditures of time produce more valuable results. Alternatively, from the human relations perspective, over time it has perhaps become a characteristic of the surveyed group that more flexible modes of access are increasingly valued.

The OU students appear to share the overall scepticism of the value of electronic as compared with face-to-face tutorials, and in all cases, they find it less effective than the QM cohorts. From a human relations perspective, it is likely that these differences reflect the fact that the OU students were mainly involved in distance learning, whereas QM students are exposed to a more varied learning environment. Likewise, for OU students, substitution of face-to-face tutorials with CMC would mean *no* face-to-face contact, whereas for QM students there could still be contact at lectures and other possible on-campus situations. From a technologically deterministic perspective, the OU students' interface was also a more difficult one to use in 1989, being via dialup modems, probably operating no faster than 1200 baud. At the time, standard issue to tutors was a split-speed modem running at 300/300 baud or 1200/75 baud.

7.7.1 Gender differences in comparing CMC with face-to-face tutorials

The interesting difference here is again in the comparison at third level. Overall, differences are very marginal, with each gender more positive in six out of the twelve means, but with males the more positive overall. At third level, however, female means are more positive in seven out of the twelve instances, and the more positive overall.

Overall, for both genders, none of the three-year means was positive, but **Intellect**, for the statement *"How would you compare electronic conferencing with face-to-face tutorial meetings as a medium for intellectual exchange?"* was neutral (viz. M=3) for male students. At third level, however, female means for **Intellect** are higher overall and in each individual year than for male students, and are never negative.

Although these are statistically marginal shifts they show some consistency, both over time and in relation to other data. This may perhaps again be related to observations by Siann *et al.* (1990) that computing experience diminishes previously existing gender differences.

Analysis of the qualitative data about comparing seminars by CMC with face-to-face meetings (**6.10.6**) produced some interesting findings.

Again there are some apparent differences at course level. Whereas first level students tend to give rather one-sided responses, only noting benefits of CMC in this respect, third level students tend to give more balanced and shaded answers. This is largely to be expected, given the differential in their experience of using CMC, and it would be expected that third-level students would thereby have a more realistic grasp of the relative benefits of CMC and face-to-face communication in different situations, and be able to cite examples.

The more interesting difference at course-level is provided by first-level male students, since - with one exception - they use language whereby their valuing of this aspect of CMC is defined by various expressions of apprehension about face-to-face communication in seminars. The survey findings have identified a pattern whereby male students overall are more positive towards most aspects of CMC than female students, but noticeably less so at third level, and therefore relatively more so at first-level. It might therefore be the case that an apparent relative positiveness of first-level males towards seminars meetings by CMC is explained to some extent by a negativeness towards, and apprehension about, participation in face-to-face seminars in the early stages of their course.

7.8 Attitudes towards CMC

Table 7.5 lists the attitude statements used to survey students about the comparative value of tutorials by CMC and by face-to-face meetings, along with the keywords associated with them. These questions were also adopted from the Open University study (Open University 1990) of students taking the DT200 course.

Keywords for Attitudes Towards CMC

keyword	:	*statement to be agreed or disagreed with*
Particip	:	Individuals can participate more equally in electronic than in face-to-face communication.
Depersonal	:	Computer communication is depersonalizing.
Assertive	:	Computer conferencing encourages individual assertiveness.
LackFeed	:	Personal interaction is more difficult with computer communication because of the lack of contextual and verbal feedback.

Table 7.5. Attitude statements for attitudes towards CMC

Of the four 'attitude statement' sections, this one might well be perceived as the least interesting, in that the four statements here (except perhaps for the 'assertive' one) could be taken as consensual truisms about CMC, commonly stated in the social-psychological literature of the subject. For example, all four are found in Kiesler *et al.* (1984), a paper also reproduced in the OU's DT200 course reader (Finnegan *et al.* 1987). On the other hand, it could be considered that, while these statements might be truisms, and descriptions of fact about the nature of CMC, there might nevertheless be interest, from the individual differences perspective, in how different respondents relatively assess them as personally realised via their own individual experiences of using CMC.

For the question about the difficulty of personal interaction by CMC because of the lack of feedback, the figure for QM students agreeing has decreased by 15% over the period of the study. This may be related both to the greater universality of e-mail use by students and lecturers, and also to the growing popularity of e-mail in the wider world.

Again, differences from OU students may be most attributable to issues of interface and educational context. Also, however, it is likely that OU students would typically have made less use of electronic messaging than QM students, and their responses may be more reflective of theoretical knowledge of the social-psychological characteristics of CMC, rather than experiential knowledge.

7.8.1 Gender differences in attitudes to CMC

The findings here are that, overall, males are more positive than females towards CMC, despite the suggestion that females may view CMC systems more favourably than males, because of the opportunity to "have their say" in a medium where they cannot be shut out by dominant males (Hiltz & Johnson 1990). Indeed, the biggest difference is, ironically, for the statement that *"Individuals can participate more equally in electronic than in face-to-face communication"* (`Participate`). In terms of the four overall means, male students are more positive for all four variables, and female students are more positive in only three out of the twelve means for individual years.

Again, however, the situation is somewhat different by the time students have reached third level. Third level male students are still more positive overall, but with diminished differences. In terms of the four overall means, third level male students are still more positive towards three out of the four attitude statements, but third level female students are the more positive for the statement that *"Computer conferencing encourages individual assertiveness"* (`Assertive`). In terms of the twelve means for individual years, third level females are the more positive in seven, compared with just three for females generally, and two of these seven instances are for the `Participate` variable, in 1996 and in 1990.

Analysis of the qualitative data about attitudes towards CMC (`6.10.7`), where students were asked whether the proposition that CMC enables greater equality of participation matched their own experiences, produced some variations in responses between genders and course levels.

Among the first level female students, two agree fairly unambivalently with the proposition about equality, much like the majority of their first-level male counterparts, and one gives no clear view. The other half of the first-level females express a more balanced view, considering related contingent factors such as access, training, and skills, similar to the majority of third-level students of both genders.

At first-level, no male student disagrees with the proposition. Four of the six male students agreed fairly straightforwardly, and the remaining two do not give a clear view. At third level, however, male students express more cautions about equality of participation, sharing along with their female counterparts reservations about having the necessary knowledge. This difference between first-level and third-level males, can be seen as perhaps related to the finding from the previous section, where first-level males valued CMC for the ability to reflect before responding, possibly due to apprehensions about face-to-face participation.

7.9 Views on present and future use of CMC

Table 7.6 lists the attitude statements used to survey views about their present and future use of CMC, along with the keywords associated with them.

Keywords for Present and Future Use of CMC

keyword	:	*statement to be agreed or disagreed with*
NotAvail	:	It would make little difference to me if CMC facilities weren't available.
Monitor	:	Being able to see other students' work helps me self-monitor and improve my own performance.
ExtendUse	:	If staff-student ratios rise, it would be desirable to make more extensive use of CMC.
FutureUse	:	I would be interested in continuing to use CMC after my course ends.

Table 7.6. Attitude statements about present and future use of CMC

The four questions in this final section of the survey might be thought of as the 'bottom line' for educators trying to evaluate the benefits and value of CMC in a cost-benefit oriented, customer-conscious academic world, preparing students for work in an 'Information Society' in which the workplace is increasing predicted/confirmed to involve electronic networking. A hard-nosed educational administrator budgeting scarce funds might want to know:

- do students value their access to CMC facilities?
- do they believe it improves their work?
- would they accept greater use of it to cut staffing costs?
- would they welcome employment involving CMC?

Responses to the statement *"It would make little difference to me if CMC facilities were not available"* (**NotAvail**), while positive, and while indicating increases in strong disagreement over time, did not show changes of magnitudes which were statistically significant. This stability over time would seem inconsistent when contrasted with the highly significant changes from the previous section, regarding intellectual exchange, and effectiveness of time spent. However, an explanation for this positive stability may perhaps lie in students' astuteness of insight that, over the time period of the study, the likelihood of CMC facilities becoming not available is a more improbably hypothetical one than the more realistic scenario posed by the later question about extending use of CMC.

Overall, 61% of students agreed with the statement that *"Being able to see other students' work helps me to self-monitor and improve my own performance"* (**Monitor**), and responses remained very stable over the period surveyed. The perspectives of technological determinism and human relations perhaps offer explanations for responses to this question having the second-highest overall mean. From the former perspective, it is the technology which enables a new shared view of other students' work which would previously have been seen only by teachers marking assignments. From the latter human relations perspective, this new sharing of experience creates shifts in the dynamics of groups engaged in similar work, perhaps increasing the sense of community for those involved. Whether or not CMC *actually* improves students' work is, of course, another question. Some hypotheses were identified from studies of the nature of information processing in oral and literate cultures which suggested some cognitive level benefits of switching some educational interaction from an immediate, face-to-face, oral mode to computed-mediated, literate mode and giving students more time to reflect upon their understanding (Goody 1987, Ong 1982, Laurillard 1993, Mason 1994). Otherwise, however, for better or for worse, in the evolving higher-educational climate, 'customer' belief in benefits would be likely to have a value alongside any objectively demonstrable benefits. To consider a reverse scenario, a hypothetical pedagogical methodology of actual benefit to students, but which students didn't believe to be the case, might not currently be very attractive to educational administrators.

In this section the question which engendered least agreement (59%) from QM students, but which also had the most neutral responses, and least disagreement (6%), was for the statement *"If staff-student ratios rise, it would be desirable to make more extensive use of CMC"* (**ExtendUse**). In interpreting the fairly positive response to this statement, and the small amount of disagreement with it, and the stability of this response over time, the human relations perspective may be the dominant one of the interactionist trio. Characteristics of the users might have some influence in disposition towards CMC, but the changes in the technological environment do not seem to be having an effect, and the attitude statement posed to students in itself literally hypothesizes about shifts in the dynamics of groups within the organization. Such a positive, but equivocal (in terms of the substantial neutrality), response to this question might be considered a commendably informed response. Concerns have been expressed in the CMC-using community about a scenario where educational administrators seeking cost-savings from IT go directly from inexperience of using CMC in education, to enforcing its wholesale application, as envisaged in the current 'digital diploma mills' debate in the USA (Noble 1997, 1998).

The significantly strengthening agreement with the statement *"I would be interested in continuing to use CMC after my course ends"* (**FutureUse**), might best be explained from the perspective of technological determinism. Firstly, this might reflect students' experience within their course, of a progressively improving CMC interface allowing them access to greater amounts of information in a more versatile way. Secondly, it might also reflect the world outwith their course, in which career prospects involving some use of CMC have become increasingly more realistic.

For this section overall, 64% of students responded positively, and the percentages for the individual years show progressive increases. This, and the component results for this section, are clearly important in relation to the earlier results where students were negative about CMC when posed questions which compared its use with face-to-face tutorials.

7.9.1 Gender differences in views on present and future use of CMC

Once again, male students appear to be more positive towards CMC than females, although both genders are positive for all the overall means and for every component mean for all four attitude statements in this section.

Even at third level, where in some instances, the balance of greater positiveness has swung towards female students, males remain the more positive overall, though with the exception of the **NotAvail** variable, for the statement *"It would make little difference to me if CMC facilities were not available"*. This was also the variable for which there was least difference between the three-year mean for female and male students for this section. Conversely, the greatest difference in mean score for this section between females and males was for the **ExtendUse** variable, for the statement *"If staff-student ratios rise, it would be desirable to make more extensive use of CMC"*.

There is something verging on contradiction in this, with something of the flavour of Sanders' (1987) and Lightbody and Durndell's (1993) *We can, I can't* and *I can, but I don't want to* syndromes. It may also illustrate one of the characteristic differences in views about CMC between the genders. On the one hand, there is least difference between genders overall, and greater positiveness by third-level females, for valuing the *availability* of CMC facilities. Yet when the idea of *extending* the use of CMC is suggested, the greatest area of difference emerges, with males the more positive, and females perhaps more cautious and having more reservations in mind.

There is some support for this from the analysis of the qualitative data gathered about this aspect (6.10.8). Here, while the majorities of both genders mentioned the importance of retaining teachers and face-to-face contact, male students otherwise expressed few reservations about extending the use of CMC in education. By contrast, there is an almost exclusively female discourse expressing cautions largely from the human relations perspective, identifying issues such as access to technology, availability of training and support, and prior experience in schools.

7.10 Additional comments by students

The characteristic early years plea from students for more widespread use by members of teaching staff suggests that in the mix of users Markus' (1987) 'critical mass' of users had then yet to be attained. The subsequent tailing off of this particular comment could be explained in technologically deterministic terms, in the expansion of network access to all staff offices of the CIS department. However, this must also be viewed from a human relations perspective, in the departmental policy that e-mail was the default method of communication with students.

There was a distinct category of comment about usefulness of delivery of course materials by CMC where students had not been able to attend the timetabled lectures or workshops. A trend in this category was from formerly being to accommodate "legit excuses for skiving", to latterly enabling more crucial activities (be they stacking supermarket shelves or dropping kids off at school or crèche). This suggests explanations both from the human relations and individual differences perspectives. The student populations and their individual and economic lives have become more varied over time in the range of competing commitments which may have to be balanced with academic ones. In this respect greater flexibility in the modes of delivery of courses may be beneficial.

7.11 Review of study aims and objectives

The aim of the study was, to examine quantitatively to what extent student use of and attitudes towards CMC change over time, with particular reference to gender issues.

The objectives of the study were:

- To present an analysis of the core CMC student user population and levels of CMC usage.
- To identify students' preferences for different kinds of information made available via CMC.
- To investigate students' attitudes towards CMC.
- To explore possible gender differences in students' uses of, preferences for and attitudes towards CMC.
- To compare results with benchmark data from comparable institutions of higher education.

In broad terms, this aim and these objectives can be seen to have been achieved in the body of quantitative data presented here, and with some interpretation from the methodological perspectives used in the study. On the one hand a degree of stability of students' responses over the period surveyed lends reliability to the results, as does some validation from objective system accounting data where this was available. On the other hand, within this overall pattern of stability of response, some particular trends can be discerned over time which are progressive and significant.

Regarding gender, little evidence has been found to support concerns that, as students are required to communicate increasingly via CMC, females may be disadvantaged by their lack of familiarity with computers and by ways in which males and females differ in their use of computing (Taylor *et al.* 1993). If anything, the present study provides support for the findings of Ory *et al.* (1997) for a reassuring 'gender similarity' in these matters. However, the recurring patterns of female students seeming to 'catch up' over time may suggest a need for attention firstly, to female CMC users at early course levels, and secondly to male CMC users generally in the longer term.

The 'interactionist' theoretical perspective adopted for the study is a realistic one for the study of acceptance and use of CMC systems, since, as noted by Hiltz and Johnson (1990) and Hiltz (1992), what determines such acceptance and use is not uni-dimensional, but rather is likely to depend on an interaction of technological, individual, and organizational variables. The other side of this coin, however, is that while the 'interactionist' perspective is clearly a realistic one in the sense argued by Hiltz *et al.* it is also a slightly frustrating one in that clearcut explanations of some results are thereby more difficult to obtain.

A final issue for review here is the extent to which the results of the present study can firstly be extrapolated into a future in which changing technology produces a different

CMC environment from that reported here, and secondly be generalised to other populations of students.

Regarding the validity of extrapolating these results into the future, students now coming new to CMC will encounter improved user interfaces and also more versatile kinds of information compared with those experienced by the majority of the students surveyed here. They are likely to also bring with them increased expectations of the information provided to them via this medium, and such a trend over time is supported by some of the results presented here. The time period of this survey has spanned what might be called three generations of computing, from centralized, terminal-based computing, via distributed PCs on LANs, to the introduction of graphical Web browsers and other clients using Internet connectivity. However, while some changes reported here have been either probably, or highly, significant, and while some of those have been attributed partly to technological change, some other results have remained stable over time and have not changed significantly. The view from the 'interactionist' perspective would be that limitations on the forward extrapolation of these results would be only partly determined by such progressively changing technological environments, and that other factors may have at least as much influence. (An example might be, the various 'human relations' aspects of the methods of implementation of CMC systems in the envisaged expansion of the higher education sector in the UK and other OECD countries.)

Regarding the validity of generalising to other student populations, firstly, although the students surveyed here are designated 'information' students, they would not generally tend to possess the kinds of specialised computing skills which might be expected of students on computer science courses. Likewise, the use of CMC systems involves relatively little technical skill. Arguably, their use can be learned more easily than, or comparably easily to, that of word-processing software, with which most users of general-purpose computers would have a working competence. Secondly, there is recognised trend that - as computers, communication and information have become more dominant features of both the workplace and the home - some activities initially within the sphere of information specialists have subsequently transferred to more general use. This trend is already quite evident in the increasingly widespread popular use of e-mail and the Internet. These factors would seem to provide grounds for believing that the kinds of results presently obtained here with information students might also be obtained in the fairly near future with students in various other disciplines and professions.

7.12 Conclusions

The main conclusions of this study are that:

- There is much stability of results over the study period, with parallel results in different institutions. This is particularly interesting since this period also includes technical transition to a new client-server networking generation. Differences with the Open University results can perhaps be understood in terms of the fact that OU students have less personal contact and therefore perceive CMC less as a complementary medium.

- Students' expectations of CMC have increased with time. Increasing popular awareness of the Internet, World Wide Web, and Information Superhighways may reinforce this.

- Students' main concern (as before CMC) is to get course-related information. Interaction with, and access to, staff via CMC may 'empower' students, and there is also a student self-support factor in usage.

- CMC is complementary rather than substitutionary. Students show positiveness towards CMC, but ambivalence about it replacing face-to-face tutorials. While the flexibility of access enabled by CMC may be of increasing value, greater use of CMC may entail greater attention to support mechanisms for students' course difficulties.

- There is little evidence to support concerns that female students may be disadvantaged by being required to communicate more by CMC, and grounds for optimism that the medium can suit women's learning styles. Such gender differences as exist at first level reduce or reverse by third level. However, this may entail some attention to the presentation of CMC to female students early in their studies.

The results of the present study underline the growing belief that computer-aided instruction often, though not always, complements traditional teaching methods, rather than replacing them. It may therefore be that rather than thinking about CMC as a *replacement* for face-to-face seminars and tutorials, the approach for conventional institutions of higher education should instead be more towards exploring 'dual mode' possibilities for using CMC in a *complementary* way.

In the first place it could enhance the quality of conventional face-to-face seminars, and, in the second, add value to conjunct network services, such as the resources available from the Internet and the World Wide Web. These information and communication technologies make it possible to design teaching and learning environments which combine different mixes of (a) face-to-face teaching, (b) self-directed study, and (c) tutorial assistance. The best mixes are likely to vary between courses and subjects and levels and need to be discovered and fine-tuned by experience. However, the greater flexibility enabled by such methods may be more likely to meet the needs both of more diverse populations of students, and also of governments seeking to expand and broaden access to post-secondary education.

Optimism that the use of CMC might eliminate, or at least reduce, various recognised gender inequities of traditional educational settings and discourse have been tempered by concerns that males have been found to dominate some electronic forums in ways that are similar to behaviours found in the face-to-face classroom, and also to the point of harassment. However, it is perhaps overly pessimistic to assume that such online behaviour found in unmonitored, course-unrelated electronic forums or in global, public discussion forums will be replicated in the moderated electronic forums supporting the modules of undergraduate and postgraduate course run under the auspices of individual higher education institutions.

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Appendix 1: Survey questions

```
QUEST1.DOC  -  HOW YOU MAKE USE OF COMPUTING, E-MAIL & CMC
==========     ==========================================

Please address this message  To:   CIMMU
                       with  Subj: QUEST1

... and answer the questions below either by editing in answer
values between the [    ] or indicating choices (eg: with an "*")
as appropriate ...


1   Using the QMC LANs electronic mail (e-mail) system:
-------------------------------------------------------
a) How many TIMES do you use the QMC LANs e-mail system per week,
   on average?
   [    ]  edit in a number of times

b) How many HOURS do you spend using the QMC LANs e-mail system
   per week, on average?
   [    ]  edit in a number of hours (or part-hours)


2   Who sends you USEFUL messages?
----------------------------------
Of the mail messages you find most useful, are most from
lecturers or other students?
   [    ]  lecturers
   [    ]  other students
   [    ]  about the same    (mark one choice)


3   Who you SEND your QMC e-mail messages to:
---------------------------------------------
On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate
how often to you send messages to these destinations. (use 0 if
you never send)

a) - lecturer, conversationally
   [    ]  (edit in 1 to 5, or 0 for "never")

b) - lecturer, as required course task
   [    ]  (edit in 1 to 5, or 0 for "never")

c) - lecturer, seeking help with course-related matters
   [    ]  (edit in 1 to 5, or 0 for "never")

d) - other student(s), conversationally
   [    ]  (edit in 1 to 5, or 0 for "never")

e) - other student(s), as required course task
   [    ]  (edit in 1 to 5, or 0 for "never")

f) - other student(s), seeking help with course-related matters
   [    ]  (edit in 1 to 5, or 0 for "never")

g) - other student(s), offering help with course-related matters
   [    ]  (edit in 1 to 5, or 0 for "never")



Many thanks for completing these questions! Your answers will be kept
strictly confidential.  Please feel free to add any further comments
below if there are other points or suggestions you would like to make
about the use of e-mail and computer-mediated communication at
Queen Margaret College.


George McMurdo  Nov '95
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QUEST2.DOC  -  CATEGORIES OF INTERNAL QMC E-MAIL & INFORMATION
==========     ==============================================

Please address this message  To:   CIMMU
                       with  Subj: QUEST2

... and answer the questions below, about the kinds of internal e-mail
and information available to you on the QMC LANS, by editing in a number
from 1 to 5 between the [    ] ...


2. What kinds of messages and information are useful to you?
------------------------------------------------------------
Indicate on a scale of 1 to 5, where 5 is high value and 1 is low
value, how important to you each category is.

a)  - ADMINistrative notices & reminders from lecturers (eg room
    changes, reminders about coursework due dates, handouts to
    collect, etc)
    [    ]  (1 to 5, how important)

b)  - ADVERTisements for books, accommodation, etc
    [    ]  (1 to 5, how important?)

c)  - information on CAREERs of past graduates, jobs, etc
    [    ]  (1 to 5, how important?)

d)  - COMMENTs by class members on material which has been
    presented in class
    [    ]  (1 to 5, how important)

e)  - political and other DISCUSSion topics
    [    ]  (1 to 5, how important?)

f)  - notices about relevant upcoming EVENTs (eg TV programmes to
    watch, seminars, guest lectures, etc)
    [    ]  (1 to 5, how important)

g)  - EXWORK - examples of coursework submissions or drafts
    [    ]  (1 to 5, how important)

h)  - FEEDBACK reports by coursework markers
    [    ]  (1 to 5, how important?)

i)  - lecturers' HANDOUTs & lecture notes
    [    ]  (1 to 5, how important?)

j)  - HELP - clarification & advice on coursework from lecturers
    [    ]  (1 to 5, how important)

k)  - course syllabus OUTLINEs & rationales
    [    ]  (1 to 5, how important?)

l)  - PHOTOS of students and staff on the LAN information system,
    to assist recognition
    [    ]  (1 to 5, how important?)

m)  - PREVIEWs of material to be presented in class (eg: videos,
    lecture synopses, software descriptions)
    [    ]  (1 to 5, how important

n)  - READING lists and subject references
    [    ]  (1 to 5, how important?)

o)  - messages from student course-REPRESENTATIVES
    [    ]  (1 to 5, how important?)


p)  - RESUME & personal information from other class members
    introducing themselves
    [    ]  (1 to 5, how important)
```

q) - SOCIAL messages
[ ] (1 to 5, how important?)

r) - coursework & workshop SPECIFICATIONS from lecturers
[ ] (1 to 5, how important)

s) - STUDENT ASSOCIATION information
[ ] (1 to 5, how important?)

t) - SYSTEM notices & reports from ITC management
[ ] (1 to 5, how important?)

Many thanks for completing these questions! Your answers will be kept strictly confidential. Please feel free to add any further comments below if there are other points or suggestions you would like to make about the use of e-mail and computer-mediated communication at Queen Margaret College.

George McMurdo Nov '95.

```
QUEST3.DOC  -  ATTITUDES STATEMENTS & AGREEMENT
==========     ==============================

Please address this message  To:   CIMMU
                      with  Subj: QUEST3

... answer the questions below either by indicating a response on
each of these 5-point scales  (eg: by typing an "*" under the line
of hyphens beneath a choice from 5 to 1) to show your strength of
Agreement or Disagreement with the following statements about
computing and computer-mediated communication:


3.1   Computing at QMC:
-----------------------

a) "Everyone at QMC should have full and easy access to a
    computer"
              Agree                          Disagree
              5    :    4    :    3    :    2    :   1
              ----------------------------------------


b) "Almost everyone should learn how to use a computer"
              Agree                          Disagree
              5    :    4    :    3    :    2    :   1
              ----------------------------------------


c) "One of the things I like about QMC is the access I have to
    computing"
              Agree                          Disagree
              5    :    4    :    3    :    2    :   1
              ----------------------------------------


d) "In general, I would like to see more practical uses of
    computers made at QMC in my course"
              Agree                          Disagree
              5    :    4    :    3    :    2    :   1
              ----------------------------------------


e) "I like to experiment with computer systems"
              Agree                          Disagree
              5    :    4    :    3    :    2    :   1
              ----------------------------------------


f) "I would like to use a computer more than I do now"
              Agree                          Disagree
              5    :    4    :    3    :    2    :   1
              ----------------------------------------


g) "There is too much emphasis on computing at QMC"
              Agree                          Disagree
              5    :    4    :    3    :    2    :   1
              ----------------------------------------
```

3.2 Comparing CMC with face-to-face tutorials:

How would you compare electronic conferencing with face-to-face tutorial meetings ...

a) ... as a means of getting help with your course-related difficulties?

Better				Less effective
5 :	4 :	3 :	2 :	1

b) ... as a means of socializing

Better				Less effective
5 :	4 :	3 :	2 :	1

c) ... as a medium for intellectual exchange?

Better				Less effective
5 :	4 :	3 :	2 :	1

d) In terms of time spent by you, electronic conferencing is ...

Better				Less effective
5 :	4 :	3 :	2 :	1

3.3 Attitudes to CMC:

Does your own experience generally support or contradict the following suggestions about computer-mediated communication?

a) "Individuals can participate more equally in electronic than in face-to-face communication"

Agree				Disagree
5 :	4 :	3 :	2 :	1

b) "Computer communication is depersonalizing"

Agree				Disagree
5 :	4 :	3 :	2 :	1

c) "Computer conferencing encourages individual assertiveness"

Agree				Disagree
5 :	4 :	3 :	2 :	1

d) "Personal interaction is more difficult with computer communication because of the lack of contextual and oral feedback"

Agree				Disagree
5 :	4 :	3 :	2 :	1

3.4 Present & future use of CMC:

From your experience of using CMC, Indicate your strength of agreement or disagreement with the following statements about computer-mediated communication:

a) "It would make little difference if computer mediated communication facilities weren't available to me"

Agree								Disagree
5	:	4	:	3	:	2	:	1

b) "Being able to see other students' work is beneficial in helping me self-monitor and improve my own performance"

Agree								Disagree
5	:	4	:	3	:	2	:	1

c) "If student-staff ratios rise, it would be desirable to make more extensive use of CMC"

Agree								Disagree
5	:	4	:	3	:	2	:	1

d) Based upon your experience so far with CMC, how would you describe your interest in continuing to use it after the end of your course, assuming you had access to the necessary equipment?

Very interested								Not interested
5	:	4	:	3	:	2	:	1

Many thanks for completing these questions! Your answers will be kept strictly confidential. Please feel free to add any further comments below if there are other points or suggestions you would like to make about the use of e-mail and computer-mediated communication at Queen Margaret College.

George McMurdo Nov '95.

Appendix 2:

Survey responses

Q 1.1 *(a)* How many *times* do you use the QMC electronic mail system per week, on average? [NumMail]

1990	n	Sum	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	104	5.20	12	1	2.7	7.6
Lv1 *(m)*	8	111	13.88	30	3	8.2	67.9
Lv1	28	215	7.68	30	1	6.3	40.1
Lv3 *(f)*	15	79	5.27	10	0	2.8	7.9
Lv3 *(m)*	10	57	5.70	15	2	3.7	13.6
Lv3	25	136	5.44	15	0	3.2	10.2
All *(f)*	35	183	5.23	12	0	2.8	7.7
All *(m)*	18	168	9.33	30	2	7.4	54.2
All	**53**	**351**	**6.62**	**30**	**0**	**5.2**	**27.3**

1995	n	Sum	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	181	4.64	25	1	4.2	17.6
Lv1 *(m)*	23	165	7.17	15	1	4.2	18.1
Lv1	62	346	5.58	25	1	4.4	19.2
Lv3 *(f)*	18	181	10.06	20	5	4.6	20.9
Lv3 *(m)*	15	168	11.20	30	3	7.6	57.9
Lv3	33	349	10.58	30	3	6.2	38.1
All *(f)*	57	362	6.35	25	1	5.0	25.0
All *(m)*	38	333	8.76	30	1	6.1	37.7
All	**95**	**695**	**7.32**	**30**	**1**	**5.6**	**31.4**

1996	n	Sum	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	198	4.60	14	1	2.5	6.1
Lv1 *(m)*	14	73	5.21	12	1	3.0	8.9
Lv1	57	271	4.75	14	1	2.6	6.9
Lv3 *(f)*	9	50	5.56	10	4	1.8	3.1
Lv3 *(m)*	21	217	10.33	30	2	7.5	56.4
Lv3	30	267	8.90	30	2	6.7	45.2
All *(f)*	52	248	4.77	14	1	2.4	5.8
All *(m)*	35	290	8.29	30	1	6.6	43.7
All	**87**	**538**	**6.18**	**30**	**1**	**4.9**	**24.0**

Q 1.1 *(b)* How many *hours* do you spend using the QMC electronic mail system per week, on average? [MailHours]

1990	n	Sum	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	32	1.58	3	1	0.6	0.4
Lv1 *(m)*	8	21	2.63	7	1	2.3	5.2
Lv1	28	53	1.88	7	1	1.4	2.0
Lv3 *(f)*	15	17	1.14	3	0	0.8	0.6
Lv3 *(m)*	10	9	0.85	2	1	0.4	0.1
Lv3	25	26	1.02	3	0	0.7	0.5
All *(f)*	35	49	1.39	3	0	0.7	0.6
All *(m)*	18	30	1.64	7	1	1.8	3.2
All	**53**	**78**	**1.47**	**7**	**0**	**1.2**	**1.4**

1995	n	Sum	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	148	3.78	10	1	2.1	4.5
Lv1 *(m)*	23	82	3.57	15	1	3.8	14.4
Lv1	62	230	3.70	15	1	2.9	8.2
Lv3 *(f)*	18	131	7.25	20	2	5.4	28.9
Lv3 *(m)*	15	105	7.00	21	2	5.2	26.8
Lv3	33	236	7.14	21	2	5.3	27.9
All *(f)*	57	278	4.88	20	1	3.9	14.8
All *(m)*	38	187	4.92	21	1	4.7	22.1
All	**95**	**465**	**4.89**	**21**	**1**	**4.2**	**17.7**

1996	n	Sum	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	100	2.31	7	1	1.4	1.9
Lv1 *(m)*	14	37	2.64	6	1	1.6	2.5
Lv1	57	137	2.39	7	1	1.4	2.1
Lv3 *(f)*	9	40	4.39	20	1	5.6	31.7
Lv3 *(m)*	21	65	3.07	8	1	2.2	4.8
Lv3	30	104	3.47	20	1	3.6	13.3
All *(f)*	52	139	2.67	20	1	2.8	7.7
All *(m)*	35	102	2.90	20	1	2.0	3.9
All	**87**	**241**	**2.76**	**20**	**1**	**2.5**	**6.2**

Q 1.2 Of the mail messages you find most useful, are most from other students, lecturers, or about the same? [**Useful**]

1990

	Other students		About Same		Lecturers	
	n	%	n	%	n	%
Lv1 *(f)*	1	5	9	45	10	50
Lv1 *(m)*	2	25	1	13	5	63
Lv1	3	11	10	36	15	54
Lv3 *(f)*	2	13	4	27	9	60
Lv3 *(m)*	0	0	5	50	5	50
Lv3	2	8	9	36	14	56
All *(f)*	3	9	13	37	19	54
All *(m)*	2	11	6	33	10	56
All	**5**	**9.4%**	**19**	**35.8%**	**29**	**54.7%**

1995

	Other students		About Same		Lecturers	
	n	%	n	%	n	%
Lv1 *(f)*	1	3	19	49	19	49
Lv1 *(m)*	0	0	10	43	13	57
Lv1	1	2	29	47	32	52
Lv3 *(f)*	1	6	7	39	10	56
Lv3 *(m)*	0	0	8	53	7	47
Lv3	1	3	15	45	17	52
All *(f)*	2	4	26	46	29	51
All *(m)*	0	0	18	47	20	53
All	**2**	**2.1%**	**44**	**46.3%**	**49**	**51.6%**

1996

	Other students		About Same		Lecturers	
	n	%	n	%	n	%
Lv1 *(f)*	3	7	20	47	20	47
Lv1 *(m)*	3	21	4	29	7	50
Lv1	6	11	24	42	27	47
Lv3 *(f)*	0	0	1	11	8	89
Lv3 *(m)*	4	19	3	14	14	67
Lv3	4	13	4	13	22	73
All *(f)*	3	6	21	40	28	54
All *(m)*	7	20	7	20	21	60
All	**10**	**11.5%**	**28**	**32.2%**	**49**	**56.3%**

Q 1.3 *(a)* On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate how often you send messages *to a lecturer, conversationally.* (use 0 if you never send) **[LectConv]**

1990

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	0	0	2	10	3	15	9	45	6	30
Lv1 *(m)*	0	0	1	13	0	0	2	25	2	25	3	38
Lv1	0	0	1	4	2	7	5	18	11	39	12	43
Lv3 *(f)*	0	0	0	0	0	0	0	0	5	33	10	67
Lv3 *(m)*	1	10	0	0	1	10	1	10	5	50	2	20
Lv3	1	4	0	0	1	4	1	4	10	40	12	48
All *(f)*	0	0	0	0	2	6	3	9	14	40	16	46
All *(m)*	1	6	1	6	1	6	3	17	7	39	5	28
All	**1**	**2%**	**1**	**2%**	**3**	**6%**	**6**	**11%**	**21**	**40%**	**21**	**40%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	1.05	3	0	0.9	0.8
Lv1 *(m)*	8	1.25	4	0	1.3	1.7
Lv1	28	1.11	4	0	1.0	1.1
Lv3 *(f)*	15	0.33	1	0	0.5	0.2
Lv3 *(m)*	10	1.50	5	0	1.4	2.1
Lv3	25	0.80	5	0	1.1	1.3
All *(f)*	35	0.74	3	0	0.8	0.7
All *(m)*	18	1.39	5	0	1.4	1.9
All	**53**	**0.96**	**5**	**0**	**1.1**	**1.2**

1995

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	0	0	0	0	2	5	6	15	31	79
Lv1 *(m)*	0	0	1	4	1	4	0	0	6	26	15	65
Lv1	0	0	1	2	1	2	2	3	12	19	21	34
Lv3 *(f)*	0	0	0	0	1	6	3	17	5	28	5	28
Lv3 *(m)*	0	0	1	7	2	13	2	13	5	33	5	33
Lv3	0	0	1	3	3	9	5	15	10	30	14	42
All *(f)*	0	0	0	0	1	2	5	9	11	19	40	70
All *(m)*	0	0	2	5	3	8	2	5	11	29	20	53
All	**0**	**0%**	**2**	**2%**	**4**	**4%**	**7**	**7%**	**22**	**23%**	**60**	**63%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	0.26	2	0	0.5	0.3
Lv1 *(m)*	23	0.57	4	0	1.0	1.0
Lv1	62	0.37	4	0	0.8	0.6
Lv3 *(f)*	12	0.78	3	0	0.9	0.8
Lv3 *(m)*	6	1.27	4	0	1.2	1.5
Lv3	18	1.00	4	0	1.1	1.2
All *(f)*	57	0.42	3	0	0.7	0.5
All *(m)*	38	0.84	4	0	1.2	1.3
All	**95**	**0.59**	**4**	**0**	**0.9**	**0.9**

1996

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	0	0	0	0	2	5	5	12	36	84
Lv1 *(m)*	0	0	0	0	0	0	0	0	3	21	11	79
Lv1	0	0	0	0	0	0	2	4	8	14	16	28
Lv3 *(f)*	0	0	0	0	0	0	3	33	3	33	3	33
Lv3 *(m)*	1	5	0	0	3	14	3	14	7	33	7	33
Lv3	1	3	0	0	3	10	6	20	10	33	10	33
All *(f)*	0	0	0	0	0	0	5	10	8	15	39	75
All *(m)*	1	3	0	0	3	9	3	9	10	29	18	51
All	**1**	**1%**	**0**	**0%**	**3**	**3%**	**8**	**9%**	**18**	**21%**	**57**	**66%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	0.21	2	0	0.5	0.3
Lv1 *(m)*	14	0.21	1	0	0.4	0.2
Lv1	57	0.21	2	0	0.5	0.2
Lv3 *(f)*	4	1.00	2	0	0.8	0.7
Lv3 *(m)*	11	1.29	5	0	1.3	1.7
Lv3	15	1.20	5	0	1.2	1.4
All *(f)*	52	0.35	2	0	0.6	0.4
All *(m)*	35	0.86	5	0	1.2	1.4
All	**87**	**0.55**	**5**	**0**	**0.9**	**0.9**

Q 1.3 *(b)* On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate how often you send messages *to a lecturer, as a required course task.* (use 0 if you never send) [**LectTask**]

1990

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	3	15	3	15	5	25	6	30	2	10	1	5
Lv1 *(m)*	2	25	1	13	3	38	0	0	2	25	0	0
Lv1	5	18	4	14	8	29	6	21	4	14	2	7
Lv3 *(f)*	1	7	1	7	4	27	4	27	4	27	1	7
Lv3 *(m)*	1	10	2	20	2	20	1	10	3	30	1	10
Lv3	2	8	3	12	6	24	5	20	7	28	2	8
All *(f)*	4	11	4	11	9	26	10	29	6	17	2	6
All *(m)*	3	17	3	17	5	28	1	6	5	28	1	6
All	**7**	**13%**	**7**	**13%**	**14**	**26%**	**11**	**21%**	**11**	**21%**	**3**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.80	5	0	1.4	1.9
Lv1 *(m)*	8	3.13	5	1	1.5	2.1
Lv1	28	2.89	5	0	1.4	2.0
Lv3 *(f)*	15	2.20	5	0	1.3	1.6
Lv3 *(m)*	10	2.40	5	0	1.6	2.4
Lv3	25	2.28	5	0	1.4	2.0
All *(f)*	35	2.54	5	0	1.4	1.8
All *(m)*	18	2.72	5	0	1.6	2.4
All	**53**	**2.60**	**5**	**0**	**1.4**	**2.1**

1995

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	1	3	1	3	8	21	7	18	12	31	10	26
Lv1 *(m)*	0	0	1	4	5	22	1	4	11	48	5	22
Lv1	1	2	2	3	13	21	8	13	23	37	17	27
Lv3 *(f)*	1	6	1	6	3	17	9	50	4	22	4	22
Lv3 *(m)*	1	7	0	0	4	27	5	33	4	27	1	7
Lv3	2	6	1	3	7	21	14	42	8	24	1	3
All *(f)*	2	4	2	4	11	19	16	28	16	28	10	18
All *(m)*	1	3	1	3	9	24	6	16	15	39	6	16
All	**3**	**3%**	**3**	**3%**	**20**	**21%**	**22**	**23%**	**31**	**33%**	**16**	**17%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	1.51	5	0	1.3	1.6
Lv1 *(m)*	23	1.39	4	0	1.2	1.4
Lv1	62	1.47	5	0	1.2	1.5
Lv3 *(f)*	12	2.22	5	1	1.0	1.1
Lv3 *(m)*	6	2.07	5	0	1.2	1.4
Lv3	18	2.15	5	0	1.1	1.2
All *(f)*	57	1.74	5	0	1.2	1.6
All *(m)*	38	1.66	5	0	1.2	1.5
All	**95**	**1.71**	**5**	**0**	**1.2**	**1.5**

1996

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	2	5	4	9	7	16	8	19	11	26	11	26
Lv1 *(m)*	1	7	0	0	0	0	4	29	4	29	5	36
Lv1	3	5	4	7	7	12	12	21	15	26	16	28
Lv3 *(f)*	0	0	2	22	2	22	4	44	0	0	0	0
Lv3 *(m)*	1	5	0	0	4	19	10	48	6	29	0	0
Lv3	1	3	2	7	6	20	14	47	6	20	1	3
All *(f)*	2	4	6	12	9	17	12	23	11	21	12	23
All *(m)*	2	6	0	0	4	11	14	40	10	29	5	14
All	**4**	**5%**	**6**	**7%**	**13**	**15%**	**26**	**30%**	**21**	**24%**	**17**	**20%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	1.72	5	0	1.5	2.2
Lv1 *(m)*	14	1.21	5	0	1.3	1.7
Lv1	57	1.60	5	0	1.4	2.1
Lv3 *(f)*	4	2.44	4	0	1.2	1.4
Lv3 *(m)*	11	2.05	5	1	0.9	0.9
Lv3	15	2.17	5	0	1.0	1.1
All *(f)*	52	1.85	5	0	1.4	2.1
All *(m)*	35	1.71	5	0	1.2	1.4
All	**87**	**1.79**	**5**	**0**	**1.3**	**1.8**

Q 1.3 *(c)* On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate how often you send messages *to a lecturer, seeking help with course-related matters.* (use 0 if you never send) [LectHelp]

1990

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	1	5	2	10	3	15	5	25	7	35	2	10
Lv1 *(m)*	0	0	0	0	1	13	3	38	4	50	0	0
Lv1	1	4	2	7	4	14	8	29	11	39	7	25
Lv3 *(f)*	0	0	0	0	2	13	5	33	3	20	5	33
Lv3 *(m)*	0	0	1	10	1	10	1	10	4	40	3	30
Lv3	0	0	1	4	3	12	6	24	7	28	8	32
All *(f)*	1	3	2	6	5	14	10	29	10	29	7	20
All *(m)*	0	0	1	6	2	11	4	22	8	44	3	17
All	**1**	**2%**	**3**	**6%**	**7**	**13%**	**14**	**26%**	**18**	**34%**	**10**	**19%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	1.95	5	0	1.3	1.7
Lv1 *(m)*	8	1.63	3	1	0.7	0.5
Lv1	28	1.86	5	0	1.2	1.4
Lv3 *(f)*	15	1.27	3	0	1.1	1.1
Lv3 *(m)*	10	1.30	4	0	1.3	1.6
Lv3	25	1.28	4	0	1.1	1.3
All *(f)*	35	1.66	5	0	1.3	1.6
All *(m)*	18	1.44	4	0	1.1	1.1
All	**53**	**1.58**	**5**	**0**	**1.2**	**1.5**

1995

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	0	0	1	3	3	8	3	8	13	33	19	49
Lv1 *(m)*	0	0	1	4	1	4	4	17	11	48	6	26
Lv1	0	0	2	3	4	6	7	11	24	39	19	31
Lv3 *(f)*	0	0	3	17	6	33	6	33	3	17	3	17
Lv3 *(m)*	1	7	1	7	5	33	4	27	3	20	1	7
Lv3	1	3	4	12	11	33	10	30	6	18	1	3
All *(f)*	0	0	4	7	9	16	9	16	16	28	19	33
All *(m)*	1	3	2	5	6	16	8	21	14	37	7	18
All	**1**	**1%**	**6**	**6%**	**15**	**16%**	**17**	**18%**	**30**	**32%**	**26**	**27%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	0.82	4	0	1.0	1.1
Lv1 *(m)*	23	1.13	4	0	1.0	1.0
Lv1	62	0.94	4	0	1.0	1.1
Lv3 *(f)*	12	2.50	4	1	1.0	0.9
Lv3 *(m)*	6	2.33	5	0	1.2	1.6
Lv3	18	2.42	5	0	1.1	1.2
All *(f)*	57	1.35	4	0	1.3	1.6
All *(m)*	38	1.61	5	0	1.2	1.6
All	**95**	**1.45**	**5**	**0**	**1.3**	**1.6**

1996

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	1	2	3	7	3	7	7	16	12	28	17	40
Lv1 *(m)*	0	0	0	0	0	0	2	14	3	21	9	64
Lv1	1	2	3	5	3	5	9	16	15	26	21	37
Lv3 *(f)*	0	0	1	11	4	44	1	11	3	33	3	33
Lv3 *(m)*	1	5	1	5	4	19	7	33	7	33	1	5
Lv3	1	3	2	7	8	27	8	27	10	33	1	3
All *(f)*	1	2	4	8	7	13	8	15	15	29	17	33
All *(m)*	1	3	1	3	4	11	9	26	10	29	10	29
All	**2**	**2%**	**5**	**6%**	**11**	**13%**	**17**	**20%**	**25**	**29%**	**27**	**31%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	1.21	5	0	1.3	1.8
Lv1 *(m)*	14	0.50	2	0	0.7	0.5
Lv1	57	1.04	5	0	1.3	1.6
Lv3 *(f)*	4	2.33	4	1	1.1	1.1
Lv3 *(m)*	11	2.00	5	0	1.2	1.3
Lv3	15	2.10	5	0	1.1	1.3
All *(f)*	52	1.40	5	0	1.4	1.9
All *(m)*	35	1.40	5	0	1.2	1.6
All	**87**	**1.40**	**5**	**0**	**1.3**	**1.7**

Q 1.3 *(d)* On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate how often you send messages *to other student(s), conversationally.* (use 0 if you never send) [StudConv]

1990

	Often 5	:	4	:	3	:	2	:	1	:	Never 0
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	7	35	2	10	2	10	2	10	4	20	3	15
Lv1 *(m)*	2	25	2	25	2	25	0	0	1	13	1	13
Lv1	9	32	4	14	4	14	2	7	5	18	5	18
Lv3 *(f)*	3	20	0	0	2	13	4	27	5	33	1	7
Lv3 *(m)*	1	10	1	10	2	20	6	60	0	0	0	0
Lv3	4	16	1	4	4	16	10	40	5	20	1	4
All *(f)*	10	29	2	6	4	11	6	17	9	26	4	11
All *(m)*	3	17	3	17	4	22	6	33	1	6	1	6
All	**13**	**25%**	**5**	**9%**	**8**	**15%**	**12**	**23%**	**10**	**19%**	**5**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.85	5	0	1.9	3.7
Lv1 *(m)*	8	3.13	5	0	1.7	2.9
Lv1	28	2.93	5	0	1.9	3.5
Lv3 *(f)*	15	2.27	5	0	1.6	2.5
Lv3 *(m)*	10	2.70	5	2	1.0	1.0
Lv3	25	2.44	5	0	1.4	1.9
All *(f)*	35	2.60	5	0	1.8	3.3
All *(m)*	18	2.89	5	0	1.4	1.9
All	**53**	**2.70**	**5**	**0**	**1.7**	**2.8**

1995

	Often 5	:	4	:	3	:	2	:	1	:	Never 0
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	8	21	6	15	12	31	4	10	6	15	3	8
Lv1 *(m)*	9	39	2	9	8	35	4	17	0	0	0	0
Lv1	17	27	8	13	20	32	8	13	6	10	6	10
Lv3 *(f)*	7	39	2	11	2	11	3	17	2	11	2	11
Lv3 *(m)*	2	13	4	27	2	13	3	20	2	13	2	13
Lv3	9	27	6	18	4	12	6	18	4	12	4	12
All *(f)*	15	26	8	14	14	25	7	12	8	14	5	9
All *(m)*	11	29	6	16	10	26	7	18	2	5	2	5
All	**26**	**27%**	**14**	**15%**	**24**	**25%**	**14**	**15%**	**10**	**11%**	**7**	**7%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.92	5	0	1.5	2.4
Lv1 *(m)*	23	3.70	5	2	1.2	1.3
Lv1	62	3.21	5	0	1.5	2.1
Lv3 *(f)*	12	3.17	5	0	1.8	3.3
Lv3 *(m)*	6	2.67	5	0	1.6	2.6
Lv3	18	2.94	5	0	1.7	3.0
All *(f)*	57	3.00	5	0	1.6	2.7
All *(m)*	38	3.29	5	0	1.4	2.1
All	**95**	**3.12**	**5**	**0**	**1.6**	**2.5**

1996

	Often 5	:	4	:	3	:	2	:	1	:	Never 0
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	14	33	13	30	9	21	4	9	3	7	0	0
Lv1 *(m)*	4	29	4	29	2	14	1	7	2	14	1	7
Lv1	18	32	17	30	11	19	5	9	5	9	4	7
Lv3 *(f)*	2	22	0	0	3	33	3	33	1	11	1	11
Lv3 *(m)*	4	19	1	5	7	33	2	10	6	29	1	5
Lv3	6	20	1	3	10	33	5	17	7	23	1	3
All *(f)*	16	31	13	25	12	23	7	13	4	8	0	0
All *(m)*	8	23	5	14	9	26	3	9	8	23	2	6
All	**24**	**28%**	**18**	**21%**	**21**	**24%**	**10**	**11%**	**12**	**14%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.72	5	1	1.2	1.5
Lv1 *(m)*	14	3.29	5	0	1.6	2.6
Lv1	57	3.61	5	0	1.3	1.8
Lv3 *(f)*	4	2.89	5	1	1.3	1.7
Lv3 *(m)*	11	2.62	5	0	1.5	2.3
Lv3	15	2.70	5	0	1.5	2.1
All *(f)*	52	3.58	5	1	1.3	1.6
All *(m)*	35	2.89	5	0	1.6	2.6
All	**87**	**3.30**	**5**	**0**	**1.4**	**2.1**

Q 1.3 *(e)* On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate how often you send messages *to other student(s), as a required course task.* (use 0 if you never send) [StudTask]

1990

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	3	15	4	20	1	5	3	15	2	10	7	35
Lv1 *(m)*	1	13	0	0	2	25	2	25	2	25	1	13
Lv1	4	14	4	14	3	11	5	18	4	14	3	11
Lv3 *(f)*	2	13	0	0	6	40	4	27	2	13	1	7
Lv3 *(m)*	1	10	4	40	1	10	2	20	2	20	0	0
Lv3	3	12	4	16	7	28	6	24	4	16	1	4
All *(f)*	5	14	4	11	7	20	7	20	4	11	8	23
All *(m)*	2	11	4	22	3	17	4	22	4	22	1	6
All	**7**	**13%**	**8**	**15%**	**10**	**19%**	**11**	**21%**	**8**	**15%**	**9**	**17%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.10	5	0	1.9	3.7
Lv1 *(m)*	8	2.13	5	0	1.5	2.1
Lv1	28	2.11	5	0	1.8	3.2
Lv3 *(f)*	15	2.53	5	0	1.3	1.7
Lv3 *(m)*	10	3.00	5	1	1.3	1.8
Lv3	25	2.72	5	0	1.3	1.8
All *(f)*	35	2.29	5	0	1.7	2.9
All *(m)*	18	2.61	5	0	1.5	2.1
All	**53**	**2.40**	**5**	**0**	**1.6**	**2.7**

1995

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	4	10	2	5	6	15	11	28	5	13	11	28
Lv1 *(m)*	1	4	1	4	10	43	7	30	2	9	2	9
Lv1	5	8	3	5	16	26	18	29	7	11	7	11
Lv3 *(f)*	1	6	1	6	3	17	5	28	6	33	6	33
Lv3 *(m)*	0	0	1	7	5	33	5	33	2	13	2	13
Lv3	1	3	2	6	8	24	10	30	8	24	4	12
All *(f)*	5	9	3	5	9	16	16	28	11	19	13	23
All *(m)*	1	3	2	5	15	39	12	32	4	11	4	11
All	**6**	**6%**	**5**	**5%**	**24**	**25%**	**28**	**29%**	**15**	**16%**	**17**	**18%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	1.87	5	0	1.6	2.5
Lv1 *(m)*	23	2.39	5	0	1.1	1.3
Lv1	62	2.06	5	0	1.5	2.1
Lv3 *(f)*	12	1.89	5	0	1.3	1.7
Lv3 *(m)*	6	2.07	4	0	1.1	1.3
Lv3	18	1.97	5	0	1.2	1.5
All *(f)*	57	1.88	5	0	1.5	2.2
All *(m)*	38	2.26	5	0	1.1	1.3
All	**95**	**2.03**	**5**	**0**	**1.4**	**1.9**

1996

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	2	5	16	37	15	35	6	14	4	9
Lv1 *(m)*	1	7	0	0	2	14	3	21	6	43	2	14
Lv1	1	2	2	4	18	32	18	32	12	21	8	14
Lv3 *(f)*	2	22	0	0	0	0	3	33	3	33	3	33
Lv3 *(m)*	1	5	0	0	2	10	5	24	6	29	7	33
Lv3	3	10	0	0	2	7	8	27	9	30	8	27
All *(f)*	2	4	2	4	16	31	18	35	9	17	5	10
All *(m)*	2	6	0	0	4	11	8	23	12	34	9	26
All	**4**	**5%**	**2**	**2%**	**20**	**23%**	**26**	**30%**	**21**	**24%**	**14**	**16%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	2.14	4	0	1.0	1.1
Lv1 *(m)*	14	1.64	5	0	1.3	1.7
Lv1	57	2.02	5	0	1.1	1.2
Lv3 *(f)*	4	2.11	5	0	1.7	2.8
Lv3 *(m)*	11	1.29	5	0	1.3	1.6
Lv3	15	1.53	5	0	1.5	2.1
All *(f)*	52	2.13	5	0	1.2	1.3
All *(m)*	35	1.43	5	0	1.3	1.7
All	**87**	**1.85**	**5**	**0**	**1.3**	**1.6**

Q 1.3 *(f)* On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate how often you send messages *to other student(s), seeking help with course-related matters.* (use 0 if you never send) [StudHelp]

1990

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	3	15	0	0	3	15	7	35	7	35
Lv1 *(m)*	0	0	0	0	2	25	0	0	4	50	2	25
Lv1	0	0	3	11	2	7	3	11	11	39	9	32
Lv3 *(f)*	0	0	0	0	1	7	3	20	6	40	5	33
Lv3 *(m)*	0	0	2	20	0	0	1	10	4	40	3	30
Lv3	0	0	2	8	1	4	4	16	10	40	8	32
All *(f)*	0	0	3	9	1	3	6	17	13	37	12	34
All *(m)*	0	0	2	11	2	11	1	6	8	44	5	28
All	**0**	**0%**	**5**	**9%**	**3**	**6%**	**7**	**13%**	**21**	**40%**	**17**	**32%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	1.25	4	0	1.3	1.8
Lv1 *(m)*	8	1.25	3	0	1.1	1.2
Lv1	28	1.25	4	0	1.3	1.6
Lv3 *(f)*	15	1.00	3	0	0.9	0.8
Lv3 *(m)*	10	1.40	4	0	1.4	2.0
Lv3	25	1.16	4	0	1.2	1.3
All *(f)*	35	1.14	4	0	1.2	1.4
All *(m)*	18	1.33	4	0	1.3	1.7
All	**53**	**1.21**	**4**	**0**	**1.2**	**1.5**

1995

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	0	0	3	8	6	15	9	23	21	54
Lv1 *(m)*	0	0	0	0	7	30	8	35	6	26	2	9
Lv1	0	0	0	0	10	16	14	23	15	24	11	18
Lv3 *(f)*	1	6	2	11	1	6	4	22	5	28	5	28
Lv3 *(m)*	0	0	0	0	2	13	3	20	6	40	4	27
Lv3	1	3	2	6	3	9	7	21	11	33	9	27
All *(f)*	1	2	2	4	4	7	10	18	14	25	26	46
All *(m)*	0	0	0	0	9	24	11	29	12	32	6	16
All	**1**	**1%**	**2**	**2%**	**13**	**14%**	**21**	**22%**	**26**	**27%**	**32**	**34%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	0.77	3	0	1.0	0.9
Lv1 *(m)*	23	1.87	3	0	0.9	0.9
Lv1	62	1.18	3	0	1.1	1.2
Lv3 *(f)*	12	1.61	5	0	1.5	2.2
Lv3 *(m)*	6	1.20	3	0	1.0	1.0
Lv3	18	1.42	5	0	1.3	1.7
All *(f)*	57	1.04	5	0	1.2	1.5
All *(m)*	38	1.61	3	0	1.0	1.0
All	**95**	**1.26**	**5**	**0**	**1.2**	**1.4**

1996

	Often 5		4		3		2		1		Never 0	
	n	%	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	2	5	3	7	8	19	9	21	21	49
Lv1 *(m)*	0	0	0	0	2	14	1	7	6	43	5	36
Lv1	0	0	2	4	5	9	9	16	15	26	14	25
Lv3 *(f)*	0	0	0	0	1	11	2	22	2	22	2	22
Lv3 *(m)*	1	5	0	0	0	0	4	19	8	38	8	38
Lv3	1	3	0	0	1	3	6	20	10	33	12	40
All *(f)*	0	0	2	4	4	8	10	19	11	21	25	48
All *(m)*	1	3	0	0	2	6	5	14	14	40	13	37
All	**1**	**1%**	**2**	**2%**	**6**	**7%**	**15**	**17%**	**25**	**29%**	**38**	**44%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	0.98	4	0	1.2	1.4
Lv1 *(m)*	14	1.00	3	0	1.0	1.0
Lv1	57	0.98	4	0	1.1	1.3
Lv3 *(f)*	4	1.00	3	0	1.1	1.1
Lv3 *(m)*	11	1.00	5	0	1.2	1.3
Lv3	15	1.00	5	0	1.1	1.3
All *(f)*	52	0.98	4	0	1.2	1.3
All *(m)*	35	1.00	5	0	1.1	1.2
All	**87**	**0.99**	**5**	**0**	**1.1**	**1.3**

Q 1.3 *(g)* On a scale of 1 to 5, where 5 is often and 1 is rarely, indicate how often you send messages *to other student(s), offering help with course-related matters.* (use 0 if you never send) [StudOffer]

1990

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	0	0	1	5	2	10	2	10	6	30	9	45
Lv1 *(m)*	0	0	0	0	2	25	1	13	2	25	3	38
Lv1	0	0	1	4	4	14	3	11	8	29	9	32
Lv3 *(f)*	0	0	0	0	0	0	1	7	4	27	10	67
Lv3 *(m)*	0	0	2	20	0	0	2	20	3	30	3	30
Lv3	0	0	2	8	0	0	3	12	7	28	13	52
All *(f)*	0	0	1	3	2	6	3	9	10	29	19	54
All *(m)*	0	0	2	11	2	11	3	17	5	28	6	33
All	**0**	**0%**	**3**	**6%**	**4**	**8%**	**6**	**11%**	**15**	**28%**	**25**	**47%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	1.00	4	0	1.2	1.4
Lv1 *(m)*	8	1.25	3	0	1.2	1.4
Lv1	28	1.07	4	0	1.2	1.4
Lv3 *(f)*	15	0.40	2	0	0.6	0.4
Lv3 *(m)*	10	1.50	4	0	1.4	2.1
Lv3	25	0.84	4	0	1.2	1.3
All *(f)*	35	0.74	4	0	1.0	1.0
All *(m)*	18	1.39	4	0	1.3	1.8
All	**53**	**0.96**	**4**	**0**	**1.2**	**1.4**

1995

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	0	0	1	3	1	3	3	8	11	28	23	59
Lv1 *(m)*	0	0	0	0	1	4	5	22	8	35	9	39
Lv1	0	0	1	2	2	3	8	13	19	31	20	32
Lv3 *(f)*	0	0	0	0	2	11	4	22	7	39	7	39
Lv3 *(m)*	0	0	0	0	0	0	3	20	6	40	6	40
Lv3	0	0	0	0	2	6	7	21	13	39	11	33
All *(f)*	0	0	1	2	3	5	7	12	18	32	28	49
All *(m)*	0	0	0	0	1	3	8	21	14	37	15	39
All	**0**	**0%**	**1**	**1%**	**4**	**4%**	**15**	**16%**	**32**	**34%**	**43**	**45%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	0.62	4	0	0.9	0.9
Lv1 *(m)*	23	0.91	3	0	0.9	0.8
Lv1	62	0.73	4	0	0.9	0.8
Lv3 *(f)*	12	1.17	3	0	1.0	0.9
Lv3 *(m)*	6	0.80	2	0	0.7	0.6
Lv3	18	1.00	3	0	0.9	0.8
All *(f)*	57	0.79	4	0	1.0	0.9
All *(m)*	38	0.87	3	0	0.8	0.7
All	**95**	**0.82**	**4**	**0**	**0.9**	**0.8**

1996

	Often 5 n	%	4 n	%	3 n	%	2 n	%	1 n	%	Never 0 n	%
Lv1 *(f)*	0	0	1	2	1	2	4	9	11	26	26	60
Lv1 *(m)*	0	0	0	0	1	7	0	0	6	43	7	50
Lv1	0	0	1	2	2	4	4	7	17	30	18	32
Lv3 *(f)*	0	0	0	0	0	0	1	11	2	22	2	22
Lv3 *(m)*	0	0	0	0	1	5	7	33	5	24	8	38
Lv3	0	0	0	0	1	3	8	27	7	23	14	47
All *(f)*	0	0	1	2	1	2	5	10	13	25	32	62
All *(m)*	0	0	0	0	2	6	7	20	11	31	15	43
All	**0**	**0%**	**1**	**1%**	**3**	**3%**	**12**	**14%**	**24**	**28%**	**47**	**54%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	0.60	4	0	0.9	0.8
Lv1 *(m)*	14	0.64	3	0	0.8	0.7
Lv1	57	0.61	4	0	0.9	0.8
Lv3 *(f)*	4	0.44	2	0	0.7	0.5
Lv3 *(m)*	11	1.05	3	0	0.9	0.9
Lv3	15	0.87	3	0	0.9	0.8
All *(f)*	52	0.58	4	0	0.9	0.8
All *(m)*	35	0.89	3	0	0.9	0.8
All	**87**	**0.70**	**4**	**0**	**0.9**	**0.8**

Q 2 (a) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *administrative notices and reminders from lecturers.* [Admin]

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	15	75	2	10	3	15	0	0	0	0
Lv1 *(m)*	6	75	1	13	1	13	0	0	0	0
Lv1	21	75	3	11	4	14	0	0	0	0
Lv3 *(f)*	4	27	10	67	0	0	1	7	0	0
Lv3 *(m)*	5	50	2	20	3	30	0	0	0	0
Lv3	9	36	12	48	3	12	1	4	0	0
All *(f)*	19	54	12	34	3	9	1	3	0	0
All *(m)*	11	61	3	17	4	22	0	0	0	0
All	**30**	**57%**	**15**	**28%**	**7**	**13%**	**1**	**2%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.60	5	3	0.7	0.5
Lv1 *(m)*	8	4.63	5	3	0.7	0.5
Lv1	28	4.61	5	3	0.7	0.5
Lv3 *(f)*	15	4.13	5	2	0.7	0.5
Lv3 *(m)*	10	4.20	5	3	0.9	0.8
Lv3	25	4.16	5	2	0.8	0.6
All *(f)*	35	4.40	5	2	0.8	0.6
All *(m)*	18	4.39	5	3	0.8	0.7
All	**53**	**4.40**	**5**	**2**	**0.8**	**0.6**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	21	54	13	33	2	5	3	8	0	0
Lv1 *(m)*	15	65	6	26	1	4	1	4	0	0
Lv1	36	58	19	31	3	5	4	6	0	0
Lv3 *(f)*	13	72	4	22	1	6	0	0	0	0
Lv3 *(m)*	11	73	3	20	0	0	0	0	1	7
Lv3	24	73	7	21	1	3	0	0	1	3
All *(f)*	34	60	17	30	3	5	3	5	0	0
All *(m)*	26	68	9	24	1	3	1	3	1	3
All	**60**	**63%**	**26**	**27%**	**4**	**4%**	**4**	**4%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	4.33	5	2	0.9	0.8
Lv1 *(m)*	23	4.52	5	2	0.8	0.6
Lv1	62	4.40	5	2	0.9	0.7
Lv3 *(f)*	12	4.67	5	3	0.6	0.3
Lv3 *(m)*	6	4.53	5	1	1.0	1.0
Lv3	18	4.61	5	1	0.8	0.7
All *(f)*	57	4.44	5	2	0.8	0.7
All *(m)*	38	4.53	5	1	0.9	0.8
All	**95**	**4.47**	**5**	**1**	**0.8**	**0.7**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	27	64	12	29	2	5	1	2	0	0
Lv1 *(m)*	7	50	3	21	3	21	1	7	0	0
Lv1	34	61	15	27	5	9	2	4	0	0
Lv3 *(f)*	8	89	1	11	0	0	0	0	0	0
Lv3 *(m)*	14	67	3	14	3	14	1	5	0	0
Lv3	22	73	4	13	3	10	1	3	0	0
All *(f)*	35	69	13	25	2	4	1	2	0	0
All *(m)*	21	60	6	17	6	17	2	6	0	0
All	**56**	**65%**	**19**	**22%**	**8**	**9%**	**3**	**3%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	4.55	5	2	0.7	0.5
Lv1 *(m)*	14	4.14	5	2	1.0	1.0
Lv1	56	4.45	5	2	0.8	0.6
Lv3 *(f)*	4	4.89	5	4	0.3	0.1
Lv3 *(m)*	11	4.43	5	2	0.9	0.8
Lv3	15	4.57	5	2	0.8	0.6
All *(f)*	51	4.61	5	2	0.7	0.4
All *(m)*	35	4.31	5	2	0.9	0.9
All	**86**	**4.49**	**5**	**2**	**0.8**	**0.6**

Q 2 *(b)* On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *advertisements for books, accommodation, etc.* [**Advert**]

1990

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	2	10	5	25	9	45	2	10	2	10
Lv1 *(m)*	2	25	0	0	1	13	2	25	3	38
Lv1	4	14	5	18	10	36	4	14	5	18
Lv3 *(f)*	1	7	4	27	8	53	1	7	1	7
Lv3 *(m)*	2	20	3	30	3	30	2	20	0	0
Lv3	3	12	7	28	11	44	3	12	1	4
All *(f)*	3	9	9	26	17	49	3	9	3	9
All *(m)*	4	22	3	17	4	22	4	22	3	17
All	**7**	**13%**	**12**	**23%**	**21**	**40%**	**7**	**13%**	**6**	**11%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.15	5	1	1.1	1.1
Lv1 *(m)*	8	2.50	5	1	1.6	2.5
Lv1	28	2.96	5	1	1.3	1.6
Lv3 *(f)*	15	3.20	5	1	0.9	0.8
Lv3 *(m)*	10	3.50	5	2	1.0	1.1
Lv3	25	3.32	5	1	1.0	0.9
All *(f)*	35	3.17	5	1	1.0	1.0
All *(m)*	18	3.06	5	1	1.4	1.9
All	**53**	**3.13**	**5**	**1**	**1.1**	**1.3**

1995

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	1	3	2	5	17	44	10	26	9	23
Lv1 *(m)*	2	9	2	9	9	39	5	22	5	22
Lv1	3	5	4	6	26	42	15	24	14	23
Lv3 *(f)*	0	0	2	11	7	39	3	17	6	33
Lv3 *(m)*	1	7	1	7	0	0	8	53	5	33
Lv3	1	3	3	9	7	21	11	33	11	33
All *(f)*	1	2	4	7	24	42	13	23	15	26
All *(m)*	3	8	3	8	9	24	13	34	10	26
All	**4**	**4%**	**7**	**7%**	**33**	**35%**	**26**	**27%**	**25**	**26%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.38	5	1	1.0	1.0
Lv1 *(m)*	23	2.61	5	1	1.2	1.4
Lv1	62	2.47	5	1	1.1	1.1
Lv3 *(f)*	12	2.28	4	1	1.0	1.1
Lv3 *(m)*	6	2.00	5	1	1.1	1.2
Lv3	18	2.15	5	1	1.1	1.2
All *(f)*	57	2.35	5	1	1.0	1.0
All *(m)*	38	2.37	5	1	1.2	1.4
All	**95**	**2.36**	**5**	**1**	**1.1**	**1.2**

1996

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	0	0	9	21	13	31	13	31	7	17
Lv1 *(m)*	0	0	0	0	5	36	4	29	5	36
Lv1	0	0	9	16	18	32	17	30	12	21
Lv3 *(f)*	0	0	0	0	2	22	2	22	5	56
Lv3 *(m)*	2	10	0	0	4	19	8	38	7	33
Lv3	2	7	0	0	6	20	10	33	12	40
All *(f)*	0	0	9	18	15	29	15	29	12	24
All *(m)*	2	6	0	0	9	26	12	34	12	34
All	**2**	**2%**	**9**	**10%**	**24**	**28%**	**27**	**31%**	**24**	**28%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	2.57	4	1	1.0	1.0
Lv1 *(m)*	14	2.00	3	1	0.8	0.7
Lv1	56	2.43	4	1	1.0	1.0
Lv3 *(f)*	4	1.67	3	1	0.8	0.7
Lv3 *(m)*	11	2.14	5	1	1.2	1.4
Lv3	15	2.00	5	1	1.1	1.2
All *(f)*	51	2.41	4	1	1.0	1.1
All *(m)*	35	2.09	5	1	1.1	1.1
All	**86**	**2.28**	**5**	**1**	**1.1**	**1.1**

Q 2 (c) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *careers and past graduates information.* **[Career]**

1990

	High value 5: n	%	4: n	%	3: n	%	2: n	%	Low value 1: n	%
Lv1 *(f)*	7	35	6	30	5	25	0	0	2	10
Lv1 *(m)*	3	43	1	14	1	14	1	14	1	14
Lv1	10	37	7	26	6	22	1	4	3	11
Lv3 *(f)*	7	54	2	15	3	23	0	0	1	8
Lv3 *(m)*	3	30	1	10	6	60	0	0	0	0
Lv3	10	43	3	13	9	39	0	0	1	4
All *(f)*	14	42	8	24	8	24	0	0	3	9
All *(m)*	6	35	2	12	7	41	1	6	1	6
All	**20**	**40%**	**10**	**20%**	**15**	**30%**	**1**	**2%**	**4**	**8%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.80	5	1	1.2	1.5
Lv1 *(m)*	7	3.57	5	1	1.5	2.2
Lv1	27	3.74	5	1	1.3	1.7
Lv3 *(f)*	13	4.08	5	1	1.2	1.5
Lv3 *(m)*	10	3.70	5	3	0.9	0.8
Lv3	23	3.91	5	1	1.1	1.2
All *(f)*	33	3.91	5	1	1.2	1.5
All *(m)*	17	3.65	5	1	1.2	1.4
All	**50**	**3.82**	**5**	**1**	**1.2**	**1.5**

1995

	High value 5: n	%	4: n	%	3: n	%	2: n	%	Low value 1: n	%
Lv1 *(f)*	1	3	4	10	9	23	12	31	13	33
Lv1 *(m)*	2	9	3	13	4	17	7	30	7	30
Lv1	3	5	7	11	13	21	19	31	20	32
Lv3 *(f)*	3	17	4	22	5	28	5	28	1	6
Lv3 *(m)*	1	7	4	27	2	13	6	40	2	13
Lv3	4	12	8	24	7	21	11	33	3	9
All *(f)*	4	7	8	14	14	25	17	30	14	25
All *(m)*	3	8	7	18	6	16	13	34	9	24
All	**7**	**7%**	**15**	**16%**	**20**	**21%**	**30**	**32%**	**23**	**24%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.18	5	1	1.1	1.2
Lv1 *(m)*	23	2.39	5	1	1.3	1.6
Lv1	62	2.26	5	1	1.2	1.4
Lv3 *(f)*	12	3.17	5	1	1.2	1.4
Lv3 *(m)*	6	2.73	5	1	1.2	1.4
Lv3	18	2.97	5	1	1.2	1.4
All *(f)*	57	2.49	5	1	1.2	1.4
All *(m)*	38	2.53	5	1	1.3	1.6
All	**95**	**2.51**	**5**	**1**	**1.2**	**1.5**

1996

	High value 5: n	%	4: n	%	3: n	%	2: n	%	Low value 1: n	%
Lv1 *(f)*	2	5	4	10	14	33	13	31	9	21
Lv1 *(m)*	0	0	0	0	5	36	4	29	5	36
Lv1	2	4	4	7	19	34	17	30	14	25
Lv3 *(f)*	1	11	5	56	1	11	2	22	0	0
Lv3 *(m)*	2	10	5	24	6	29	5	24	3	14
Lv3	3	10	10	33	7	23	7	23	3	10
All *(f)*	3	6	9	18	15	29	15	29	9	18
All *(m)*	2	6	5	14	11	31	9	26	8	23
All	**5**	**6%**	**14**	**16%**	**26**	**30%**	**24**	**28%**	**17**	**20%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	2.45	5	1	1.1	1.2
Lv1 *(m)*	14	2.00	3	1	0.8	0.7
Lv1	56	2.34	5	1	1.0	1.1
Lv3 *(f)*	4	3.56	5	2	1.0	0.9
Lv3 *(m)*	11	2.90	5	1	1.2	1.4
Lv3	15	3.10	5	1	1.2	1.4
All *(f)*	51	2.65	5	1	1.1	1.3
All *(m)*	35	2.54	5	1	1.2	1.3
All	**86**	**2.60**	**5**	**1**	**1.1**	**1.3**

Q 2 (d) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *comments by class members on material presented in class.* [Comment]

1990

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	4	20	3	15	5	25	8	40	0	0
Lv1 *(m)*	1	13	1	13	3	38	2	25	1	13
Lv1	5	18	4	14	8	29	10	36	1	4
Lv3 *(f)*	2	13	1	7	7	47	4	27	1	7
Lv3 *(m)*	0	0	5	50	1	10	3	30	1	10
Lv3	2	8	6	24	8	32	7	28	2	8
All *(f)*	6	17	4	11	12	34	12	34	1	3
All *(m)*	1	6	6	33	4	22	5	28	2	11
All	**7**	**13%**	**10**	**19%**	**16**	**30%**	**17**	**32%**	**3**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.15	5	2	1.2	1.3
Lv1 *(m)*	8	2.88	5	1	1.2	1.4
Lv1	28	3.07	5	1	1.2	1.4
Lv3 *(f)*	15	2.93	5	1	1.1	1.1
Lv3 *(m)*	10	3.00	4	1	1.1	1.2
Lv3	25	2.96	5	1	1.1	1.2
All *(f)*	35	3.06	5	1	1.1	1.3
All *(m)*	18	2.94	5	1	1.1	1.3
All	**53**	**3.02**	**5**	**1**	**1.1**	**1.3**

1995

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	3	8	6	15	16	41	11	28	3	8
Lv1 *(m)*	1	4	3	13	8	35	8	35	3	13
Lv1	4	6	9	15	24	39	19	31	6	10
Lv3 *(f)*	1	6	5	28	5	28	5	28	2	11
Lv3 *(m)*	0	0	4	27	6	40	3	20	2	13
Lv3	1	3	9	27	11	33	8	24	4	12
All *(f)*	4	7	11	19	21	37	16	28	5	9
All *(m)*	1	3	7	18	14	37	11	29	5	13
All	**5**	**5%**	**18**	**19%**	**35**	**37%**	**27**	**28%**	**10**	**11%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.87	5	1	1.0	1.0
Lv1 *(m)*	23	2.61	5	1	1.0	1.0
Lv1	62	2.77	5	1	1.0	1.0
Lv3 *(f)*	12	2.89	5	1	1.1	1.2
Lv3 *(m)*	6	2.80	4	1	1.0	1.0
Lv3	18	2.85	5	1	1.0	1.1
All *(f)*	57	2.88	5	1	1.0	1.1
All *(m)*	38	2.68	5	1	1.0	1.0
All	**95**	**2.80**	**5**	**1**	**1.0**	**1.1**

1996

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	1	2	12	29	16	38	8	19	5	12
Lv1 *(m)*	0	0	1	7	7	50	3	21	3	21
Lv1	1	2	13	23	23	41	11	20	8	14
Lv3 *(f)*	1	11	3	33	2	22	1	11	2	22
Lv3 *(m)*	0	0	2	10	14	67	4	19	1	5
Lv3	1	3	5	17	16	53	5	17	3	10
All *(f)*	2	4	15	29	18	35	9	18	7	14
All *(m)*	0	0	3	9	21	60	7	20	4	11
All	**2**	**2%**	**18**	**21%**	**39**	**45%**	**16**	**19%**	**11**	**13%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	2.90	5	1	1.0	1.0
Lv1 *(m)*	14	2.43	4	1	0.9	0.8
Lv1	56	2.79	5	1	1.0	1.0
Lv3 *(f)*	4	3.00	5	1	1.3	1.8
Lv3 *(m)*	11	2.81	4	1	0.7	0.4
Lv3	15	2.87	5	1	0.9	0.8
All *(f)*	51	2.92	5	1	1.1	1.2
All *(m)*	35	2.66	4	1	0.8	0.6
All	**86**	**2.81**	**5**	**1**	**1.0**	**1.0**

Q 2 (e) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *extra-curricular discussion -politics, media, etc.* [Discuss]

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	3	15	4	20	10	50	0	0	3	15
Lv1 *(m)*	1	13	3	38	1	13	3	38	0	0
Lv1	4	14	7	25	11	39	3	11	3	11
Lv3 *(f)*	3	20	7	47	3	20	0	0	2	13
Lv3 *(m)*	1	10	4	40	4	40	1	10	0	0
Lv3	4	16	11	44	7	28	1	4	2	8
All *(f)*	6	17	11	31	13	37	0	0	5	14
All *(m)*	2	11	7	39	5	28	4	22	0	0
All	**8**	**15%**	**18**	**34%**	**18**	**34%**	**4**	**8%**	**5**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.20	5	1	1.2	1.4
Lv1 *(m)*	8	3.25	5	2	1.1	1.2
Lv1	28	3.21	5	1	1.1	1.3
Lv3 *(f)*	15	3.60	5	1	1.2	1.4
Lv3 *(m)*	10	3.50	5	2	0.8	0.7
Lv3	25	3.56	5	1	1.1	1.1
All *(f)*	35	3.37	5	1	1.2	1.4
All *(m)*	18	3.39	5	2	1.0	0.9
All	**53**	**3.38**	**5**	**1**	**1.1**	**1.3**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	1	3	13	33	14	36	11	28
Lv1 *(m)*	1	4	2	9	7	30	9	39	4	17
Lv1	1	2	3	5	20	32	23	37	15	24
Lv3 *(f)*	0	0	1	6	6	33	6	33	5	28
Lv3 *(m)*	2	13	2	13	3	20	3	20	5	33
Lv3	2	6	3	9	9	27	9	27	10	30
All *(f)*	0	0	2	4	19	33	20	35	16	28
All *(m)*	3	8	4	11	10	26	12	32	9	24
All	**3**	**3%**	**6**	**6%**	**29**	**31%**	**32**	**34%**	**25**	**26%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.10	4	1	0.8	0.7
Lv1 *(m)*	23	2.43	5	1	1.0	1.0
Lv1	62	2.23	5	1	0.9	0.9
Lv3 *(f)*	12	2.17	4	1	0.9	0.8
Lv3 *(m)*	6	2.53	5	1	1.4	2.0
Lv3	18	2.33	5	1	1.2	1.4
All *(f)*	57	2.12	4	1	0.9	0.7
All *(m)*	38	2.47	5	1	1.2	1.4
All	**95**	**2.26**	**5**	**1**	**1.0**	**1.0**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	3	7	10	24	19	45	10	24
Lv1 *(m)*	0	0	0	0	2	14	5	36	7	50
Lv1	0	0	3	5	12	21	24	43	17	30
Lv3 *(f)*	1	11	1	11	0	0	6	67	1	11
Lv3 *(m)*	0	0	2	10	2	10	9	43	8	38
Lv3	1	3	3	10	2	7	15	50	9	30
All *(f)*	1	2	4	8	10	20	25	49	11	22
All *(m)*	0	0	2	6	4	11	14	40	15	43
All	**1**	**1%**	**6**	**7%**	**14**	**16%**	**39**	**45%**	**26**	**30%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	2.14	4	1	0.9	0.7
Lv1 *(m)*	14	1.64	3	1	0.7	0.5
Lv1	56	2.02	4	1	0.9	0.7
Lv3 *(f)*	4	2.44	5	1	1.2	1.4
Lv3 *(m)*	11	1.90	4	1	0.9	0.8
Lv3	15	2.07	5	1	1.0	1.1
All *(f)*	51	2.20	5	1	0.9	0.9
All *(m)*	35	1.80	4	1	0.9	0.7
All	**86**	**2.03**	**5**	**1**	**0.9**	**0.8**

Q 2 (f) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *notices about upcoming events, TV, seminars, guest lectures, etc.* [Event]

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	6	30	7	35	6	30	1	5	0	0
Lv1 *(m)*	2	25	3	38	3	38	0	0	0	0
Lv1	8	29	10	36	9	32	1	4	0	0
Lv3 *(f)*	6	40	6	40	3	20	0	0	0	0
Lv3 *(m)*	2	20	4	40	3	30	1	10	0	0
Lv3	8	32	10	40	6	24	1	4	0	0
All *(f)*	12	34	13	37	9	26	1	3	0	0
All *(m)*	4	22	7	39	6	33	1	6	0	0
All	**16**	**30%**	**20**	**38%**	**15**	**28%**	**2**	**4%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.90	5	2	0.9	0.8
Lv1 *(m)*	8	3.88	5	3	0.8	0.6
Lv1	28	3.89	5	2	0.9	0.7
Lv3 *(f)*	15	4.20	5	3	0.7	0.6
Lv3 *(m)*	10	3.70	5	2	0.9	0.8
Lv3	25	4.00	5	2	0.8	0.7
All *(f)*	35	4.03	5	2	0.8	0.7
All *(m)*	18	3.78	5	2	0.9	0.7
All	**53**	**3.94**	**5**	**2**	**0.9**	**0.7**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	8	21	12	31	13	33	4	10	2	5
Lv1 *(m)*	3	13	10	43	7	30	2	9	1	4
Lv1	11	18	22	35	20	32	6	10	3	5
Lv3 *(f)*	4	22	4	22	6	33	4	22	0	0
Lv3 *(m)*	3	20	2	13	7	47	2	13	1	7
Lv3	7	21	6	18	13	39	6	18	1	3
All *(f)*	12	21	16	28	19	33	8	14	2	4
All *(m)*	6	16	12	32	14	37	4	11	2	5
All	**18**	**19%**	**28**	**29%**	**33**	**35%**	**12**	**13%**	**4**	**4%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	3.51	5	1	1.1	1.2
Lv1 *(m)*	23	3.52	5	1	1.0	0.9
Lv1	62	3.52	5	1	1.0	1.1
Lv3 *(f)*	12	3.44	5	2	1.1	1.1
Lv3 *(m)*	6	3.27	5	1	1.1	1.3
Lv3	18	3.36	5	1	1.1	1.2
All *(f)*	57	3.49	5	1	1.1	1.2
All *(m)*	38	3.42	5	1	1.0	1.1
All	**95**	**3.46**	**5**	**1**	**1.1**	**1.1**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	7	17	13	31	16	38	4	10	2	5
Lv1 *(m)*	0	0	3	21	5	36	4	29	2	14
Lv1	7	13	16	29	21	38	8	14	4	7
Lv3 *(f)*	3	33	1	11	5	56	0	0	0	0
Lv3 *(m)*	2	10	7	33	5	24	6	29	1	5
Lv3	5	17	8	27	10	33	6	20	1	3
All *(f)*	10	20	14	27	21	41	4	8	2	4
All *(m)*	2	6	10	29	10	29	10	29	3	9
All	**12**	**14%**	**24**	**28%**	**31**	**36%**	**14**	**16%**	**5**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	3.45	5	1	1.0	1.1
Lv1 *(m)*	14	2.64	4	1	1.0	0.9
Lv1	56	3.25	5	1	1.1	1.2
Lv3 *(f)*	4	3.78	5	3	0.9	0.8
Lv3 *(m)*	11	3.14	5	1	1.1	1.2
Lv3	15	3.33	5	1	1.1	1.2
All *(f)*	51	3.51	5	1	1.0	1.0
All *(m)*	35	2.94	5	1	1.1	1.1
All	**86**	**3.28**	**5**	**1**	**1.1**	**1.2**

Q 2 (g) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *examples of coursework submissions or drafts.* [**Exwork**]

1990

	5 (High value) n	5 %	4 n	4 %	3 n	3 %	2 n	2 %	1 (Low value) n	1 %
Lv1 *(f)*	2	10	5	25	11	55	1	5	1	5
Lv1 *(m)*	1	13	0	0	3	38	3	38	1	13
Lv1	3	11	5	18	14	50	4	14	2	7
Lv3 *(f)*	0	0	7	47	5	33	1	7	2	13
Lv3 *(m)*	1	10	6	60	2	20	0	0	1	10
Lv3	1	4	13	52	7	28	1	4	3	12
All *(f)*	2	6	12	34	16	46	2	6	3	9
All *(m)*	2	11	6	33	5	28	3	17	2	11
All	**4**	**8%**	**18**	**34%**	**21**	**40%**	**5**	**9%**	**5**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.30	5	1	0.9	0.8
Lv1 *(m)*	8	2.63	5	1	1.1	1.2
Lv1	28	3.11	5	1	1.0	1.0
Lv3 *(f)*	15	3.13	4	1	1.0	1.0
Lv3 *(m)*	10	3.60	5	1	1.0	1.0
Lv3	25	3.32	5	1	1.0	1.1
All *(f)*	35	3.23	5	1	1.0	0.9
All *(m)*	18	3.17	5	1	1.2	1.4
All	**53**	**3.21**	**5**	**1**	**1.0**	**1.1**

1995

	5 (High value) n	5 %	4 n	4 %	3 n	3 %	2 n	2 %	1 (Low value) n	1 %
Lv1 *(f)*	13	33	14	36	10	26	1	3	1	3
Lv1 *(m)*	6	27	6	27	5	23	4	18	1	5
Lv1	19	31	20	33	15	25	5	8	2	3
Lv3 *(f)*	7	39	5	28	3	17	1	6	2	11
Lv3 *(m)*	5	33	4	27	2	13	2	13	2	13
Lv3	12	36	9	27	5	15	3	9	4	12
All *(f)*	20	35	19	33	13	23	2	4	3	5
All *(m)*	11	30	10	27	7	19	6	16	3	8
All	**31**	**33%**	**29**	**31%**	**20**	**21%**	**8**	**9%**	**6**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	3.95	5	1	1.0	0.9
Lv1 *(m)*	22	3.55	5	1	1.2	1.4
Lv1	61	3.80	5	1	1.1	1.1
Lv3 *(f)*	12	3.78	5	1	1.3	1.7
Lv3 *(m)*	6	3.53	5	1	1.4	2.0
Lv3	18	3.67	5	1	1.4	1.9
All *(f)*	57	3.89	5	1	1.1	1.2
All *(m)*	37	3.54	5	1	1.3	1.7
All	**94**	**3.76**	**5**	**1**	**1.2**	**1.4**

1996

	5 (High value) n	5 %	4 n	4 %	3 n	3 %	2 n	2 %	1 (Low value) n	1 %
Lv1 *(f)*	11	26	17	40	9	21	4	10	1	2
Lv1 *(m)*	2	14	6	43	4	29	2	14	0	0
Lv1	13	23	23	41	13	23	6	11	1	2
Lv3 *(f)*	6	67	2	22	1	11	0	0	0	0
Lv3 *(m)*	6	29	5	24	7	33	2	10	1	5
Lv3	12	40	7	23	8	27	2	7	1	3
All *(f)*	17	33	19	37	10	20	4	8	1	2
All *(m)*	8	23	11	31	11	31	4	11	1	3
All	**25**	**29%**	**30**	**35%**	**21**	**24%**	**8**	**9%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	3.79	5	1	1.0	1.0
Lv1 *(m)*	14	3.57	5	2	0.9	0.8
Lv1	56	3.73	5	1	1.0	1.0
Lv3 *(f)*	4	4.56	5	3	0.7	0.5
Lv3 *(m)*	11	3.62	5	1	1.1	1.3
Lv3	15	3.90	5	1	1.1	1.2
All *(f)*	51	3.92	5	1	1.0	1.0
All *(m)*	35	3.60	5	1	1.0	1.1
All	**86**	**3.79**	**5**	**1**	**1.0**	**1.1**

Q 2 *(h)* On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *feedback reports by coursework markers.* **[Feedback]**

1990

	High value 5	:	4	:	3	:	2	:	Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	17	85	3	15	0	0	0	0	0	0
Lv1 *(m)*	4	50	4	50	0	0	0	0	0	0
Lv1	21	75	7	25	0	0	0	0	0	0
Lv3 *(f)*	9	60	3	20	2	13	1	7	0	0
Lv3 *(m)*	6	60	3	30	0	0	1	10	0	0
Lv3	15	60	6	24	2	8	2	8	0	0
All *(f)*	26	74	6	17	2	6	1	3	0	0
All *(m)*	10	56	7	39	0	0	1	6	0	0
All	**36**	**68%**	**13**	**25%**	**2**	**4%**	**2**	**4%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.85	5	4	0.4	0.1
Lv1 *(m)*	8	4.50	5	4	0.5	0.3
Lv1	28	4.75	5	4	0.4	0.2
Lv3 *(f)*	15	4.33	5	2	0.9	0.9
Lv3 *(m)*	10	4.40	5	2	0.9	0.8
Lv3	25	4.36	5	2	0.9	0.9
All *(f)*	35	4.63	5	2	0.7	0.5
All *(m)*	18	4.44	5	2	0.8	0.6
All	**53**	**4.57**	**5**	**2**	**0.7**	**0.5**

1995

	High value 5	:	4	:	3	:	2	:	Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	11	28	11	28	6	15	9	23	2	5
Lv1 *(m)*	9	41	6	27	4	18	2	9	1	5
Lv1	20	33	17	28	10	16	11	18	3	5
Lv3 *(f)*	12	67	2	11	3	17	0	0	1	6
Lv3 *(m)*	7	47	2	13	2	13	2	13	2	13
Lv3	19	58	4	12	5	15	2	6	3	9
All *(f)*	23	40	13	23	9	16	9	16	3	5
All *(m)*	16	43	8	22	6	16	4	11	3	8
All	**39**	**41%**	**21**	**22%**	**15**	**16%**	**13**	**14%**	**6**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	3.51	5	1	1.3	1.6
Lv1 *(m)*	22	3.91	5	1	1.2	1.4
Lv1	61	3.66	5	1	1.2	1.5
Lv3 *(f)*	12	4.33	5	1	1.1	1.2
Lv3 *(m)*	6	3.67	5	1	1.5	2.2
Lv3	18	4.03	5	1	1.3	1.8
All *(f)*	57	3.77	5	1	1.3	1.6
All *(m)*	37	3.81	5	1	1.3	1.7
All	**94**	**3.79**	**5**	**1**	**1.3**	**1.7**

1996

	High value 5	:	4	:	3	:	2	:	Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	20	48	11	26	10	24	1	2	0	0
Lv1 *(m)*	4	29	5	36	3	21	2	14	0	0
Lv1	24	43	16	29	13	23	3	5	0	0
Lv3 *(f)*	7	78	2	22	0	0	0	0	0	0
Lv3 *(m)*	11	52	1	5	5	24	1	5	3	14
Lv3	18	60	3	10	5	17	1	3	3	10
All *(f)*	27	53	13	25	10	20	1	2	0	0
All *(m)*	15	43	6	17	8	23	3	9	3	9
All	**42**	**49%**	**19**	**22%**	**18**	**21%**	**4**	**5%**	**3**	**3%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	4.19	5	2	0.9	0.8
Lv1 *(m)*	14	3.79	5	2	1.0	1.0
Lv1	56	4.09	5	2	0.9	0.9
Lv3 *(f)*	4	4.78	5	4	0.4	0.2
Lv3 *(m)*	11	3.76	5	1	1.5	2.2
Lv3	15	4.07	5	1	1.3	1.8
All *(f)*	51	4.29	5	2	0.8	0.7
All *(m)*	35	3.77	5	1	1.3	1.7
All	**86**	**4.08**	**5**	**1**	**1.1**	**1.2**

Q 2 (i) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *lecturer's handouts and lecture notes.* [Handout]

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	18	90	1	5	1	5	0	0	0	0
Lv1 *(m)*	5	71	2	29	0	0	0	0	0	0
Lv1	23	85	3	11	1	4	0	0	0	0
Lv3 *(f)*	6	46	4	31	2	15	1	8	0	0
Lv3 *(m)*	8	80	1	10	1	10	0	0	0	0
Lv3	14	61	5	22	3	13	1	4	0	0
All *(f)*	24	73	5	15	3	9	1	3	0	0
All *(m)*	13	76	3	18	1	6	0	0	0	0
All	**37**	**74%**	**8**	**16%**	**4**	**8%**	**1**	**2%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.85	5	3	0.5	0.2
Lv1 *(m)*	7	4.71	5	4	0.5	0.2
Lv1	27	4.81	5	3	0.5	0.2
Lv3 *(f)*	13	4.15	5	2	0.9	0.9
Lv3 *(m)*	10	4.70	5	3	0.6	0.4
Lv3	23	4.39	5	2	0.9	0.8
All *(f)*	33	4.58	5	2	0.8	0.6
All *(m)*	17	4.71	5	3	0.6	0.3
All	**50**	**4.62**	**5**	**2**	**0.7**	**0.5**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	27	69	9	23	3	8	0	0	0	0
Lv1 *(m)*	17	74	5	22	1	4	0	0	0	0
Lv1	44	71	14	23	4	6	0	0	0	0
Lv3 *(f)*	14	78	2	11	2	11	0	0	0	0
Lv3 *(m)*	11	73	1	7	1	7	1	7	1	7
Lv3	25	76	3	9	3	9	1	3	1	3
All *(f)*	41	72	11	19	5	9	0	0	0	0
All *(m)*	28	74	6	16	2	5	1	3	1	3
All	**69**	**73%**	**17**	**18%**	**7**	**7%**	**1**	**1%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	4.62	5	3	0.6	0.4
Lv1 *(m)*	23	4.70	5	3	0.5	0.3
Lv1	62	4.65	5	3	0.6	0.4
Lv3 *(f)*	12	4.67	5	3	0.7	0.4
Lv3 *(m)*	6	4.33	5	1	1.2	1.6
Lv3	18	4.52	5	1	1.0	1.0
All *(f)*	57	4.63	5	3	0.6	0.4
All *(m)*	38	4.55	5	1	0.9	0.8
All	**95**	**4.60**	**5**	**1**	**0.8**	**0.6**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	25	60	11	26	4	10	2	5	0	0
Lv1 *(m)*	7	50	3	21	1	7	3	21	0	0
Lv1	32	57	14	25	5	9	5	9	0	0
Lv3 *(f)*	8	89	1	11	0	0	0	0	0	0
Lv3 *(m)*	16	76	3	14	2	10	0	0	0	0
Lv3	24	80	4	13	2	7	0	0	0	0
All *(f)*	33	65	12	24	4	8	2	4	0	0
All *(m)*	23	66	6	17	3	9	3	9	0	0
All	**56**	**65%**	**18**	**21%**	**7**	**8%**	**5**	**6%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	4.40	5	2	0.8	0.7
Lv1 *(m)*	14	4.00	5	2	1.2	1.4
Lv1	56	4.30	5	2	1.0	0.9
Lv3 *(f)*	4	4.89	5	4	0.3	0.1
Lv3 *(m)*	11	4.67	5	3	0.6	0.4
Lv3	15	4.73	5	3	0.6	0.3
All *(f)*	51	4.49	5	2	0.8	0.6
All *(m)*	35	4.40	5	2	1.0	0.9
All	**86**	**4.45**	**5**	**2**	**0.9**	**0.8**

Q 2 (j) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *help -clarification and advice on coursework from lecturers.* [Help]

1990

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	18	90	2	10	0	0	0	0	0	0
Lv1 *(m)*	7	88	1	13	0	0	0	0	0	0
Lv1	25	89	3	11	0	0	0	0	0	0
Lv3 *(f)*	9	60	4	27	2	13	0	0	0	0
Lv3 *(m)*	4	40	5	50	1	10	0	0	0	0
Lv3	13	52	9	36	3	12	0	0	0	0
All *(f)*	27	77	6	17	2	6	0	0	0	0
All *(m)*	11	61	6	33	1	6	0	0	0	0
All	**38**	**72%**	**12**	**23%**	**3**	**6%**	**0**	**0%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.90	5	4	0.3	0.1
Lv1 *(m)*	8	4.88	5	4	0.3	0.1
Lv1	28	4.89	5	4	0.3	0.1
Lv3 *(f)*	15	4.47	5	3	0.7	0.5
Lv3 *(m)*	10	4.30	5	3	0.6	0.4
Lv3	25	4.40	5	3	0.7	0.5
All *(f)*	35	4.71	5	3	0.6	0.3
All *(m)*	18	4.56	5	3	0.6	0.4
All	**53**	**4.66**	**5**	**3**	**0.6**	**0.3**

1995

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	23	59	13	33	2	5	0	0	1	3
Lv1 *(m)*	9	39	10	43	3	13	1	4	0	0
Lv1	32	52	23	37	5	8	1	2	1	2
Lv3 *(f)*	13	72	3	17	2	11	0	0	0	0
Lv3 *(m)*	7	47	5	33	0	0	2	13	1	7
Lv3	20	61	8	24	2	6	2	6	1	3
All *(f)*	36	63	16	28	4	7	0	0	1	2
All *(m)*	16	42	15	39	3	8	3	8	1	3
All	**52**	**55%**	**31**	**33%**	**7**	**7%**	**3**	**3%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	4.46	5	1	0.8	0.7
Lv1 *(m)*	23	4.17	5	2	0.8	0.7
Lv1	62	4.35	5	1	0.8	0.7
Lv3 *(f)*	12	4.61	5	3	0.7	0.5
Lv3 *(m)*	6	4.00	5	1	1.3	1.6
Lv3	18	4.33	5	1	1.0	1.1
All *(f)*	57	4.51	5	1	0.8	0.6
All *(m)*	38	4.11	5	1	1.0	1.0
All	**95**	**4.35**	**5**	**1**	**0.9**	**0.8**

1996

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	25	60	15	36	1	2	1	2	0	0
Lv1 *(m)*	5	36	3	21	4	29	2	14	0	0
Lv1	30	54	18	32	5	9	3	5	0	0
Lv3 *(f)*	6	67	2	22	1	11	0	0	0	0
Lv3 *(m)*	10	48	8	38	2	10	1	5	0	0
Lv3	16	53	10	33	3	10	1	3	0	0
All *(f)*	31	61	17	33	2	4	1	2	0	0
All *(m)*	15	43	11	31	6	17	3	9	0	0
All	**46**	**53%**	**28**	**33%**	**8**	**9%**	**4**	**5%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	4.52	5	2	0.7	0.4
Lv1 *(m)*	14	3.79	5	2	1.1	1.2
Lv1	56	4.34	5	2	0.9	0.7
Lv3 *(f)*	4	4.56	5	3	0.7	0.5
Lv3 *(m)*	11	4.29	5	2	0.8	0.7
Lv3	15	4.37	5	2	0.8	0.6
All *(f)*	51	4.53	5	2	0.7	0.4
All *(m)*	35	4.09	5	2	1.0	0.9
All	**86**	**4.35**	**5**	**2**	**0.8**	**0.7**

Q 2 (k) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *course syllabus outlines and rationales.* [**Outline**]

1990

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	11	55	3	15	5	25	1	5	0	0
Lv1 *(m)*	3	43	2	29	1	14	1	14	0	0
Lv1	14	52	5	19	6	22	2	7	0	0
Lv3 *(f)*	8	67	2	17	2	17	0	0	0	0
Lv3 *(m)*	4	40	2	20	3	30	1	10	0	0
Lv3	12	55	4	18	5	23	1	5	0	0
All *(f)*	19	59	5	16	7	22	1	3	0	0
All *(m)*	7	41	4	24	4	24	2	12	0	0
All	**26**	**53%**	**9**	**18%**	**11**	**22%**	**3**	**6%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.20	5	2	1.0	1.0
Lv1 *(m)*	7	4.00	5	2	1.1	1.1
Lv1	27	4.15	5	2	1.0	1.0
Lv3 *(f)*	12	4.50	5	3	0.8	0.6
Lv3 *(m)*	10	3.90	5	2	1.0	1.1
Lv3	22	4.23	5	2	1.0	0.9
All *(f)*	32	4.31	5	2	0.9	0.8
All *(m)*	17	3.94	5	2	1.1	1.1
All	**49**	**4.18**	**5**	**2**	**1.0**	**1.0**

1995

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	17	44	13	33	5	13	4	10	0	0
Lv1 *(m)*	9	39	6	26	6	26	1	4	1	4
Lv1	26	42	19	31	11	18	5	8	1	2
Lv3 *(f)*	10	56	3	17	5	28	0	0	0	0
Lv3 *(m)*	8	53	3	20	3	20	1	7	0	0
Lv3	18	55	6	18	8	24	1	3	0	0
All *(f)*	27	47	16	28	10	18	4	7	0	0
All *(m)*	17	45	9	24	9	24	2	5	1	3
All	**44**	**46%**	**25**	**26%**	**19**	**20%**	**6**	**6%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	4.10	5	2	1.0	1.0
Lv1 *(m)*	23	3.91	5	1	1.1	1.2
Lv1	62	4.03	5	1	1.0	1.1
Lv3 *(f)*	12	4.28	5	3	0.9	0.8
Lv3 *(m)*	6	4.20	5	2	1.0	1.0
Lv3	18	4.24	5	2	0.9	0.9
All *(f)*	57	4.16	5	2	1.0	0.9
All *(m)*	38	4.03	5	1	1.1	1.1
All	**95**	**4.11**	**5**	**1**	**1.0**	**1.0**

1996

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	12	29	19	45	9	21	2	5	0	0
Lv1 *(m)*	1	7	5	36	3	21	5	36	0	0
Lv1	13	23	24	43	12	21	7	13	0	0
Lv3 *(f)*	4	44	4	44	0	0	1	11	0	0
Lv3 *(m)*	9	43	6	29	3	14	2	10	1	5
Lv3	13	43	10	33	3	10	3	10	1	3
All *(f)*	16	31	23	45	9	18	3	6	0	0
All *(m)*	10	29	11	31	6	17	7	20	1	3
All	**26**	**30%**	**34**	**40%**	**15**	**17%**	**10**	**12%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	3.98	5	2	0.8	0.7
Lv1 *(m)*	14	3.14	5	2	1.0	1.0
Lv1	56	3.77	5	2	0.9	0.9
Lv3 *(f)*	4	4.22	5	2	0.9	0.8
Lv3 *(m)*	11	3.95	5	1	1.2	1.4
Lv3	15	4.03	5	1	1.1	1.2
All *(f)*	51	4.02	5	2	0.9	0.7
All *(m)*	35	3.63	5	1	1.2	1.4
All	**86**	**3.86**	**5**	**1**	**1.0**	**1.0**

Q 2 (l) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *photos of staff and students to assist recognition.* [Photos]

1990

Question not asked this year, as not technically feasible at this time.

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	6	15	9	23	14	36	10	26
Lv1 *(m)*	1	4	0	0	6	26	8	35	8	35
Lv1	1	2	6	10	15	24	22	35	18	29
Lv3 *(f)*	0	0	2	11	3	17	7	39	6	33
Lv3 *(m)*	1	7	1	7	0	0	2	13	11	73
Lv3	1	3	3	9	3	9	9	27	17	52
All *(f)*	0	0	8	14	12	21	21	37	16	28
All *(m)*	2	5	1	3	6	16	10	26	19	50
All	**2**	**2%**	**9**	**9%**	**18**	**19%**	**31**	**33%**	**35**	**37%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.28	4	1	1.0	1.0
Lv1 *(m)*	23	2.04	5	1	1.0	1.0
Lv1	62	2.19	5	1	1.0	1.0
Lv3 *(f)*	12	2.06	4	1	1.0	0.9
Lv3 *(m)*	6	1.60	5	1	1.2	1.4
Lv3	18	1.85	5	1	1.1	1.2
All *(f)*	57	2.21	4	1	1.0	1.0
All *(m)*	38	1.87	5	1	1.1	1.2
All	**95**	**2.07**	**5**	**1**	**1.1**	**1.1**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	4	10	11	26	15	36	12	29
Lv1 *(m)*	0	0	1	7	5	36	3	21	5	36
Lv1	0	0	5	9	16	29	18	32	17	30
Lv3 *(f)*	0	0	0	0	3	33	3	33	3	33
Lv3 *(m)*	0	0	2	10	3	14	3	14	13	62
Lv3	0	0	2	7	6	20	6	20	16	53
All *(f)*	0	0	4	8	14	27	18	35	15	29
All *(m)*	0	0	3	9	8	23	6	17	18	51
All	**0**	**0%**	**7**	**8%**	**22**	**26%**	**24**	**28%**	**33**	**38%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	2.17	4	1	0.9	0.9
Lv1 *(m)*	14	2.14	4	1	1.0	1.0
Lv1	56	2.16	4	1	1.0	0.9
Lv3 *(f)*	4	2.00	3	1	0.8	0.7
Lv3 *(m)*	11	1.71	4	1	1.0	1.1
Lv3	15	1.80	4	1	1.0	1.0
All *(f)*	51	2.14	4	1	0.9	0.9
All *(m)*	35	1.89	4	1	1.0	1.1
All	**86**	**2.03**	**4**	**1**	**1.0**	**1.0**

Q 2 (m) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *previews of material to be presented in class.* [**Preview**]

1990

	High value 5	:	4	:	3	:	2	:	Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	13	65	5	25	2	10	0	0	0	0
Lv1 *(m)*	5	63	1	13	1	13	1	13	0	0
Lv1	18	64	6	21	3	11	1	4	0	0
Lv3 *(f)*	7	47	4	27	3	20	1	7	0	0
Lv3 *(m)*	2	20	6	60	2	20	0	0	0	0
Lv3	9	36	10	40	5	20	1	4	0	0
All *(f)*	20	57	9	26	5	14	1	3	0	0
All *(m)*	7	39	7	39	3	17	1	6	0	0
All	**27**	**51%**	**16**	**30%**	**8**	**15%**	**2**	**4%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.55	5	3	0.7	0.4
Lv1 *(m)*	8	4.25	5	2	1.1	1.2
Lv1	28	4.46	5	2	0.8	0.7
Lv3 *(f)*	15	4.13	5	2	1.0	0.9
Lv3 *(m)*	10	4.00	5	3	0.6	0.4
Lv3	25	4.08	5	2	0.8	0.7
All *(f)*	35	4.37	5	2	0.8	0.7
All *(m)*	18	4.11	5	2	0.9	0.8
All	**53**	**4.28**	**5**	**2**	**0.9**	**0.7**

1995

	High value 5	:	4	:	3	:	2	:	Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	4	10	6	15	21	54	6	15	2	5
Lv1 *(m)*	3	13	2	9	9	39	7	30	2	9
Lv1	7	11	8	13	30	48	13	21	4	6
Lv3 *(f)*	3	17	6	33	5	28	2	11	2	11
Lv3 *(m)*	2	13	3	20	5	33	3	20	2	13
Lv3	5	15	9	27	10	30	5	15	4	12
All *(f)*	7	12	12	21	26	46	8	14	4	7
All *(m)*	5	13	5	13	14	37	10	26	4	11
All	**12**	**13%**	**17**	**18%**	**40**	**42%**	**18**	**19%**	**8**	**8%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	3.10	5	1	1.0	0.9
Lv1 *(m)*	23	2.87	5	1	1.1	1.2
Lv1	62	3.02	5	1	1.0	1.0
Lv3 *(f)*	12	3.33	5	1	1.2	1.4
Lv3 *(m)*	6	3.00	5	1	1.2	1.5
Lv3	18	3.18	5	1	1.2	1.5
All *(f)*	57	3.18	5	1	1.0	1.1
All *(m)*	38	2.92	5	1	1.2	1.3
All	**95**	**3.07**	**5**	**1**	**1.1**	**1.2**

1996

	High value 5	:	4	:	3	:	2	:	Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	1	2	12	29	17	40	10	24	2	5
Lv1 *(m)*	2	14	1	7	8	57	1	7	2	14
Lv1	3	5	13	23	25	45	11	20	4	7
Lv3 *(f)*	2	22	2	22	5	56	0	0	0	0
Lv3 *(m)*	1	5	9	43	8	38	1	5	2	10
Lv3	3	10	11	37	13	43	1	3	2	7
All *(f)*	3	6	14	27	22	43	10	20	2	4
All *(m)*	3	9	10	29	16	46	2	6	4	11
All	**6**	**7%**	**24**	**28%**	**38**	**44%**	**12**	**14%**	**6**	**7%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	3.00	5	1	0.9	0.8
Lv1 *(m)*	14	3.00	5	1	1.1	1.3
Lv1	56	3.00	5	1	1.0	0.9
Lv3 *(f)*	4	3.67	5	3	0.8	0.7
Lv3 *(m)*	11	3.29	5	1	1.0	1.0
Lv3	15	3.40	5	1	1.0	0.9
All *(f)*	51	3.12	5	1	0.9	0.8
All *(m)*	35	3.17	5	1	1.1	1.1
All	**86**	**3.14**	**5**	**1**	**1.0**	**1.0**

Q 2 (n) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *reading lists and subject references.* [Reading]

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	16	80	2	10	2	10	0	0	0	0
Lv1 *(m)*	5	71	2	29	0	0	0	0	0	0
Lv1	21	78	4	15	2	7	0	0	0	0
Lv3 *(f)*	8	62	3	23	1	8	0	0	1	8
Lv3 *(m)*	8	80	1	10	1	10	0	0	0	0
Lv3	16	70	4	17	2	9	0	0	1	4
All *(f)*	24	73	5	15	3	9	0	0	1	3
All *(m)*	13	76	3	18	1	6	0	0	0	0
All	**37**	**74%**	**8**	**16%**	**4**	**8%**	**0**	**0%**	**1**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.70	5	3	0.6	0.4
Lv1 *(m)*	7	4.71	5	4	0.5	0.2
Lv1	27	4.70	5	3	0.6	0.4
Lv3 *(f)*	13	4.31	5	1	1.1	1.3
Lv3 *(m)*	10	4.70	5	3	0.6	0.4
Lv3	23	4.48	5	1	1.0	0.9
All *(f)*	33	4.55	5	1	0.9	0.8
All *(m)*	17	4.71	5	3	0.6	0.3
All	**50**	**4.60**	**5**	**1**	**0.8**	**0.6**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	11	28	11	28	15	38	1	3	1	3
Lv1 *(m)*	6	26	7	30	9	39	1	4	0	0
Lv1	17	27	18	29	24	39	2	3	1	2
Lv3 *(f)*	8	44	8	44	1	6	0	0	1	6
Lv3 *(m)*	6	40	4	27	4	27	1	7	0	0
Lv3	14	42	12	36	5	15	1	3	1	3
All *(f)*	19	33	19	33	16	28	1	2	2	4
All *(m)*	12	32	11	29	13	34	2	5	0	0
All	**31**	**33%**	**30**	**32%**	**29**	**31%**	**3**	**3%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	3.77	5	1	1.0	0.9
Lv1 *(m)*	23	3.78	5	2	0.9	0.8
Lv1	62	3.77	5	1	0.9	0.9
Lv3 *(f)*	12	4.22	5	1	1.0	1.0
Lv3 *(m)*	6	4.00	5	2	1.0	0.9
Lv3	18	4.12	5	1	1.0	1.0
All *(f)*	57	3.91	5	1	1.0	1.0
All *(m)*	38	3.87	5	2	0.9	0.9
All	**95**	**3.89**	**5**	**1**	**1.0**	**0.9**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	17	40	15	36	9	21	1	2	0	0
Lv1 *(m)*	3	21	6	43	3	21	2	14	0	0
Lv1	20	36	21	38	12	21	3	5	0	0
Lv3 *(f)*	5	56	3	33	1	11	0	0	0	0
Lv3 *(m)*	8	38	4	19	6	29	1	5	2	10
Lv3	13	43	7	23	7	23	1	3	2	7
All *(f)*	22	43	18	35	10	20	1	2	0	0
All *(m)*	11	31	10	29	9	26	3	9	2	6
All	**33**	**38%**	**28**	**33%**	**19**	**22%**	**4**	**5%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	4.14	5	2	0.8	0.7
Lv1 *(m)*	14	3.71	5	2	1.0	0.9
Lv1	56	4.04	5	2	0.9	0.8
Lv3 *(f)*	4	4.44	5	3	0.7	0.5
Lv3 *(m)*	11	3.71	5	1	1.3	1.6
Lv3	15	3.93	5	1	1.2	1.4
All *(f)*	51	4.20	5	2	0.8	0.7
All *(m)*	35	3.71	5	1	1.2	1.3
All	**86**	**4.00**	**5**	**1**	**1.0**	**1.0**

Q 2 *(o)* On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *messages from student course-representatives.* **[Reps]**

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	9	45	7	35	4	20	0	0	0	0
Lv1 *(m)*	3	38	3	38	2	25	0	0	0	0
Lv1	12	43	10	36	6	21	0	0	0	0
Lv3 *(f)*	6	40	6	40	2	13	1	7	0	0
Lv3 *(m)*	5	50	2	20	2	20	1	10	0	0
Lv3	11	44	8	32	4	16	2	8	0	0
All *(f)*	15	43	13	37	6	17	1	3	0	0
All *(m)*	8	44	5	28	4	22	1	6	0	0
All	**23**	**43%**	**18**	**34%**	**10**	**19%**	**2**	**4%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.25	5	3	0.8	0.6
Lv1 *(m)*	8	4.13	5	3	0.8	0.6
Lv1	28	4.21	5	3	0.8	0.6
Lv3 *(f)*	15	4.13	5	2	0.9	0.8
Lv3 *(m)*	10	4.10	5	2	1.0	1.1
Lv3	25	4.12	5	2	1.0	0.9
All *(f)*	35	4.20	5	2	0.8	0.7
All *(m)*	18	4.11	5	2	0.9	0.9
All	**53**	**4.17**	**5**	**2**	**0.9**	**0.7**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	4	10	9	23	13	33	8	21	5	13
Lv1 *(m)*	1	5	2	9	8	36	8	36	3	14
Lv1	5	8	11	18	21	34	16	26	8	13
Lv3 *(f)*	5	28	3	17	8	44	1	6	1	6
Lv3 *(m)*	1	7	0	0	6	40	4	27	4	27
Lv3	6	18	3	9	14	42	5	15	5	15
All *(f)*	9	16	12	21	21	37	9	16	6	11
All *(m)*	2	5	2	5	14	38	12	32	7	19
All	**11**	**12%**	**14**	**15%**	**35**	**37%**	**21**	**22%**	**13**	**14%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.97	5	1	1.2	1.4
Lv1 *(m)*	22	2.55	5	1	1.0	1.0
Lv1	61	2.82	5	1	1.1	1.3
Lv3 *(f)*	12	3.56	5	1	1.1	1.2
Lv3 *(m)*	6	2.33	5	1	1.1	1.2
Lv3	18	3.00	5	1	1.3	1.6
All *(f)*	57	3.16	5	1	1.2	1.4
All *(m)*	37	2.46	5	1	1.0	1.1
All	**94**	**2.88**	**5**	**1**	**1.2**	**1.4**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	1	2	7	17	20	48	13	31	1	2
Lv1 *(m)*	0	0	2	14	4	29	5	36	3	21
Lv1	1	2	9	16	24	43	18	32	4	7
Lv3 *(f)*	1	11	2	22	3	33	2	22	1	11
Lv3 *(m)*	2	10	3	14	7	33	6	29	3	14
Lv3	3	10	5	17	10	33	8	27	4	13
All *(f)*	2	4	9	18	23	45	15	29	2	4
All *(m)*	2	6	5	14	11	31	11	31	6	17
All	**4**	**5%**	**14**	**16%**	**34**	**40%**	**26**	**30%**	**8**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	2.86	5	1	0.8	0.6
Lv1 *(m)*	14	2.36	4	1	1.0	0.9
Lv1	56	2.73	5	1	0.9	0.8
Lv3 *(f)*	4	3.00	5	1	1.2	1.3
Lv3 *(m)*	11	2.76	5	1	1.2	1.3
Lv3	15	2.83	5	1	1.2	1.3
All *(f)*	51	2.88	5	1	0.9	0.8
All *(m)*	35	2.60	5	1	1.1	1.2
All	**86**	**2.77**	**5**	**1**	**1.0**	**1.0**

Q 2 (p) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *resume and personal information about other class members.* [Resume]

1990

	High value 5		4		3		2		1 Low value	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	1	5	9	47	4	21	5	26
Lv1 *(m)*	2	29	0	0	0	0	3	43	2	29
Lv1	2	8	1	4	9	35	7	27	7	27
Lv3 *(f)*	0	0	0	0	1	7	4	27	10	67
Lv3 *(m)*	0	0	2	20	2	20	3	30	3	30
Lv3	0	0	2	8	3	12	7	28	13	52
All *(f)*	0	0	1	3	10	29	8	24	15	44
All *(m)*	2	12	2	12	2	12	6	35	5	29
All	**2**	**4%**	**3**	**6%**	**12**	**24%**	**14**	**27%**	**20**	**39%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	19	2.32	4	1	0.9	0.8
Lv1 *(m)*	7	2.57	5	1	1.6	2.5
Lv1	26	2.38	5	1	1.1	1.3
Lv3 *(f)*	15	1.40	3	1	0.6	0.4
Lv3 *(m)*	10	2.30	4	1	1.1	1.2
Lv3	25	1.76	4	1	0.9	0.9
All *(f)*	34	1.91	4	1	0.9	0.8
All *(m)*	17	2.41	5	1	1.3	1.8
All	**51**	**2.08**	**5**	**1**	**1.1**	**1.2**

1995

	High value 5		4		3		2		1 Low value	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	1	3	7	18	12	31	13	33	6	15
Lv1 *(m)*	1	4	5	22	8	35	5	22	4	17
Lv1	2	3	12	19	20	32	18	29	10	16
Lv3 *(f)*	0	0	1	6	4	22	7	39	6	33
Lv3 *(m)*	0	0	0	0	1	7	8	53	6	40
Lv3	0	0	1	3	5	15	15	45	12	36
All *(f)*	1	2	8	14	16	28	20	35	12	21
All *(m)*	1	3	5	13	9	24	13	34	10	26
All	**2**	**2%**	**13**	**14%**	**25**	**26%**	**33**	**35%**	**22**	**23%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.59	5	1	1.0	1.1
Lv1 *(m)*	23	2.74	5	1	1.1	1.2
Lv1	62	2.65	5	1	1.1	1.1
Lv3 *(f)*	12	2.00	4	1	0.9	0.8
Lv3 *(m)*	6	1.67	3	1	0.6	0.4
Lv3	18	1.85	4	1	0.8	0.6
All *(f)*	57	2.40	5	1	1.0	1.0
All *(m)*	38	2.32	5	1	1.1	1.2
All	**95**	**2.37**	**5**	**1**	**1.0**	**1.1**

1996

	High value 5		4		3		2		1 Low value	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	8	19	17	40	8	19	9	21
Lv1 *(m)*	0	0	6	43	5	36	2	14	1	7
Lv1	0	0	14	25	22	39	10	18	10	18
Lv3 *(f)*	0	0	0	0	2	22	6	67	1	11
Lv3 *(m)*	0	0	2	10	2	10	11	52	6	29
Lv3	0	0	2	7	4	13	17	57	7	23
All *(f)*	0	0	8	16	19	37	14	27	10	20
All *(m)*	0	0	8	23	7	20	13	37	7	20
All	**0**	**0%**	**16**	**19%**	**26**	**30%**	**27**	**31%**	**17**	**20%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	2.57	4	1	1.0	1.1
Lv1 *(m)*	14	3.14	4	1	0.9	0.8
Lv1	56	2.71	4	1	1.0	1.1
Lv3 *(f)*	4	2.11	3	1	0.6	0.3
Lv3 *(m)*	11	2.00	4	1	0.9	0.8
Lv3	15	2.03	4	1	0.8	0.6
All *(f)*	51	2.49	4	1	1.0	1.0
All *(m)*	35	2.46	4	1	1.1	1.1
All	**86**	**2.48**	**4**	**1**	**1.0**	**1.0**

Q 2 (q) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *social messages.* [SocMess]

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	3	15	6	30	7	35	2	10	2	10
Lv1 *(m)*	3	38	1	13	1	13	1	13	2	25
Lv1	6	21	7	25	8	29	3	11	4	14
Lv3 *(f)*	0	0	5	33	7	47	2	13	1	7
Lv3 *(m)*	0	0	4	40	4	40	1	10	1	10
Lv3	0	0	9	36	11	44	3	12	2	8
All *(f)*	3	9	11	31	14	40	4	11	3	9
All *(m)*	3	17	5	28	5	28	2	11	3	17
All	**6**	**11%**	**16**	**30%**	**19**	**36%**	**6**	**11%**	**6**	**11%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.30	5	1	1.1	1.3
Lv1 *(m)*	8	3.25	5	1	1.6	2.7
Lv1	28	3.29	5	1	1.3	1.7
Lv3 *(f)*	15	3.07	4	1	0.9	0.7
Lv3 *(m)*	10	3.10	4	1	0.9	0.9
Lv3	25	3.08	4	1	0.9	0.8
All *(f)*	35	3.20	5	1	1.0	1.1
All *(m)*	18	3.17	5	1	1.3	1.7
All	**53**	**3.19**	**5**	**1**	**1.1**	**1.3**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	7	18	16	41	11	28	3	8	2	5
Lv1 *(m)*	7	30	5	22	9	39	1	4	1	4
Lv1	14	23	21	34	20	32	4	6	3	5
Lv3 *(f)*	3	17	2	11	5	28	6	33	2	11
Lv3 *(m)*	2	13	3	20	2	13	3	20	5	33
Lv3	5	15	5	15	7	21	9	27	7	21
All *(f)*	10	18	18	32	16	28	9	16	4	7
All *(m)*	9	24	8	21	11	29	4	11	6	16
All	19	20%	26	27%	27	28%	13	14%	10	11%

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	3.59	5	1	1.0	1.1
Lv1 *(m)*	23	3.70	5	1	1.1	1.2
Lv1	62	3.63	5	1	1.1	1.1
Lv3 *(f)*	12	2.89	5	1	1.2	1.5
Lv3 *(m)*	6	2.60	5	1	1.5	2.1
Lv3	18	2.76	5	1	1.3	1.8
All *(f)*	57	3.37	5	1	1.1	1.3
All *(m)*	38	3.26	5	1	1.4	1.8
All	95	3.33	5	1	1.2	1.5

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	9	21	15	36	15	36	1	2	2	5
Lv1 *(m)*	4	29	6	43	1	7	3	21	0	0
Lv1	13	23	21	38	16	29	4	7	2	4
Lv3 *(f)*	0	0	0	0	3	33	5	56	1	11
Lv3 *(m)*	1	5	4	19	6	29	5	24	5	24
Lv3	1	3	4	13	9	30	10	33	6	20
All *(f)*	9	18	15	29	18	35	6	12	3	6
All *(m)*	5	14	10	29	7	20	8	23	5	14
All	**14**	**16%**	**25**	**29%**	**25**	**29%**	**14**	**16%**	**8**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	3.67	5	1	1.0	1.0
Lv1 *(m)*	14	3.79	5	2	1.1	1.2
Lv1	56	3.70	5	1	1.0	1.0
Lv3 *(f)*	4	2.22	3	1	0.6	0.4
Lv3 *(m)*	11	2.57	5	1	1.2	1.4
Lv3	15	2.47	5	1	1.1	1.1
All *(f)*	51	3.41	5	1	1.1	1.2
All *(m)*	35	3.06	5	1	1.3	1.7
All	**86**	**3.27**	**5**	**1**	**1.2**	**1.4**

Q 2 (r) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *coursework and workshop specifications from lecturers.* [Spec]

1990

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	16	80	4	20	0	0	0	0	0	0
Lv1 *(m)*	7	88	1	13	0	0	0	0	0	0
Lv1	23	82	5	18	0	0	0	0	0	0
Lv3 *(f)*	11	73	3	20	1	7	0	0	0	0
Lv3 *(m)*	7	70	3	30	0	0	0	0	0	0
Lv3	18	72	6	24	1	4	0	0	0	0
All *(f)*	27	77	7	20	1	3	0	0	0	0
All *(m)*	14	78	4	22	0	0	0	0	0	0
All	**41**	**77%**	**11**	**21%**	**1**	**2%**	**0**	**0%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.80	5	4	0.4	0.2
Lv1 *(m)*	8	4.88	5	4	0.3	0.1
Lv1	28	4.82	5	4	0.4	0.1
Lv3 *(f)*	15	4.67	5	3	0.6	0.4
Lv3 *(m)*	10	4.70	5	4	0.5	0.2
Lv3	25	4.68	5	3	0.5	0.3
All *(f)*	35	4.74	5	3	0.5	0.2
All *(m)*	18	4.78	5	4	0.4	0.2
All	**53**	**4.75**	**5**	**3**	**0.5**	**0.2**

1995

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	22	56	13	33	4	10	0	0	0	0
Lv1 *(m)*	10	43	8	35	5	22	0	0	0	0
Lv1	32	52	21	34	9	15	0	0	0	0
Lv3 *(f)*	10	56	3	17	5	28	0	0	0	0
Lv3 *(m)*	7	47	5	33	2	13	0	0	1	7
Lv3	17	52	8	24	7	21	0	0	1	3
All *(f)*	32	56	16	28	9	16	0	0	0	0
All *(m)*	17	45	13	34	7	18	0	0	1	3
All	**49**	**52%**	**29**	**31%**	**16**	**17%**	**0**	**0%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	4.46	5	3	0.7	0.5
Lv1 *(m)*	23	4.22	5	3	0.8	0.6
Lv1	62	4.37	5	3	0.7	0.5
Lv3 *(f)*	12	4.28	5	3	0.9	0.8
Lv3 *(m)*	6	4.13	5	1	1.1	1.2
Lv3	18	4.21	5	1	1.0	1.0
All *(f)*	57	4.40	5	3	0.7	0.6
All *(m)*	38	4.18	5	1	0.9	0.8
All	**95**	**4.32**	**5**	**1**	**0.8**	**0.7**

1996

	High value 5 n	%	4 n	%	3 n	%	2 n	%	Low value 1 n	%
Lv1 *(f)*	23	55	15	36	3	7	1	2	0	0
Lv1 *(m)*	8	57	1	7	4	29	1	7	0	0
Lv1	31	55	16	29	7	13	2	4	0	0
Lv3 *(f)*	6	67	1	11	2	22	0	0	0	0
Lv3 *(m)*	10	48	6	29	4	19	1	5	0	0
Lv3	16	53	7	23	6	20	1	3	0	0
All *(f)*	29	57	16	31	5	10	1	2	0	0
All *(m)*	18	51	7	20	8	23	2	6	0	0
All	**47**	**55%**	**23**	**27%**	**13**	**15%**	**3**	**3%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	4.43	5	2	0.7	0.5
Lv1 *(m)*	14	4.14	5	2	1.1	1.1
Lv1	56	4.36	5	2	0.8	0.7
Lv3 *(f)*	4	4.44	5	3	0.8	0.7
Lv3 *(m)*	11	4.19	5	2	0.9	0.8
Lv3	15	4.27	5	2	0.9	0.8
All *(f)*	51	4.43	5	2	0.7	0.6
All *(m)*	35	4.17	5	2	1.0	0.9
All	**86**	**4.33**	**5**	**2**	**0.9**	**0.7**

Q 2 (s) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *Student Association information.* [**StudAss**]

1990

	5 (High value) n	5 %	4 n	4 %	3 n	3 %	2 n	2 %	1 (Low value) n	1 %
Lv1 *(f)*	3	15	11	55	4	20	0	0	2	10
Lv1 *(m)*	1	13	4	50	0	0	3	38	0	0
Lv1	4	14	15	54	4	14	3	11	2	7
Lv3 *(f)*	4	27	6	40	3	20	2	13	0	0
Lv3 *(m)*	3	30	2	20	5	50	0	0	0	0
Lv3	7	28	8	32	8	32	2	8	0	0
All *(f)*	7	20	17	49	7	20	2	6	2	6
All *(m)*	4	22	6	33	5	28	3	17	0	0
All	**11**	**21%**	**23**	**43%**	**12**	**23%**	**5**	**9%**	**2**	**4%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.65	5	1	1.1	1.1
Lv1 *(m)*	8	3.38	5	2	1.1	1.2
Lv1	28	3.57	5	1	1.1	1.2
Lv3 *(f)*	15	3.80	5	2	1.0	1.0
Lv3 *(m)*	10	3.80	5	3	0.9	0.8
Lv3	25	3.80	5	2	0.9	0.9
All *(f)*	35	3.71	5	1	1.0	1.1
All *(m)*	18	3.61	5	2	1.0	1.0
All	**53**	**3.68**	**5**	**1**	**1.0**	**1.0**

1995

	5 (High value) n	5 %	4 n	4 %	3 n	3 %	2 n	2 %	1 (Low value) n	1 %
Lv1 *(f)*	1	3	9	23	15	38	9	23	5	13
Lv1 *(m)*	2	9	4	17	9	39	6	26	2	9
Lv1	3	5	13	21	24	39	15	24	7	11
Lv3 *(f)*	1	6	2	11	6	33	6	33	3	17
Lv3 *(m)*	1	7	2	13	5	33	5	33	2	13
Lv3	2	6	4	12	11	33	11	33	5	15
All *(f)*	2	4	11	19	21	37	15	26	8	14
All *(m)*	3	8	6	16	14	37	11	29	4	11
All	**5**	**5%**	**17**	**18%**	**35**	**37%**	**26**	**27%**	**12**	**13%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	2.79	5	1	1.0	1.0
Lv1 *(m)*	23	2.91	5	1	1.1	1.1
Lv1	62	2.84	5	1	1.0	1.1
Lv3 *(f)*	12	2.56	5	1	1.1	1.1
Lv3 *(m)*	6	2.67	5	1	1.1	1.2
Lv3	18	2.61	5	1	1.1	1.1
All *(f)*	57	2.72	5	1	1.0	1.1
All *(m)*	38	2.82	5	1	1.1	1.2
All	**95**	**2.76**	**5**	**1**	**1.1**	**1.1**

1996

	5 (High value) n	5 %	4 n	4 %	3 n	3 %	2 n	2 %	1 (Low value) n	1 %
Lv1 *(f)*	3	7	12	29	16	38	7	17	4	10
Lv1 *(m)*	0	0	4	29	6	43	3	21	1	7
Lv1	3	5	16	29	22	39	10	18	5	9
Lv3 *(f)*	0	0	0	0	3	33	5	56	1	11
Lv3 *(m)*	1	5	2	10	7	33	9	43	2	10
Lv3	1	3	2	7	10	33	14	47	3	10
All *(f)*	3	6	12	24	19	37	12	24	5	10
All *(m)*	1	3	6	17	13	37	12	34	3	9
All	**4**	**5%**	**18**	**21%**	**32**	**37%**	**24**	**28%**	**8**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	3.07	5	1	1.1	1.1
Lv1 *(m)*	14	2.93	4	1	0.9	0.8
Lv1	56	3.04	5	1	1.0	1.0
Lv3 *(f)*	4	2.22	3	1	0.6	0.4
Lv3 *(m)*	11	2.57	5	1	1.0	0.9
Lv3	15	2.47	5	1	0.9	0.8
All *(f)*	51	2.92	5	1	1.0	1.1
All *(m)*	35	2.71	5	1	0.9	0.9
All	**86**	**2.84**	**5**	**1**	**1.0**	**1.0**

Q 2 (i) On a scale of 1 to 5, where 5 is high value and 1 is low value, how important to you is the category of CMC information, *system notices and reports from ITC management.* [System]

1990

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	4	20	5	25	7	35	3	15	1	5
Lv1 *(m)*	3	38	0	0	4	50	1	13	0	0
Lv1	7	25	5	18	11	39	4	14	1	4
Lv3 *(f)*	2	14	4	29	5	36	2	14	1	7
Lv3 *(m)*	3	30	6	60	1	10	0	0	0	0
Lv3	5	21	10	42	6	25	2	8	1	4
All *(f)*	6	18	9	26	12	35	5	15	2	6
All *(m)*	6	33	6	33	5	28	1	6	0	0
All	**12**	**23%**	**15**	**29%**	**17**	**33%**	**6**	**12%**	**2**	**4%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.40	5	1	1.1	1.2
Lv1 *(m)*	8	3.63	5	2	1.1	1.2
Lv1	28	3.46	5	1	1.1	1.2
Lv3 *(f)*	14	3.29	5	1	1.1	1.2
Lv3 *(m)*	10	4.20	5	3	0.6	0.4
Lv3	24	3.67	5	1	1.0	1.1
All *(f)*	34	3.35	5	1	1.1	1.2
All *(m)*	18	3.94	5	2	0.9	0.8
All	**52**	**3.56**	**5**	**1**	**1.1**	**1.2**

1995

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	9	23	5	13	13	33	9	23	3	8
Lv1 *(m)*	3	13	9	39	5	22	6	26	0	0
Lv1	12	19	14	23	18	29	15	24	3	5
Lv3 *(f)*	7	39	4	22	4	22	2	11	1	6
Lv3 *(m)*	4	27	2	13	4	27	4	27	1	7
Lv3	11	33	6	18	8	24	6	18	2	6
All *(f)*	16	28	9	16	17	30	11	19	4	7
All *(m)*	7	18	11	29	9	24	10	26	1	3
All	**23**	**24%**	**20**	**21%**	**26**	**27%**	**21**	**22%**	**5**	**5%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	39	3.21	5	1	1.2	1.5
Lv1 *(m)*	23	3.39	5	2	1.0	1.0
Lv1	62	3.27	5	1	1.2	1.4
Lv3 *(f)*	12	3.78	5	1	1.2	1.5
Lv3 *(m)*	6	3.27	5	1	1.3	1.7
Lv3	18	3.55	5	1	1.3	1.6
All *(f)*	57	3.39	5	1	1.3	1.6
All *(m)*	38	3.34	5	1	1.1	1.3
All	**95**	**3.37**	**5**	**1**	**1.2**	**1.5**

1996

	High value 5		4		3		2		Low value 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	14	33	13	31	11	26	2	5	2	5
Lv1 *(m)*	2	14	4	29	5	36	3	21	0	0
Lv1	16	29	17	30	16	29	5	9	2	4
Lv3 *(f)*	2	22	4	44	2	22	1	11	0	0
Lv3 *(m)*	3	14	5	24	6	29	4	19	3	14
Lv3	5	17	9	30	8	27	5	17	3	10
All *(f)*	16	31	17	33	13	25	3	6	2	4
All *(m)*	5	14	9	26	11	31	7	20	3	9
All	**21**	**24%**	**26**	**30%**	**24**	**28%**	**10**	**12%**	**5**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	42	3.83	5	1	1.1	1.2
Lv1 *(m)*	14	3.36	5	2	1.0	0.9
Lv1	56	3.71	5	1	1.1	1.2
Lv3 *(f)*	4	3.78	5	2	0.9	0.8
Lv3 *(m)*	11	3.05	5	1	1.3	1.6
Lv3	15	3.27	5	1	1.2	1.5
All *(f)*	51	3.82	5	1	1.1	1.1
All *(m)*	35	3.17	5	1	1.2	1.3
All	**86**	**3.56**	**5**	**1**	**1.1**	**1.3**

Q 3.1 *(a)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, show your strength of agreement or disagreement with the following statement: *"Everyone at QMC should have full and easy access to a computer."* **[EasyAccess]**

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	7	35	6	30	5	25	2	10	0	0
Lv1 *(m)*	4	50	0	0	3	38	1	13	0	0
Lv1	11	39	6	21	8	29	3	11	0	0
Lv3 *(f)*	11	73	2	13	2	13	0	0	0	0
Lv3 *(m)*	9	90	1	10	0	0	0	0	0	0
Lv3	20	80	3	12	2	8	0	0	0	0
All *(f)*	18	51	8	23	7	20	2	6	0	0
All *(m)*	13	72	1	6	3	17	1	6	0	0
All	**31**	**58%**	**9**	**17%**	**10**	**19%**	**3**	**6%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.90	5	2	1.0	1.0
Lv1 *(m)*	8	3.88	5	2	1.2	1.4
Lv1	28	3.89	5	2	1.0	1.1
Lv3 *(f)*	15	4.60	5	3	0.7	0.5
Lv3 *(m)*	10	4.90	5	4	0.3	0.1
Lv3	25	4.72	5	3	0.6	0.4
All *(f)*	35	4.20	5	2	1.0	0.9
All *(m)*	18	4.44	5	2	1.0	0.9
All	**53**	**4.28**	**5**	**2**	**1.0**	**0.9**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	32	84	5	13	0	0	0	0	1	3
Lv1 *(m)*	19	86	2	9	1	5	0	0	0	0
Lv1	51	85	7	12	1	2	0	0	1	2
Lv3 *(f)*	16	89	2	11	0	0	0	0	0	0
Lv3 *(m)*	10	71	0	0	1	7	1	7	2	14
Lv3	26	81	2	6	1	3	1	3	2	6
All *(f)*	48	86	7	13	0	0	0	0	1	2
All *(m)*	29	81	2	6	2	6	1	3	2	6
All	**77**	**84%**	**9**	**10%**	**2**	**2%**	**1**	**1%**	**3**	**3%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	4.76	5	1	0.7	0.5
Lv1 *(m)*	22	4.82	5	3	0.5	0.2
Lv1	60	4.78	5	1	0.6	0.4
Lv3 *(f)*	12	4.89	5	4	0.3	0.1
Lv3 *(m)*	5	4.07	5	1	1.5	2.4
Lv3	17	4.53	5	1	1.1	1.2
All *(f)*	56	4.80	5	1	0.6	0.4
All *(m)*	36	4.53	5	1	1.1	1.2
All	**92**	**4.70**	**5**	**1**	**0.8**	**0.7**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	40	93	1	2	2	5	0	0	0	0
Lv1 *(m)*	12	86	2	14	0	0	0	0	0	0
Lv1	52	91	3	5	2	4	0	0	0	0
Lv3 *(f)*	8	89	0	0	0	0	1	11	0	0
Lv3 *(m)*	17	81	2	10	1	5	1	5	0	0
Lv3	25	83	2	7	1	3	2	7	0	0
All *(f)*	48	92	1	2	2	4	1	2	0	0
All *(m)*	29	83	4	11	1	3	1	3	0	0
All	**77**	**89%**	**5**	**6%**	**3**	**3%**	**2**	**2%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	4.88	5	3	0.4	0.2
Lv1 *(m)*	14	4.86	5	4	0.3	0.1
Lv1	57	4.88	5	3	0.4	0.2
Lv3 *(f)*	4	4.67	5	2	0.9	0.9
Lv3 *(m)*	11	4.67	5	2	0.8	0.6
Lv3	15	4.67	5	2	0.8	0.7
All *(f)*	52	4.85	5	2	0.6	0.3
All *(m)*	35	4.74	5	2	0.6	0.4
All	**87**	**4.80**	**5**	**2**	**0.6**	**0.4**

Q 3.1 *(b)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, show your strength of agreement or disagreement with the following statement: *"Almost everyone should learn to use a computer."* [**LearnUse**]

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	9	45	6	30	4	20	0	0	1	5
Lv1 *(m)*	1	13	2	25	1	13	3	38	1	13
Lv1	10	36	8	29	5	18	3	11	2	7
Lv3 *(f)*	9	60	5	33	1	7	0	0	0	0
Lv3 *(m)*	6	60	2	20	2	20	0	0	0	0
Lv3	15	60	7	28	3	12	0	0	0	0
All *(f)*	18	51	11	31	5	14	0	0	1	3
All *(m)*	7	39	4	22	3	17	3	17	1	6
All	**25**	**47%**	**15**	**28%**	**8**	**15%**	**3**	**6%**	**2**	**4%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.10	5	1	1.0	1.1
Lv1 *(m)*	8	2.88	5	1	1.3	1.6
Lv1	28	3.75	5	1	1.2	1.5
Lv3 *(f)*	15	4.53	5	3	0.6	0.4
Lv3 *(m)*	10	4.40	5	3	0.8	0.6
Lv3	25	4.48	5	3	0.7	0.5
All *(f)*	35	4.29	5	1	0.9	0.8
All *(m)*	18	3.72	5	1	1.3	1.6
All	**53**	**4.09**	**5**	**1**	**1.1**	**1.2**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	23	61	9	24	5	13	1	3	0	0
Lv1 *(m)*	18	82	2	9	2	9	0	0	0	0
Lv1	41	68	11	18	7	12	1	2	0	0
Lv3 *(f)*	12	67	3	17	1	6	1	6	1	6
Lv3 *(m)*	7	50	4	29	2	14	1	7	0	0
Lv3	19	59	7	22	3	9	2	6	1	3
All *(f)*	35	63	12	21	6	11	2	4	1	2
All *(m)*	25	69	6	17	4	11	1	3	0	0
All	**60**	**65%**	**18**	**20%**	**10**	**11%**	**3**	**3%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	4.42	5	2	0.8	0.7
Lv1 *(m)*	22	4.73	5	3	0.6	0.4
Lv1	60	4.53	5	2	0.8	0.6
Lv3 *(f)*	12	4.33	5	1	1.2	1.3
Lv3 *(m)*	5	4.21	5	2	0.9	0.9
Lv3	17	4.28	5	1	1.1	1.1
All *(f)*	56	4.39	5	1	0.9	0.9
All *(m)*	36	4.53	5	2	0.8	0.6
All	**92**	**4.45**	**5**	**1**	**0.9**	**0.8**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	37	86	5	12	0	0	1	2	0	0
Lv1 *(m)*	11	79	3	21	0	0	0	0	0	0
Lv1	48	84	8	14	0	0	1	2	0	0
Lv3 *(f)*	7	78	2	22	0	0	0	0	0	0
Lv3 *(m)*	15	71	4	19	2	10	0	0	0	0
Lv3	22	73	6	20	2	7	0	0	0	0
All *(f)*	44	85	7	13	0	0	1	2	0	0
All *(m)*	26	74	7	20	2	6	0	0	0	0
All	**70**	**80%**	**14**	**16%**	**2**	**2%**	**1**	**1%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	4.81	5	2	0.5	0.3
Lv1 *(m)*	14	4.79	5	4	0.4	0.2
Lv1	57	4.81	5	2	0.5	0.3
Lv3 *(f)*	4	4.78	5	4	0.4	0.2
Lv3 *(m)*	11	4.62	5	3	0.7	0.4
Lv3	15	4.67	5	3	0.6	0.4
All *(f)*	52	4.81	5	2	0.5	0.3
All *(m)*	35	4.69	5	3	0.6	0.3
All	**87**	**4.76**	**5**	**2**	**0.5**	**0.3**

Q 3.1 *(c)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, show your strength of agreement or disagreement with the following statement: *"One of the things I like about QMC is the access I have to computing."* **[LikeAccess]**

1990

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	5	25	8	40	4	20	2	10	1	5
Lv1 *(m)*	2	25	0	0	2	25	3	38	1	13
Lv1	7	25	8	29	6	21	5	18	2	7
Lv3 *(f)*	5	33	4	27	5	33	1	7	0	0
Lv3 *(m)*	5	50	3	30	1	10	0	0	1	10
Lv3	10	40	7	28	6	24	1	4	1	4
All *(f)*	10	29	12	34	9	26	3	9	1	3
All *(m)*	7	39	3	17	3	17	3	17	2	11
All	**17**	**32%**	**15**	**28%**	**12**	**23%**	**6**	**11%**	**3**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.70	5	1	1.1	1.2
Lv1 *(m)*	8	2.88	5	1	1.4	1.9
Lv1	28	3.46	5	1	1.2	1.5
Lv3 *(f)*	15	3.87	5	2	1.0	0.9
Lv3 *(m)*	10	4.10	5	1	1.2	1.5
Lv3	25	3.96	5	1	1.1	1.2
All *(f)*	35	3.77	5	1	1.0	1.1
All *(m)*	18	3.56	5	1	1.4	2.0
All	**53**	**3.70**	**5**	**1**	**1.2**	**1.4**

1995

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	12	32	10	26	12	32	3	8	1	3
Lv1 *(m)*	9	41	6	27	3	14	3	14	1	5
Lv1	21	35	16	27	15	25	6	10	2	3
Lv3 *(f)*	7	39	5	28	3	17	3	17	0	0
Lv3 *(m)*	6	43	3	21	2	14	1	7	2	14
Lv3	13	41	8	25	5	16	4	13	2	6
All *(f)*	19	34	15	27	15	27	6	11	1	2
All *(m)*	15	42	9	25	5	14	4	11	3	8
All	**34**	**37%**	**24**	**26%**	**20**	**22%**	**10**	**11%**	**4**	**4%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.76	5	1	1.1	1.1
Lv1 *(m)*	22	3.86	5	1	1.2	1.5
Lv1	60	3.80	5	1	1.1	1.3
Lv3 *(f)*	12	3.89	5	2	1.1	1.2
Lv3 *(m)*	5	3.71	5	1	1.4	2.1
Lv3	17	3.81	5	1	1.3	1.6
All *(f)*	56	3.80	5	1	1.1	1.2
All *(m)*	36	3.81	5	1	1.3	1.7
All	**92**	**3.80**	**5**	**1**	**1.2**	**1.4**

1996

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	18	42	16	37	9	21	0	0	0	0
Lv1 *(m)*	7	50	2	14	4	29	1	7	0	0
Lv1	25	44	18	32	13	23	1	2	0	0
Lv3 *(f)*	4	44	4	44	0	0	1	11	0	0
Lv3 *(m)*	9	43	5	24	2	10	3	14	2	10
Lv3	13	43	9	30	2	7	4	13	2	7
All *(f)*	22	42	20	38	9	17	1	2	0	0
All *(m)*	16	46	7	20	6	17	4	11	2	6
All	**38**	**44%**	**27**	**31%**	**15**	**17%**	**5**	**6%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	4.21	5	3	0.8	0.6
Lv1 *(m)*	14	4.07	5	2	1.0	1.1
Lv1	57	4.18	5	2	0.8	0.7
Lv3 *(f)*	4	4.22	5	2	0.9	0.8
Lv3 *(m)*	11	3.76	5	1	1.4	1.9
Lv3	15	3.90	5	1	1.3	1.6
All *(f)*	52	4.21	5	2	0.8	0.6
All *(m)*	35	3.89	5	1	1.3	1.6
All	**87**	**4.08**	**5**	**1**	**1.0**	**1.0**

Q 3.1 *(d)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, show your strength of agreement or disagreement with the following statement: *"In general I would like to see more practical uses of computers made at QMC in my course."* [Practical]

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	5	25	3	15	8	40	3	15	1	5
Lv1 *(m)*	4	50	0	0	1	13	2	25	1	13
Lv1	9	32	3	11	9	32	5	18	2	7
Lv3 *(f)*	4	27	4	27	5	33	2	13	0	0
Lv3 *(m)*	1	10	4	40	5	50	0	0	0	0
Lv3	5	20	8	32	10	40	2	8	0	0
All *(f)*	9	26	7	20	13	37	5	14	1	3
All *(m)*	5	28	4	22	6	33	2	11	1	6
All	**14**	**26%**	**11**	**21%**	**19**	**36%**	**7**	**13%**	**2**	**4%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.40	5	1	1.2	1.3
Lv1 *(m)*	8	3.50	5	1	1.6	2.5
Lv1	28	3.43	5	1	1.3	1.7
Lv3 *(f)*	15	3.67	5	2	1.0	1.0
Lv3 *(m)*	10	3.60	5	3	0.7	0.4
Lv3	25	3.64	5	2	0.9	0.8
All *(f)*	35	3.51	5	1	1.1	1.2
All *(m)*	18	3.56	5	1	1.2	1.4
All	**53**	**3.53**	**5**	**1**	**1.1**	**1.3**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	4	11	8	21	18	47	8	21	0	0
Lv1 *(m)*	1	5	7	32	9	41	4	18	1	5
Lv1	5	8	15	25	27	45	12	20	1	2
Lv3 *(f)*	7	39	6	33	5	28	0	0	0	0
Lv3 *(m)*	8	57	6	43	0	0	0	0	0	0
Lv3	15	47	12	38	5	16	0	0	0	0
All *(f)*	11	20	14	25	23	41	8	14	0	0
All *(m)*	9	25	13	36	9	25	4	11	1	3
All	**20**	**22%**	**27**	**29%**	**32**	**35%**	**12**	**13%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.21	5	2	0.9	0.8
Lv1 *(m)*	22	3.14	5	1	0.9	0.8
Lv1	60	3.18	5	1	0.9	0.8
Lv3 *(f)*	12	4.11	5	3	0.8	0.7
Lv3 *(m)*	5	4.57	5	4	0.5	0.2
Lv3	17	4.31	5	3	0.7	0.5
All *(f)*	56	3.50	5	2	1.0	0.9
All *(m)*	36	3.69	5	1	1.0	1.1
All	**92**	**3.58**	**5**	**1**	**1.0**	**1.0**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	4	9	16	37	21	49	2	5	0	0
Lv1 *(m)*	4	29	4	29	4	29	2	14	0	0
Lv1	8	14	20	35	25	44	4	7	0	0
Lv3 *(f)*	3	33	3	33	3	33	0	0	0	0
Lv3 *(m)*	4	19	12	57	4	19	1	5	0	0
Lv3	7	23	15	50	7	23	1	3	0	0
All *(f)*	7	13	19	37	24	46	2	4	0	0
All *(m)*	8	23	16	46	8	23	3	9	0	0
All	**15**	**17%**	**35**	**40%**	**32**	**37%**	**5**	**6%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.51	5	2	0.7	0.5
Lv1 *(m)*	14	3.71	5	2	1.0	1.1
Lv1	57	3.56	5	2	0.8	0.7
Lv3 *(f)*	4	4.00	5	3	0.8	0.7
Lv3 *(m)*	11	3.90	5	2	0.7	0.6
Lv3	15	3.93	5	2	0.8	0.6
All *(f)*	52	3.60	5	2	0.8	0.6
All *(m)*	35	3.83	5	2	0.9	0.8
All	**87**	**3.69**	**5**	**2**	**0.8**	**0.7**

Q 3.1 *(f)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, show your strength of agreement or disagreement with the following statement: *"I like to experiment with computer systems."* [**Experiment**]

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	5	25	2	10	7	35	5	25	1	5
Lv1 *(m)*	2	25	1	13	1	13	3	38	1	13
Lv1	7	25	3	11	8	29	8	29	2	7
Lv3 *(f)*	1	7	1	7	9	60	2	13	2	13
Lv3 *(m)*	5	50	2	20	2	20	1	10	0	0
Lv3	6	24	3	12	11	44	3	12	2	8
All *(f)*	6	17	3	9	16	46	7	20	3	9
All *(m)*	7	39	3	17	3	17	4	22	1	6
All	**13**	**25%**	**6**	**11%**	**19**	**36%**	**11**	**21%**	**4**	**8%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.25	5	1	1.2	1.5
Lv1 *(m)*	8	3.00	5	1	1.4	2.0
Lv1	28	3.18	5	1	1.3	1.6
Lv3 *(f)*	15	2.80	5	1	1.0	1.0
Lv3 *(m)*	10	4.10	5	2	1.0	1.1
Lv3	25	3.32	5	1	1.2	1.4
All *(f)*	35	3.06	5	1	1.1	1.3
All *(m)*	18	3.61	5	1	1.3	1.8
All	**53**	**3.25**	**5**	**1**	**1.2**	**1.5**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	2	5	5	13	9	24	13	34	9	24
Lv1 *(m)*	4	18	6	27	3	14	4	18	5	23
Lv1	6	10	11	18	12	20	17	28	14	23
Lv3 *(f)*	7	39	7	39	4	22	0	0	0	0
Lv3 *(m)*	8	57	3	21	2	14	1	7	0	0
Lv3	15	47	10	31	6	19	1	3	0	0
All *(f)*	9	16	12	21	13	23	13	23	9	16
All *(m)*	12	33	9	25	5	14	5	14	5	14
All	**21**	**23%**	**21**	**23%**	**18**	**20%**	**18**	**20%**	**14**	**15%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	2.42	5	1	1.1	1.3
Lv1 *(m)*	22	3.00	5	1	1.4	2.1
Lv1	60	2.63	5	1	1.3	1.7
Lv3 *(f)*	12	4.17	5	3	0.8	0.6
Lv3 *(m)*	5	4.29	5	2	1.0	0.9
Lv3	17	4.22	5	2	0.9	0.7
All *(f)*	56	2.98	5	1	1.3	1.7
All *(m)*	36	3.50	5	1	1.4	2.0
All	**92**	**3.18**	**5**	**1**	**1.4**	**1.9**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	6	14	12	28	17	40	6	14	2	5
Lv1 *(m)*	1	7	6	43	4	29	3	21	0	0
Lv1	7	12	18	32	21	37	9	16	2	4
Lv3 *(f)*	4	44	4	44	1	11	0	0	0	0
Lv3 *(m)*	9	43	6	29	5	24	0	0	1	5
Lv3	13	43	10	33	6	20	0	0	1	3
All *(f)*	10	19	16	31	18	35	6	12	2	4
All *(m)*	10	29	12	34	9	26	3	9	1	3
All	**20**	**23%**	**28**	**32%**	**27**	**31%**	**9**	**10%**	**3**	**3%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.33	5	1	1.0	1.1
Lv1 *(m)*	14	3.36	5	2	0.9	0.8
Lv1	57	3.33	5	1	1.0	1.0
Lv3 *(f)*	4	4.33	5	3	0.7	0.4
Lv3 *(m)*	11	4.05	5	1	1.0	1.1
Lv3	15	4.13	5	1	1.0	0.9
All *(f)*	52	3.50	5	1	1.0	1.1
All *(m)*	35	3.77	5	1	1.0	1.1
All	**87**	**3.61**	**5**	**1**	**1.1**	**1.1**

Q 3.1 *(j)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, show your strength of agreement or disagreement with the following statement: *"I would like to use a computer more than I do now."* [UseMore]

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	5	25	2	10	2	10	8	40	3	15
Lv1 *(m)*	3	38	1	13	0	0	2	25	2	25
Lv1	8	29	3	11	2	7	10	36	5	18
Lv3 *(f)*	2	13	1	7	6	40	6	40	0	0
Lv3 *(m)*	1	10	6	60	1	10	1	10	1	10
Lv3	3	12	7	28	7	28	7	28	1	4
All *(f)*	7	20	3	9	8	23	14	40	3	9
All *(m)*	4	22	7	39	1	6	3	17	3	17
All	**11**	**21%**	**10**	**19%**	**9**	**17%**	**17**	**32%**	**6**	**11%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.90	5	1	1.4	2.1
Lv1 *(m)*	8	3.13	5	1	1.7	2.9
Lv1	28	2.96	5	1	1.5	2.3
Lv3 *(f)*	15	2.93	5	2	1.0	1.0
Lv3 *(m)*	10	3.50	5	1	1.1	1.3
Lv3	25	3.16	5	1	1.1	1.2
All *(f)*	35	2.91	5	1	1.3	1.6
All *(m)*	18	3.33	5	1	1.4	2.0
All	**53**	**3.06**	**5**	**1**	**1.3**	**1.8**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	6	16	6	16	14	37	9	24	3	8
Lv1 *(m)*	4	18	7	32	5	23	2	9	4	18
Lv1	10	17	13	22	19	32	11	18	7	12
Lv3 *(f)*	7	39	7	39	3	17	0	0	1	6
Lv3 *(m)*	6	43	2	14	6	43	0	0	0	0
Lv3	13	41	9	28	9	28	0	0	1	3
All *(f)*	13	23	13	23	17	30	9	16	4	7
All *(m)*	10	28	9	25	11	31	2	6	4	11
All	**23**	**25%**	**22**	**24%**	**28**	**30%**	**11**	**12%**	**8**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.08	5	1	1.2	1.3
Lv1 *(m)*	22	3.23	5	1	1.3	1.8
Lv1	60	3.13	5	1	1.2	1.5
Lv3 *(f)*	12	4.06	5	1	1.0	1.1
Lv3 *(m)*	5	4.00	5	3	0.9	0.9
Lv3	17	4.03	5	1	1.0	1.0
All *(f)*	56	3.39	5	1	1.2	1.5
All *(m)*	36	3.53	5	1	1.3	1.6
All	**92**	**3.45**	**5**	**1**	**1.2**	**1.5**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	5	12	10	23	21	49	7	16	0	0
Lv1 *(m)*	5	36	3	21	3	21	3	21	0	0
Lv1	10	18	13	23	24	42	10	18	0	0
Lv3 *(f)*	3	33	3	33	2	22	1	11	0	0
Lv3 *(m)*	9	43	9	43	2	10	0	0	1	5
Lv3	12	40	12	40	4	13	1	3	1	3
All *(f)*	8	15	13	25	23	44	8	15	0	0
All *(m)*	14	40	12	34	5	14	3	9	1	3
All	**22**	**25%**	**25**	**29%**	**28**	**32%**	**11**	**13%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.30	5	2	0.9	0.8
Lv1 *(m)*	14	3.71	5	2	1.2	1.3
Lv1	57	3.40	5	2	1.0	0.9
Lv3 *(f)*	4	3.89	5	2	1.0	1.0
Lv3 *(m)*	11	4.19	5	1	1.0	0.9
Lv3	15	4.10	5	1	1.0	1.0
All *(f)*	52	3.40	5	2	0.9	0.9
All *(m)*	35	4.00	5	1	1.1	1.1
All	**87**	**3.64**	**5**	**1**	**1.0**	**1.1**

Q 3.1 *(g)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, show your strength of agreement or disagreement with the following statement: *"There is too much emphasis on computing at QMC."* [TooMuch]

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	1	5	2	10	8	40	8	40	1	5
Lv1 *(m)*	1	13	2	25	1	13	3	38	1	13
Lv1	2	7	4	14	9	32	11	39	2	7
Lv3 *(f)*	0	0	1	7	1	7	9	60	4	27
Lv3 *(m)*	0	0	0	0	1	11	5	56	3	33
Lv3	0	0	1	4	2	8	14	58	7	29
All *(f)*	1	3	3	9	9	26	17	49	5	14
All *(m)*	1	6	2	12	2	12	8	47	4	24
All	**2**	**4%**	**5**	**10%**	**11**	**21%**	**25**	**48%**	**9**	**17%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.70	5	1	0.9	0.8
Lv1 *(m)*	8	2.88	5	1	1.3	1.6
Lv1	28	2.75	5	1	1.0	1.0
Lv3 *(f)*	15	1.93	4	1	0.8	0.6
Lv3 *(m)*	9	1.78	3	1	0.6	0.4
Lv3	24	1.88	4	1	0.7	0.5
All *(f)*	35	2.37	5	1	0.9	0.9
All *(m)*	17	2.29	5	1	1.1	1.3
All	**52**	**2.35**	**5**	**1**	**1.0**	**1.0**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	8	21	16	42	8	21	6	16
Lv1 *(m)*	2	9	3	14	6	27	6	27	5	23
Lv1	2	3	11	18	22	37	14	23	11	18
Lv3 *(f)*	2	11	0	0	1	6	8	44	7	39
Lv3 *(m)*	0	0	1	7	2	14	4	29	7	50
Lv3	2	6	1	3	3	9	12	38	14	44
All *(f)*	2	4	8	14	17	30	16	29	13	23
All *(m)*	2	6	4	11	8	22	10	28	12	33
All	**4**	**4%**	**12**	**13%**	**25**	**27%**	**26**	**28%**	**25**	**27%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	2.68	4	1	1.0	1.0
Lv1 *(m)*	22	2.59	5	1	1.2	1.5
Lv1	60	2.65	5	1	1.1	1.2
Lv3 *(f)*	12	2.00	5	1	1.2	1.4
Lv3 *(m)*	5	1.79	4	1	0.9	0.9
Lv3	17	1.91	5	1	1.1	1.2
All *(f)*	56	2.46	5	1	1.1	1.2
All *(m)*	36	2.28	5	1	1.2	1.4
All	**92**	**2.39**	**5**	**1**	**1.1**	**1.3**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	3	7	9	21	17	40	14	33
Lv1 *(m)*	0	0	3	23	3	23	4	31	3	23
Lv1	0	0	6	11	12	21	21	38	17	30
Lv3 *(f)*	0	0	0	0	1	11	4	44	4	44
Lv3 *(m)*	0	0	0	0	3	14	6	29	12	57
Lv3	0	0	0	0	4	13	10	33	16	53
All *(f)*	0	0	3	6	10	19	21	40	18	35
All *(m)*	0	0	3	9	6	18	10	29	15	44
All	**0**	**0%**	**6**	**7%**	**16**	**19%**	**31**	**36%**	**33**	**38%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	2.02	4	1	0.9	0.8
Lv1 *(m)*	13	2.46	4	1	1.1	1.2
Lv1	56	2.13	4	1	1.0	0.9
Lv3 *(f)*	4	1.67	3	1	0.7	0.4
Lv3 *(m)*	11	1.57	3	1	0.7	0.5
Lv3	15	1.60	3	1	0.7	0.5
All *(f)*	52	1.96	4	1	0.9	0.8
All *(m)*	34	1.91	4	1	1.0	1.0
All	**86**	**1.94**	**4**	**1**	**0.9**	**0.8**

Q 3.2 *(a)* On a scale of 1 to 5, where 5 is better and 1 less effective, how would you compare electronic conferencing with face-to-face tutorials ... *as a means of getting help with your course-related difficulties?* [CourseDiff]

1990

	Better 5: n	%	4: n	%	3: n	%	Less effective 2: n	%	1: n	%
Lv1 *(f)*	1	5	2	10	6	30	8	40	3	15
Lv1 *(m)*	1	13	0	0	2	25	3	38	2	25
Lv1	2	7	2	7	8	29	11	39	5	18
Lv3 *(f)*	0	0	0	0	4	27	10	67	1	7
Lv3 *(m)*	0	0	1	10	3	30	4	40	2	20
Lv3	0	0	1	4	7	28	14	56	3	12
All *(f)*	1	3	2	6	10	29	18	51	4	11
All *(m)*	1	6	1	6	5	28	7	39	4	22
All	**2**	**4%**	**3**	**6%**	**15**	**28%**	**25**	**47%**	**8**	**15%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.50	5	1	1.0	1.1
Lv1 *(m)*	8	2.38	5	1	1.2	1.5
Lv1	28	2.46	5	1	1.1	1.2
Lv3 *(f)*	15	2.20	3	1	0.5	0.3
Lv3 *(m)*	10	2.30	4	1	0.9	0.8
Lv3	25	2.24	4	1	0.7	0.5
All *(f)*	35	2.37	5	1	0.9	0.7
All *(m)*	18	2.33	5	1	1.1	1.1
All	**53**	**2.36**	**5**	**1**	**0.9**	**0.9**

1995

	Better 5: n	%	4: n	%	3: n	%	Less effective 2: n	%	1: n	%
Lv1 *(f)*	2	5	3	8	9	24	18	47	6	16
Lv1 *(m)*	0	0	2	9	6	27	8	36	6	27
Lv1	2	3	5	8	15	25	26	43	12	20
Lv3 *(f)*	1	6	2	11	7	39	5	28	3	17
Lv3 *(m)*	1	8	4	31	5	38	3	23	0	0
Lv3	2	6	6	19	12	39	8	26	3	10
All *(f)*	3	5	5	9	16	29	23	41	9	16
All *(m)*	1	3	6	17	11	31	11	31	6	17
All	**4**	**4%**	**11**	**12%**	**27**	**30%**	**34**	**37%**	**15**	**16%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	2.39	5	1	1.0	1.0
Lv1 *(m)*	22	2.18	4	1	0.9	0.9
Lv1	60	2.32	5	1	1.0	1.0
Lv3 *(f)*	12	2.61	5	1	1.1	1.1
Lv3 *(m)*	5	3.23	5	2	0.9	0.8
Lv3	17	2.87	5	1	1.0	1.1
All *(f)*	56	2.46	5	1	1.0	1.1
All *(m)*	35	2.57	5	1	1.0	1.1
All	**91**	**2.51**	**5**	**1**	**1.0**	**1.1**

1996

	Better 5: n	%	4: n	%	3: n	%	Less effective 2: n	%	1: n	%
Lv1 *(f)*	0	0	7	16	12	28	16	37	8	19
Lv1 *(m)*	0	0	0	0	2	14	11	79	1	7
Lv1	0	0	7	12	14	25	27	47	9	16
Lv3 *(f)*	0	0	1	11	4	44	4	44	0	0
Lv3 *(m)*	1	5	3	14	6	29	7	33	4	19
Lv3	1	3	4	13	10	33	11	37	4	13
All *(f)*	0	0	8	15	16	31	20	38	8	15
All *(m)*	1	3	3	9	8	23	18	51	5	14
All	**1**	**1%**	**11**	**13%**	**24**	**28%**	**38**	**44%**	**13**	**15%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	2.42	4	1	1.0	0.9
Lv1 *(m)*	14	2.07	3	1	0.5	0.2
Lv1	57	2.33	4	1	0.9	0.8
Lv3 *(f)*	4	2.67	4	2	0.7	0.4
Lv3 *(m)*	11	2.52	5	1	1.1	1.2
Lv3	15	2.57	5	1	1.0	1.0
All *(f)*	52	2.46	4	1	0.9	0.9
All *(m)*	35	2.34	5	1	0.9	0.9
All	**87**	**2.41**	**5**	**1**	**0.9**	**0.9**

Q 3.2 *(b)* On a scale of 1 to 5, where 5 is better and 1 less effective, how would you compare electronic conferencing with face-to-face tutorials ... *as a means of socializing?* [Socialize]

1990

	Better 5		4		3		2		Less effective 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	2	10	5	25	10	50	3	15
Lv1 *(m)*	0	0	1	13	1	13	3	38	3	38
Lv1	0	0	3	11	6	21	13	46	6	21
Lv3 *(f)*	0	0	0	0	2	13	8	53	5	33
Lv3 *(m)*	0	0	1	10	2	20	3	30	4	40
Lv3	0	0	1	4	4	16	11	44	9	36
All *(f)*	0	0	2	6	7	20	18	51	8	23
All *(m)*	0	0	2	11	3	17	6	33	7	39
All	**0**	**0%**	**4**	**8%**	**10**	**19%**	**24**	**45%**	**15**	**28%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.30	4	1	0.8	0.7
Lv1 *(m)*	8	2.00	4	1	1.0	1.0
Lv1	28	2.21	4	1	0.9	0.8
Lv3 *(f)*	15	1.80	3	1	0.7	0.4
Lv3 *(m)*	10	2.00	4	1	1.0	1.0
Lv3	25	1.88	4	1	0.8	0.7
All *(f)*	35	2.09	4	1	0.8	0.6
All *(m)*	18	2.00	4	1	1.0	1.0
All	**53**	**2.06**	**4**	**1**	**0.9**	**0.8**

1995

	Better 5		4		3		2		Less effective 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	3	8	7	18	17	45	11	29
Lv1 *(m)*	1	5	3	14	4	18	6	27	8	36
Lv1	1	2	6	10	11	18	23	38	19	32
Lv3 *(f)*	1	6	1	6	5	28	9	50	2	11
Lv3 *(m)*	0	0	0	0	2	15	7	54	4	31
Lv3	1	3	1	3	7	23	16	52	6	19
All *(f)*	1	2	4	7	12	21	26	46	13	23
All *(m)*	1	3	3	9	6	17	13	37	12	34
All	**2**	**2%**	**7**	**8%**	**18**	**20%**	**39**	**43%**	**25**	**27%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	2.05	4	1	0.9	0.8
Lv1 *(m)*	22	2.23	5	1	1.2	1.4
Lv1	60	2.12	5	1	1.0	1.0
Lv3 *(f)*	12	2.44	5	1	1.0	0.9
Lv3 *(m)*	5	1.85	3	1	0.7	0.4
Lv3	17	2.19	5	1	0.9	0.8
All *(f)*	56	2.18	5	1	0.9	0.9
All *(m)*	35	2.09	5	1	1.1	1.1
All	**91**	**2.14**	**5**	**1**	**1.0**	**1.0**

1996

	Better 5		4		3		2		Less effective 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	0	0	2	5	11	26	16	37	14	33
Lv1 *(m)*	0	0	1	7	3	21	6	43	4	29
Lv1	0	0	3	5	14	25	22	39	18	32
Lv3 *(f)*	0	0	0	0	2	22	5	56	2	22
Lv3 *(m)*	1	5	1	5	6	29	7	33	6	29
Lv3	1	3	1	3	8	27	12	40	8	27
All *(f)*	0	0	2	4	13	25	21	40	16	31
All *(m)*	1	3	2	6	9	26	13	37	10	29
All	**1**	**1%**	**4**	**5%**	**22**	**25%**	**34**	**39%**	**26**	**30%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	2.02	4	1	0.9	0.8
Lv1 *(m)*	14	2.07	4	1	0.9	0.8
Lv1	57	2.04	4	1	0.9	0.8
Lv3 *(f)*	4	2.00	3	1	0.7	0.4
Lv3 *(m)*	11	2.24	5	1	1.1	1.1
Lv3	15	2.17	5	1	1.0	0.9
All *(f)*	52	2.02	4	1	0.8	0.7
All *(m)*	35	2.17	5	1	1.0	1.0
All	**87**	**2.08**	**5**	**1**	**0.9**	**0.8**

Q 3.2 *(c)* On a scale of 1 to 5, where 5 is better and 1 less effective, how would you compare electronic conferencing with face-to-face tutorials ... *as a medium for intellectual exchange?* [Intellect]

1990

	Better 5 n	%	4 n	%	3 n	%	2 n	%	Less effective 1 n	%
Lv1 *(f)*	0	0	4	20	6	30	7	35	3	15
Lv1 *(m)*	0	0	1	13	3	38	2	25	2	25
Lv1	0	0	5	18	9	32	9	32	5	18
Lv3 *(f)*	0	0	2	13	11	73	2	13	0	0
Lv3 *(m)*	1	10	1	10	4	40	3	30	1	10
Lv3	1	4	3	12	15	60	5	20	1	4
All *(f)*	0	0	6	17	17	49	9	26	3	9
All *(m)*	1	6	2	11	7	39	5	28	3	17
All	**1**	**2%**	**8**	**15%**	**24**	**45%**	**14**	**26%**	**6**	**11%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.55	4	1	1.0	0.9
Lv1 *(m)*	8	2.38	4	1	1.0	1.0
Lv1	28	2.50	4	1	1.0	1.0
Lv3 *(f)*	15	3.00	4	2	0.5	0.3
Lv3 *(m)*	10	2.80	5	1	1.1	1.2
Lv3	25	2.92	5	1	0.8	0.6
All *(f)*	35	2.74	4	1	0.8	0.7
All *(m)*	18	2.61	5	1	1.1	1.1
All	**53**	**2.70**	**5**	**1**	**0.9**	**0.9**

1995

	Better 5 n	%	4 n	%	3 n	%	2 n	%	Less effective 1 n	%
Lv1 *(f)*	0	0	10	27	15	41	10	27	2	5
Lv1 *(m)*	2	9	6	27	8	36	4	18	2	9
Lv1	2	3	16	27	23	39	14	24	4	7
Lv3 *(f)*	1	6	5	28	12	67	0	0	0	0
Lv3 *(m)*	1	8	4	31	4	31	3	23	1	8
Lv3	2	6	9	29	16	52	3	10	1	3
All *(f)*	1	2	15	27	27	49	10	18	2	4
All *(m)*	3	9	10	29	12	34	7	20	3	9
All	**4**	**4%**	**25**	**28%**	**39**	**43%**	**17**	**19%**	**5**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	37	2.89	4	1	0.9	0.7
Lv1 *(m)*	22	3.09	5	1	1.1	1.2
Lv1	59	2.97	5	1	1.0	0.9
Lv3 *(f)*	12	3.39	5	3	0.6	0.3
Lv3 *(m)*	5	3.08	5	1	1.1	1.1
Lv3	17	3.26	5	1	0.8	0.7
All *(f)*	55	3.05	5	1	0.8	0.7
All *(m)*	35	3.09	5	1	1.1	1.2
All	**90**	**3.07**	**5**	**1**	**0.9**	**0.9**

1996

	Better 5 n	%	4 n	%	3 n	%	2 n	%	Less effective 1 n	%
Lv1 *(f)*	2	5	8	19	24	56	8	19	1	2
Lv1 *(m)*	1	7	5	36	6	43	2	14	0	0
Lv1	3	5	13	23	30	53	10	18	1	2
Lv3 *(f)*	0	0	5	56	3	33	0	0	1	11
Lv3 *(m)*	1	5	10	48	7	33	0	0	3	14
Lv3	1	3	15	50	10	33	0	0	4	13
All *(f)*	2	4	13	25	27	52	8	15	2	4
All *(m)*	2	6	15	43	13	37	2	6	3	9
All	**4**	**5%**	**28**	**32%**	**40**	**46%**	**10**	**11%**	**5**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.05	5	1	0.8	0.6
Lv1 *(m)*	14	3.36	5	2	0.8	0.7
Lv1	57	3.12	5	1	0.8	0.7
Lv3 *(f)*	4	3.33	4	1	0.9	0.9
Lv3 *(m)*	11	3.29	5	1	1.1	1.2
Lv3	15	3.30	5	1	1.0	1.1
All *(f)*	52	3.10	5	1	0.8	0.7
All *(m)*	35	3.31	5	1	1.0	1.0
All	**87**	**3.18**	**5**	**1**	**0.9**	**0.8**

Q 3.2 *(d)* On a scale of 1 to 5, where 5 is better and 1 less effective, how would you compare electronic conferencing with face-to-face tutorials ... *in terms of time spent by you?* [Effective]

1990

	Better 5 n	%	4 n	%	3 n	%	2 n	%	Less effective 1 n	%
Lv1 *(f)*	0	0	1	5	11	55	6	30	2	10
Lv1 *(m)*	0	0	1	13	5	63	1	13	1	13
Lv1	0	0	2	7	16	57	7	25	3	11
Lv3 *(f)*	0	0	2	13	6	40	3	20	4	27
Lv3 *(m)*	0	0	0	0	6	60	2	20	2	20
Lv3	0	0	2	8	12	48	5	20	6	24
All *(f)*	0	0	3	9	17	49	9	26	6	17
All *(m)*	0	0	1	6	11	61	3	17	3	17
All	**0**	**0%**	**4**	**8%**	**28**	**53%**	**12**	**23%**	**9**	**17%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.55	4	1	0.7	0.5
Lv1 *(m)*	8	2.75	4	1	0.8	0.7
Lv1	28	2.61	4	1	0.8	0.6
Lv3 *(f)*	15	2.40	4	1	1.0	1.0
Lv3 *(m)*	10	2.40	3	1	0.8	0.6
Lv3	25	2.40	4	1	0.9	0.9
All *(f)*	35	2.49	4	1	0.9	0.8
All *(m)*	18	2.56	4	1	0.8	0.7
All	**53**	**2.51**	**4**	**1**	**0.9**	**0.7**

1995

	Better 5 n	%	4 n	%	3 n	%	2 n	%	Less effective 1 n	%
Lv1 *(f)*	1	3	4	11	16	42	13	34	4	11
Lv1 *(m)*	0	0	5	23	5	23	10	45	2	9
Lv1	1	2	9	15	21	35	23	38	6	10
Lv3 *(f)*	0	0	3	17	10	56	3	17	2	11
Lv3 *(m)*	1	8	3	23	7	54	2	15	0	0
Lv3	1	3	6	19	17	55	5	16	2	6
All *(f)*	1	2	7	13	26	46	16	29	6	11
All *(m)*	1	3	8	23	12	34	12	34	2	6
All	**2**	**2%**	**15**	**16%**	**38**	**42%**	**28**	**31%**	**8**	**9%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	2.61	5	1	0.9	0.8
Lv1 *(m)*	22	2.59	4	1	0.9	0.9
Lv1	60	2.60	5	1	0.9	0.8
Lv3 *(f)*	12	2.78	4	1	0.9	0.7
Lv3 *(m)*	5	3.23	5	2	0.8	0.6
Lv3	17	2.97	5	1	0.9	0.7
All *(f)*	56	2.66	5	1	0.9	0.8
All *(m)*	35	2.83	5	1	0.9	0.9
All	**91**	**2.73**	**5**	**1**	**0.9**	**0.8**

1996

	Better 5 n	%	4 n	%	3 n	%	2 n	%	Less effective 1 n	%
Lv1 *(f)*	1	2	2	5	29	67	10	23	1	2
Lv1 *(m)*	0	0	4	29	7	50	3	21	0	0
Lv1	1	2	6	11	36	63	13	23	1	2
Lv3 *(f)*	1	11	2	22	6	67	0	0	0	0
Lv3 *(m)*	0	0	5	24	9	43	5	24	2	10
Lv3	1	3	7	23	15	50	5	17	2	7
All *(f)*	2	4	4	8	35	67	10	19	1	2
All *(m)*	0	0	9	26	16	46	8	23	2	6
All	**2**	**2%**	**13**	**15%**	**51**	**59%**	**18**	**21%**	**3**	**3%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	2.81	5	1	0.7	0.4
Lv1 *(m)*	14	3.07	4	2	0.7	0.5
Lv1	57	2.88	5	1	0.7	0.5
Lv3 *(f)*	4	3.44	5	3	0.7	0.5
Lv3 *(m)*	11	2.81	4	1	0.9	0.8
Lv3	15	3.00	5	1	0.9	0.8
All *(f)*	52	2.92	5	1	0.7	0.5
All *(m)*	35	2.91	4	1	0.8	0.7
All	**87**	**2.92**	**5**	**1**	**0.8**	**0.6**

Q 3.3 (a) On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, from your own experience of CMC, show your strength of agreement or disagreement with the following statement: *"Individuals can participate more equally in electronic than in face-to-face communication."* [Particip]

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	1	5	4	20	9	45	4	20	2	10
Lv1 *(m)*	2	25	3	38	0	0	1	13	2	25
Lv1	3	11	7	25	9	32	5	18	4	14
Lv3 *(f)*	0	0	6	40	5	33	2	13	2	13
Lv3 *(m)*	1	10	2	20	3	30	2	20	2	20
Lv3	1	4	8	32	8	32	4	16	4	16
All *(f)*	1	3	10	29	14	40	6	17	4	11
All *(m)*	3	17	5	28	3	17	3	17	4	22
All	**4**	**8%**	**15**	**28%**	**17**	**32%**	**9**	**17%**	**8**	**15%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.90	5	1	1.0	1.0
Lv1 *(m)*	8	3.25	5	1	1.6	2.4
Lv1	28	3.00	5	1	1.2	1.4
Lv3 *(f)*	15	3.00	4	1	1.0	1.1
Lv3 *(m)*	10	2.80	5	1	1.2	1.6
Lv3	25	2.92	5	1	1.1	1.3
All *(f)*	35	2.94	5	1	1.0	1.0
All *(m)*	18	3.00	5	1	1.4	2.0
All	**53**	**2.96**	**5**	**1**	**1.2**	**1.4**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	4	11	9	24	10	26	8	21	7	18
Lv1 *(m)*	3	14	7	32	5	23	3	14	4	18
Lv1	7	12	16	27	15	25	11	18	11	18
Lv3 *(f)*	1	6	8	44	3	17	4	22	2	11
Lv3 *(m)*	3	23	5	38	2	15	1	8	2	15
Lv3	4	13	13	42	5	16	5	16	4	13
All *(f)*	5	9	17	30	13	23	12	21	9	16
All *(m)*	6	17	12	34	7	20	4	11	6	17
All	**11**	**12%**	**29**	**32%**	**20**	**22%**	**16**	**18%**	**15**	**16%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	2.87	5	1	1.3	1.6
Lv1 *(m)*	22	3.09	5	1	1.3	1.7
Lv1	60	2.95	5	1	1.3	1.6
Lv3 *(f)*	12	3.11	5	1	1.1	1.3
Lv3 *(m)*	5	3.46	5	1	1.3	1.8
Lv3	17	3.26	5	1	1.2	1.5
All *(f)*	56	2.95	5	1	1.2	1.5
All *(m)*	35	3.23	5	1	1.3	1.8
All	**91**	**3.05**	**5**	**1**	**1.3**	**1.6**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	2	5	11	26	19	44	11	26	0	0
Lv1 *(m)*	1	7	10	71	2	14	1	7	0	0
Lv1	3	5	21	37	21	37	12	21	0	0
Lv3 *(f)*	3	33	2	22	3	33	1	11	0	0
Lv3 *(m)*	6	29	8	38	4	19	2	10	1	5
Lv3	9	30	10	33	7	23	3	10	1	3
All *(f)*	5	10	13	25	22	42	12	23	0	0
All *(m)*	7	20	18	51	6	17	3	9	1	3
All	**12**	**14%**	**31**	**36%**	**28**	**32%**	**15**	**17%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.09	5	2	0.8	0.7
Lv1 *(m)*	14	3.79	5	2	0.7	0.5
Lv1	57	3.26	5	2	0.8	0.7
Lv3 *(f)*	4	3.78	5	2	1.0	1.1
Lv3 *(m)*	11	3.76	5	1	1.1	1.2
Lv3	15	3.77	5	1	1.1	1.2
All *(f)*	52	3.21	5	2	0.9	0.8
All *(m)*	35	3.77	5	1	1.0	0.9
All	**87**	**3.44**	**5**	**1**	**1.0**	**0.9**

Q 3.3 (b) On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, from your own experience of CMC, show your strength of agreement or disagreement with the following statement: *"Computer communication is depersonalizing."* [**Depersonal**]

1990

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	2	10	9	45	5	25	4	20	0	0
Lv1 *(m)*	1	13	2	25	2	25	2	25	1	13
Lv1	3	11	11	39	7	25	6	21	1	4
Lv3 *(f)*	4	27	7	47	0	0	4	27	0	0
Lv3 *(m)*	1	10	1	10	6	60	2	20	0	0
Lv3	5	20	8	32	6	24	6	24	0	0
All *(f)*	6	17	16	46	5	14	8	23	0	0
All *(m)*	2	11	3	17	8	44	4	22	1	6
All	**8**	**15%**	**19**	**36%**	**13**	**25%**	**12**	**23%**	**1**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.45	5	2	0.9	0.8
Lv1 *(m)*	8	3.00	5	1	1.2	1.5
Lv1	28	3.32	5	1	1.0	1.1
Lv3 *(f)*	15	3.73	5	2	1.1	1.3
Lv3 *(m)*	10	3.10	5	2	0.8	0.7
Lv3	25	3.48	5	2	1.1	1.1
All *(f)*	35	3.57	5	2	1.0	1.0
All *(m)*	18	3.06	5	1	1.0	1.1
All	**53**	**3.40**	**5**	**1**	**1.1**	**1.1**

1995

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	9	24	11	29	14	37	3	8	1	3
Lv1 *(m)*	8	36	6	27	4	18	4	18	0	0
Lv1	17	28	17	28	18	30	7	12	1	2
Lv3 *(f)*	3	17	5	28	6	33	1	6	3	17
Lv3 *(m)*	0	0	8	62	2	15	2	15	1	8
Lv3	3	10	13	42	8	26	3	10	4	13
All *(f)*	12	21	16	29	20	36	4	7	4	7
All *(m)*	8	23	14	40	6	17	6	17	1	3
All	**20**	**22%**	**30**	**33%**	**26**	**29%**	**10**	**11%**	**5**	**5%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.63	5	1	1.0	1.0
Lv1 *(m)*	22	3.82	5	2	1.1	1.2
Lv1	60	3.70	5	1	1.1	1.1
Lv3 *(f)*	12	3.22	5	1	1.3	1.6
Lv3 *(m)*	5	3.31	4	1	1.0	1.0
Lv3	17	3.26	5	1	1.2	1.4
All *(f)*	56	3.50	5	1	1.1	1.3
All *(m)*	35	3.63	5	1	1.1	1.2
All	**91**	**3.55**	**5**	**1**	**1.1**	**1.2**

1996

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	6	14	14	33	10	23	7	16	6	14
Lv1 *(m)*	2	14	6	43	1	7	5	36	0	0
Lv1	8	14	20	35	11	19	12	21	6	11
Lv3 *(f)*	0	0	4	44	3	33	2	22	0	0
Lv3 *(m)*	1	5	8	38	6	29	3	14	3	14
Lv3	1	3	12	40	9	30	5	17	3	10
All *(f)*	6	12	18	35	13	25	9	17	6	12
All *(m)*	3	9	14	40	7	20	8	23	3	9
All	**9**	**10%**	**32**	**37%**	**20**	**23%**	**17**	**20%**	**9**	**10%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.16	5	1	1.3	1.6
Lv1 *(m)*	14	3.36	5	2	1.1	1.2
Lv1	57	3.21	5	1	1.2	1.5
Lv3 *(f)*	4	3.22	4	2	0.8	0.6
Lv3 *(m)*	11	3.05	5	1	1.1	1.3
Lv3	15	3.10	5	1	1.0	1.1
All *(f)*	52	3.17	5	1	1.2	1.4
All *(m)*	35	3.17	5	1	1.1	1.3
All	**87**	**3.17**	**5**	**1**	**1.2**	**1.4**

Q 3.3 *(c)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, from your own experience of CMC, show your strength of agreement or disagreement with the following statement: *"Computer conferencing encourages individual assertiveness."* [**Assertive**]

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	2	11	5	26	8	42	4	21	0	0
Lv1 *(m)*	2	25	2	25	2	25	2	25	0	0
Lv1	4	15	7	26	10	37	6	22	0	0
Lv3 *(f)*	1	7	6	40	6	40	2	13	0	0
Lv3 *(m)*	2	20	1	10	5	50	2	20	0	0
Lv3	3	12	7	28	11	44	4	16	0	0
All *(f)*	3	9	11	32	14	41	6	18	0	0
All *(m)*	4	22	3	17	7	39	4	22	0	0
All	**7**	**13%**	**14**	**27%**	**21**	**40%**	**10**	**19%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	19	3.26	5	2	0.9	0.8
Lv1 *(m)*	8	3.50	5	2	1.1	1.3
Lv1	27	3.33	5	2	1.0	1.0
Lv3 *(f)*	15	3.40	5	2	0.8	0.6
Lv3 *(m)*	10	3.30	5	2	1.0	1.0
Lv3	25	3.36	5	2	0.9	0.8
All *(f)*	34	3.32	5	2	0.9	0.7
All *(m)*	18	3.39	5	2	1.1	1.1
All	**52**	**3.35**	**5**	**2**	**0.9**	**0.9**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	5	13	10	26	15	39	7	18	1	3
Lv1 *(m)*	1	5	9	41	5	23	1	5	6	27
Lv1	6	10	19	32	20	33	8	13	7	12
Lv3 *(f)*	3	17	6	33	7	39	1	6	1	6
Lv3 *(m)*	1	8	6	46	5	38	0	0	1	8
Lv3	4	13	12	39	12	39	1	3	2	6
All *(f)*	8	14	16	29	22	39	8	14	2	4
All *(m)*	2	6	15	43	10	29	1	3	7	20
All	**10**	**11%**	**31**	**34%**	**32**	**35%**	**9**	**10%**	**9**	**10%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.29	5	1	1.0	1.0
Lv1 *(m)*	22	2.91	5	1	1.3	1.7
Lv1	60	3.15	5	1	1.1	1.3
Lv3 *(f)*	12	3.50	5	1	1.0	1.0
Lv3 *(m)*	5	3.46	5	1	0.9	0.9
Lv3	17	3.48	5	1	1.0	1.0
All *(f)*	56	3.36	5	1	1.0	1.0
All *(m)*	35	3.11	5	1	1.2	1.5
All	**91**	**3.26**	**5**	**1**	**1.1**	**1.2**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	1	2	7	16	26	60	8	19	1	2
Lv1 *(m)*	1	7	4	29	9	64	0	0	0	0
Lv1	2	4	11	19	35	61	8	14	1	2
Lv3 *(f)*	2	22	2	22	4	44	1	11	0	0
Lv3 *(m)*	3	14	6	29	9	43	2	10	1	5
Lv3	5	17	8	27	13	43	3	10	1	3
All *(f)*	3	6	9	17	30	58	9	17	1	2
All *(m)*	4	11	10	29	18	51	2	6	1	3
All	**7**	**8%**	**19**	**22%**	**48**	**55%**	**11**	**13%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	2.98	5	1	0.7	0.5
Lv1 *(m)*	14	3.43	5	3	0.6	0.4
Lv1	57	3.09	5	1	0.7	0.5
Lv3 *(f)*	4	3.56	5	2	1.0	0.9
Lv3 *(m)*	11	3.38	5	1	1.0	1.0
Lv3	15	3.43	5	1	1.0	1.0
All *(f)*	52	3.08	5	1	0.8	0.6
All *(m)*	35	3.40	5	1	0.9	0.8
All	**87**	**3.21**	**5**	**1**	**0.8**	**0.7**

Q 3.3 *(d)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, from your own experience of CMC, show your strength of agreement or disagreement with the following statement: *"Personal interaction is more difficult with computer communication because of the lack of contextual and oral feedback."* **[LackFeed]**

1990

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	7	35	9	45	3	15	1	5	0	0
Lv1 *(m)*	5	63	1	13	1	13	1	13	0	0
Lv1	12	43	10	36	4	14	2	7	0	0
Lv3 *(f)*	1	7	6	40	8	53	0	0	0	0
Lv3 *(m)*	1	10	7	70	1	10	1	10	0	0
Lv3	2	8	13	52	9	36	1	4	0	0
All *(f)*	8	23	15	43	11	31	1	3	0	0
All *(m)*	6	33	8	44	2	11	2	11	0	0
All	**14**	**26%**	**23**	**43%**	**13**	**25%**	**3**	**6%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	4.10	5	2	0.8	0.7
Lv1 *(m)*	8	4.25	5	2	1.1	1.2
Lv1	28	4.14	5	2	0.9	0.8
Lv3 *(f)*	15	3.53	5	3	0.6	0.4
Lv3 *(m)*	10	3.80	5	2	0.7	0.6
Lv3	25	3.64	5	2	0.7	0.5
All *(f)*	35	3.86	5	2	0.8	0.6
All *(m)*	18	4.00	5	2	0.9	0.9
All	**53**	**3.91**	**5**	**2**	**0.9**	**0.7**

1995

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	8	21	16	42	9	24	5	13	0	0
Lv1 *(m)*	7	32	3	14	8	36	2	9	2	9
Lv1	15	25	19	32	17	28	7	12	2	3
Lv3 *(f)*	3	17	7	39	4	22	3	17	1	6
Lv3 *(m)*	2	15	4	31	3	23	4	31	0	0
Lv3	5	16	11	35	7	23	7	23	1	3
All *(f)*	11	20	23	41	13	23	8	14	1	2
All *(m)*	9	26	7	20	11	31	6	17	2	6
All	**20**	**22%**	**30**	**33%**	**24**	**26%**	**14**	**15%**	**3**	**3%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.71	5	2	0.9	0.9
Lv1 *(m)*	22	3.50	5	1	1.3	1.6
Lv1	60	3.63	5	1	1.1	1.2
Lv3 *(f)*	12	3.44	5	1	1.1	1.2
Lv3 *(m)*	5	3.31	5	2	1.1	1.1
Lv3	17	3.39	5	1	1.1	1.2
All *(f)*	56	3.63	5	1	1.0	1.0
All *(m)*	35	3.43	5	1	1.2	1.4
All	**91**	**3.55**	**5**	**1**	**1.1**	**1.2**

1996

	Agree 5		4		3		2		Disagree 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	7	16	18	42	14	33	4	9	0	0
Lv1 *(m)*	2	14	8	57	3	21	1	7	0	0
Lv1	9	16	26	46	17	30	5	9	0	0
Lv3 *(f)*	1	11	3	33	4	44	1	11	0	0
Lv3 *(m)*	4	19	4	19	8	38	5	24	0	0
Lv3	5	17	7	23	12	40	6	20	0	0
All *(f)*	8	15	21	40	18	35	5	10	0	0
All *(m)*	6	17	12	34	11	31	6	17	0	0
All	**14**	**16%**	**33**	**38%**	**29**	**33%**	**11**	**13%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.65	5	2	0.9	0.7
Lv1 *(m)*	14	3.79	5	2	0.8	0.6
Lv1	57	3.68	5	2	0.8	0.7
Lv3 *(f)*	4	3.44	5	2	0.8	0.7
Lv3 *(m)*	11	3.33	5	2	1.0	1.1
Lv3	15	3.37	5	2	1.0	1.0
All *(f)*	52	3.62	5	2	0.9	0.7
All *(m)*	35	3.51	5	2	1.0	0.9
All	**87**	**3.57**	**5**	**2**	**0.9**	**0.8**

Q 3.4 *(a)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, from your own experience of CMC, show your strength of agreement or disagreement with the following statement: *"It would make little difference to me if computer mediated communication facilities weren't available to me."* [`NotAvail`]

1990

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	1	5	1	5	7	35	8	40	3	15
Lv1 *(m)*	1	13	0	0	0	0	4	50	3	38
Lv1	2	7	1	4	7	25	12	43	6	21
Lv3 *(f)*	1	7	2	13	4	27	8	53	0	0
Lv3 *(m)*	0	0	1	10	1	10	6	60	2	20
Lv3	1	4	3	12	5	20	14	56	2	8
All *(f)*	2	6	3	9	11	31	16	46	3	9
All *(m)*	1	6	1	6	1	6	10	56	5	28
All	**3**	**6%**	**4**	**8%**	**12**	**23%**	**26**	**49%**	**8**	**15%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	2.45	5	1	1.0	0.9
Lv1 *(m)*	8	2.00	5	1	1.2	1.5
Lv1	28	2.32	5	1	1.1	1.1
Lv3 *(f)*	15	2.73	5	2	0.9	0.9
Lv3 *(m)*	10	2.10	4	1	0.8	0.7
Lv3	25	2.48	5	1	0.9	0.9
All *(f)*	35	2.57	5	1	1.0	0.9
All *(m)*	18	2.06	5	1	1.0	1.1
All	**53**	**2.40**	**5**	**1**	**1.0**	**1.0**

1995

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	4	11	9	24	8	21	10	26	7	18
Lv1 *(m)*	1	5	1	5	7	32	7	32	6	27
Lv1	5	8	10	17	15	25	17	28	13	22
Lv3 *(f)*	0	0	2	11	4	22	7	39	5	28
Lv3 *(m)*	1	8	1	8	3	23	4	31	4	31
Lv3	1	3	3	10	7	23	11	35	9	29
All *(f)*	4	7	11	20	12	21	17	30	12	21
All *(m)*	2	6	2	6	10	29	11	31	10	29
All	**6**	**7%**	**13**	**14%**	**22**	**24%**	**28**	**31%**	**22**	**24%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	2.82	5	1	1.3	1.6
Lv1 *(m)*	22	2.27	5	1	1.1	1.1
Lv1	60	2.62	5	1	1.2	1.5
Lv3 *(f)*	12	2.17	4	1	1.0	0.9
Lv3 *(m)*	5	2.31	5	1	1.2	1.4
Lv3	17	2.23	5	1	1.1	1.1
All *(f)*	56	2.61	5	1	1.2	1.5
All *(m)*	35	2.29	5	1	1.1	1.2
All	**91**	**2.48**	**5**	**1**	**1.2**	**1.4**

1996

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	3	7	5	12	7	16	17	40	11	26
Lv1 *(m)*	0	0	0	0	2	14	7	50	5	36
Lv1	3	5	5	9	9	16	24	42	16	28
Lv3 *(f)*	0	0	0	0	1	11	4	44	4	44
Lv3 *(m)*	3	14	3	14	3	14	8	38	4	19
Lv3	3	10	3	10	4	13	12	40	8	27
All *(f)*	3	6	5	10	8	15	21	40	15	29
All *(m)*	3	9	3	9	5	14	15	43	9	26
All	6	7%	8	9%	13	15%	36	41%	24	28%

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	2.35	5	1	1.2	1.4
Lv1 *(m)*	14	1.79	3	1	0.7	0.5
Lv1	57	2.21	5	1	1.1	1.2
Lv3 *(f)*	4	1.67	3	1	0.7	0.4
Lv3 *(m)*	11	2.67	5	1	1.3	1.7
Lv3	15	2.37	5	1	1.3	1.6
All *(f)*	52	2.23	5	1	1.1	1.3
All *(m)*	35	2.31	5	1	1.2	1.4
All	**87**	**2.26**	**5**	**1**	**1.2**	**1.3**

Q 3.4 (b) On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, from your own experience of CMC, show your strength of agreement or disagreement with the following statement: *"Being able to see other students' work is beneficial in helping me self-monitor and improve my own performance."* [Monitor]

1990

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	4	20	6	30	10	50	0	0	0	0
Lv1 *(m)*	4	50	2	25	1	13	0	0	1	13
Lv1	8	29	8	29	11	39	0	0	1	4
Lv3 *(f)*	2	13	5	33	5	33	2	13	1	7
Lv3 *(m)*	4	40	2	20	3	30	0	0	1	10
Lv3	6	24	7	28	8	32	2	8	2	8
All *(f)*	6	17	11	31	15	43	2	6	1	3
All *(m)*	8	44	4	22	4	22	0	0	2	11
All	**14**	**26%**	**15**	**28%**	**19**	**36%**	**2**	**4%**	**3**	**6%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.70	5	3	0.8	0.6
Lv1 *(m)*	8	4.00	5	1	1.3	1.8
Lv1	28	3.79	5	1	1.0	1.0
Lv3 *(f)*	15	3.33	5	1	1.1	1.2
Lv3 *(m)*	10	3.80	5	1	1.2	1.6
Lv3	25	3.52	5	1	1.2	1.4
All *(f)*	35	3.54	5	1	0.9	0.9
All *(m)*	18	3.89	5	1	1.3	1.7
All	**53**	**3.66**	**5**	**1**	**1.1**	**1.2**

1995

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	9	24	18	49	6	16	2	5	2	5
Lv1 *(m)*	9	41	5	23	6	27	2	9	0	0
Lv1	18	31	23	39	12	20	4	7	2	3
Lv3 *(f)*	6	33	8	44	2	11	1	6	1	6
Lv3 *(m)*	5	38	4	31	3	23	1	8	0	0
Lv3	11	35	12	39	5	16	2	6	1	3
All *(f)*	15	27	26	47	8	15	3	5	3	5
All *(m)*	14	40	9	26	9	26	3	9	0	0
All	**29**	**32%**	**35**	**39%**	**17**	**19%**	**6**	**7%**	**3**	**3%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	37	3.81	5	1	1.0	1.1
Lv1 *(m)*	22	3.95	5	2	1.0	1.0
Lv1	59	3.86	5	1	1.0	1.1
Lv3 *(f)*	12	3.94	5	1	1.1	1.2
Lv3 *(m)*	5	4.00	5	2	1.0	0.9
Lv3	17	3.97	5	1	1.0	1.1
All *(f)*	55	3.85	5	1	1.1	1.1
All *(m)*	35	3.97	5	2	1.0	1.0
All	**90**	**3.90**	**5**	**1**	**1.0**	**1.1**

1996

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	4	9	18	42	16	37	5	12	0	0
Lv1 *(m)*	3	21	6	43	4	29	1	7	0	0
Lv1	7	12	24	42	20	35	6	11	0	0
Lv3 *(f)*	2	22	2	22	3	33	2	22	0	0
Lv3 *(m)*	3	14	13	62	2	10	3	14	0	0
Lv3	5	17	15	50	5	17	5	17	0	0
All *(f)*	6	12	20	38	19	37	7	13	0	0
All *(m)*	6	17	19	54	6	17	4	11	0	0
All	**12**	**14%**	**39**	**45%**	**25**	**29%**	**11**	**13%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.49	5	2	0.8	0.7
Lv1 *(m)*	14	3.79	5	2	0.9	0.7
Lv1	57	3.56	5	2	0.8	0.7
Lv3 *(f)*	4	3.44	5	2	1.1	1.1
Lv3 *(m)*	11	3.76	5	2	0.9	0.8
Lv3	15	3.67	5	2	0.9	0.9
All *(f)*	52	3.48	5	2	0.9	0.7
All *(m)*	35	3.77	5	2	0.9	0.7
All	**87**	**3.60**	**5**	**2**	**0.9**	**0.8**

Q 3.4 *(c)* On a scale of 1 to 5, where 5 is strong agreement and 1 strong disagreement, from your own experience of CMC, show your strength of agreement or disagreement with the following statement: *"If student-staff ratios rise, it would be desirable to makemore extensive use of CMC."* [ExtendUse]

1990

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	4	20	7	35	9	45	0	0	0	0
Lv1 *(m)*	3	38	2	25	3	38	0	0	0	0
Lv1	7	25	9	32	12	43	0	0	0	0
Lv3 *(f)*	1	7	7	47	7	47	0	0	0	0
Lv3 *(m)*	3	30	4	40	2	20	1	10	0	0
Lv3	4	16	11	44	9	36	1	4	0	0
All *(f)*	5	14	14	40	16	46	0	0	0	0
All *(m)*	6	33	6	33	5	28	1	6	0	0
All	**11**	**21%**	**20**	**38%**	**21**	**40%**	**1**	**2%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.75	5	3	0.8	0.6
Lv1 *(m)*	8	4.00	5	3	0.9	0.8
Lv1	28	3.82	5	3	0.8	0.6
Lv3 *(f)*	15	3.60	5	3	0.6	0.4
Lv3 *(m)*	10	3.90	5	2	0.9	0.9
Lv3	25	3.72	5	2	0.8	0.6
All *(f)*	35	3.69	5	3	0.7	0.5
All *(m)*	18	3.94	5	2	0.9	0.8
All	**53**	**3.77**	**5**	**2**	**0.8**	**0.6**

1995

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	7	18	11	29	18	47	2	5	0	0
Lv1 *(m)*	4	18	8	36	5	23	2	9	3	14
Lv1	11	18	19	32	23	38	4	7	3	5
Lv3 *(f)*	4	22	6	33	7	39	1	6	0	0
Lv3 *(m)*	6	46	4	31	3	23	0	0	0	0
Lv3	10	32	10	32	10	32	1	3	0	0
All *(f)*	11	20	17	30	25	45	3	5	0	0
All *(m)*	10	29	12	34	8	23	2	6	3	9
All	**21**	**23%**	**29**	**32%**	**33**	**36%**	**5**	**5%**	**3**	**3%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.61	5	2	0.8	0.7
Lv1 *(m)*	22	3.36	5	1	1.3	1.6
Lv1	60	3.52	5	1	1.0	1.0
Lv3 *(f)*	12	3.72	5	2	0.9	0.8
Lv3 *(m)*	5	4.23	5	3	0.8	0.6
Lv3	17	3.94	5	2	0.9	0.8
All *(f)*	56	3.64	5	2	0.9	0.7
All *(m)*	35	3.69	5	1	1.2	1.4
All	**91**	**3.66**	**5**	**1**	**1.0**	**1.0**

1996

	Agree 5 n	%	4 n	%	3 n	%	2 n	%	Disagree 1 n	%
Lv1 *(f)*	1	2	16	37	22	51	3	7	1	2
Lv1 *(m)*	3	21	10	71	1	7	0	0	0	0
Lv1	4	7	26	46	23	40	3	5	1	2
Lv3 *(f)*	2	22	5	56	1	11	1	11	0	0
Lv3 *(m)*	8	38	9	43	3	14	1	5	0	0
Lv3	10	33	14	47	4	13	2	7	0	0
All *(f)*	3	6	21	40	23	44	4	8	1	2
All *(m)*	11	31	19	54	4	11	1	3	0	0
All	**14**	**16%**	**40**	**46%**	**27**	**31%**	**5**	**6%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.30	5	1	0.7	0.5
Lv1 *(m)*	14	4.14	5	3	0.5	0.3
Lv1	57	3.51	5	1	0.8	0.6
Lv3 *(f)*	4	3.89	5	2	0.9	0.8
Lv3 *(m)*	11	4.14	5	2	0.8	0.7
Lv3	15	4.07	5	2	0.9	0.7
All *(f)*	52	3.40	5	1	0.8	0.6
All *(m)*	35	4.14	5	2	0.7	0.5
All	**87**	**3.70**	**5**	**1**	**0.8**	**0.7**

Q 3.4 *(d)* On a scale of 1 to 5, where 5 is very interested and 1 not interested, based on your experience so far with CMC, how would you describe your interest in continuing to use it after the end of your course, assuming you had access to the necessary equipment? [FutureUse]

1990

	Very interested 5		4		3		2		Not interested 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	6	30	8	40	5	25	1	5	0	0
Lv1 *(m)*	2	25	1	13	5	63	0	0	0	0
Lv1	8	29	9	32	10	36	1	4	0	0
Lv3 *(f)*	3	20	4	27	5	33	3	20	0	0
Lv3 *(m)*	5	50	3	30	1	10	1	10	0	0
Lv3	8	32	7	28	6	24	4	16	0	0
All *(f)*	9	26	12	34	10	29	4	11	0	0
All *(m)*	7	39	4	22	6	33	1	6	0	0
All	**16**	**30%**	**16**	**30%**	**16**	**30%**	**5**	**9%**	**0**	**0%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	20	3.95	5	2	0.9	0.7
Lv1 *(m)*	8	3.63	5	3	0.9	0.7
Lv1	28	3.86	5	2	0.9	0.8
Lv3 *(f)*	15	3.47	5	2	1.0	1.0
Lv3 *(m)*	10	4.20	5	2	1.0	1.0
Lv3	25	3.76	5	2	1.1	1.1
All *(f)*	35	3.74	5	2	1.0	0.9
All *(m)*	18	3.94	5	2	1.0	0.9
All	**53**	**3.81**	**5**	**2**	**1.0**	**0.9**

1995

	Very interested 5		4		3		2		Not interested 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	7	18	13	34	15	39	3	8	0	0
Lv1 *(m)*	7	32	8	36	5	23	0	0	2	9
Lv1	14	23	21	35	20	33	3	5	2	3
Lv3 *(f)*	9	50	6	33	3	17	0	0	0	0
Lv3 *(m)*	9	69	4	31	0	0	0	0	0	0
Lv3	18	58	10	32	3	10	0	0	0	0
All *(f)*	16	29	19	34	18	32	3	5	0	0
All *(m)*	16	46	12	34	5	14	0	0	2	6
All	**32**	**35%**	**31**	**34%**	**23**	**25%**	**3**	**3%**	**2**	**2%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	38	3.63	5	2	0.9	0.8
Lv1 *(m)*	22	3.82	5	1	1.2	1.3
Lv1	60	3.70	5	1	1.0	1.0
Lv3 *(f)*	12	4.33	5	3	0.7	0.6
Lv3 *(m)*	5	4.69	5	4	0.5	0.2
Lv3	17	4.48	5	3	0.7	0.4
All *(f)*	56	3.86	5	2	0.9	0.8
All *(m)*	35	4.14	5	1	1.0	1.1
All	**91**	**3.97**	**5**	**1**	**1.0**	**0.9**

1996

	Very interested 5		4		3		2		Not interested 1	
	n	%	n	%	n	%	n	%	n	%
Lv1 *(f)*	14	33	17	40	9	21	2	5	1	2
Lv1 *(m)*	4	29	10	71	0	0	0	0	0	0
Lv1	18	32	27	47	9	16	2	4	1	2
Lv3 *(f)*	7	78	2	22	0	0	0	0	0	0
Lv3 *(m)*	14	67	6	29	0	0	1	5	0	0
Lv3	21	70	8	27	0	0	1	3	0	0
All *(f)*	21	40	19	37	9	17	2	4	1	2
All *(m)*	18	51	16	46	0	0	1	3	0	0
All	**39**	**45%**	**35**	**40%**	**9**	**10%**	**3**	**3%**	**1**	**1%**

	n	Avg	Max	Min	StD	Var
Lv1 *(f)*	43	3.95	5	1	1.0	0.9
Lv1 *(m)*	14	4.29	5	4	0.5	0.2
Lv1	57	4.04	5	1	0.9	0.8
Lv3 *(f)*	4	4.78	5	4	0.4	0.2
Lv3 *(m)*	11	4.57	5	2	0.7	0.5
Lv3	15	4.63	5	2	0.7	0.4
All *(f)*	52	4.10	5	1	0.9	0.9
All *(m)*	35	4.46	5	2	0.6	0.4
All	**87**	**4.24**	**5**	**1**	**0.9**	**0.7**

Appendix 3:

Qualitative data

App.3.1 Levels and patterns of use: *How do you plan and organise the time you devote to your use of CMC? For example, do you tend to have some objectives set before checking what actual e-mail you have? Do you prioritise, or how do you prioritise, the kinds of messages you deal with first? Do you allow, or plan, a set number of daily, or weekly, sessions of using CMC?*

Level 1 Females: Levels and patterns of use

F1-1-m: I tend to check my email everyday, usually before or after classes, for at least half an hour once I have read everything and replyed the emails. When I open my inbox I firstly delete the hundered or so emails from the computer error in the University, then I read emails from my friends and I tend to put the emails from Uni staff into a folder and read it later.

F1-2-l: I spend two hours on a Monday in the Computing and Information Environment work shop. When I first come in I tend to check all my e-mails before I do anything else. I deal with the ones concerning lectures or other work then sort through the others. I usually check my e-mails a few times a week.

F1-3-l: I tend not to have specific limits for the number of times I check my e-mail. It just tends to happen when I have a space in the day. As for prioritising the sort of e-mails I will deal with first, I would tend to read or if need be reply to e-mails from lecturers first since they may be related to work to be completed.

F1-4-m: I check my email a lot, although most of it, if not 99.9%, is the spam that is currently getting emailed to me 200 times a day ;) ...although it's not as bad as it was. I dislike leaving my mailbox, for the reason that if I leave my mail unopened for too long, I might miss something - which is only one disadvantage of email being fast :)

F1-5-h: I have no set times or numbers of times I check my e-mail a day or a week, but I do tend to check my e-mail a lot! *s* E-mails from my family & friends have total & absolute priority above e-mails from lecturers, administration etc., which might be stupid as I'm supposed to be a good student, but.... *s* I love the whole concept of e-mail; it makes it so much easier to keep in touch with people whlen you are away from home! :O)

F1-6-h: I check my email every day if possible as for me it isn't just a tool I use for my course but moer importantly I use it as a substitute for a phone (and as a substitute for the high phone bills ;)), and as a substitute for letters.I'm from Holland and all my friends and my family live in Holland. As my electronic mailbox is used as a substitute for both phone and letters, I check it everyday as every other day I will receive some emails by parents, brothers, aunts, uncles, friends from school, friends from concerts, etc. Email is *the* sollution to stay in contact with them, for me it is anyway. They've all got email, I haven't got to worry about bills as emailing is free, it's very easy and it's a fast and clear way of communicating, I don't have to worry about time changes between Britain & Holland, I don't have to post anything, I'm in this building everyday anyway > for classes / the Union :), so why not ?! As I enjoy reading those private emails I always leave them to the end. First I delete everything that comes from the administrator (the emails I receive 500 times a day or so), then I read the other emails, concerning my CIE module and then I read and reply to my private emails.

Level 1 Males: Levels and patterns of use

M1-1-h: I dont have any set procedure concerning checking my e-mails as such, but I do try and have look every couple of days though. I still use my existing e-mail address's with Yahoo and AOL in keeping in contact with friends and family rather than the college adderss. When checking my college e-mails I usually read the ones from my course tutors first, moving on to the ones from George Mcmurdo and although i know that everyone is aware of the problem about repeating messages, it is really annoying to have to deleate them every time you start, i am sure imporatant messages are being overlooked because of them.

M1-2-l: I try to check my e-mail every day for several reasons one to clear the "spam" from the administrator. Two because I have friends in other cities whom I keep in contact with. Thirdly, it means that I can keep abreast of what is going on lecture wise. I have set up my mail client (outlook) to check my college mail, which means that I usually check all my emails first thing in the morning, leaving me all day to worry about replies, or things that I need to do with regards to what people have sent me.

M1-3-m: I always check my e-mail first thing on Tuesday mornings, the first e-mails I deal with are those from the System Administrator, usually about 50 or so!.Once these have been checked I look at those from lecturers and then those from friends. I have recently discovered how to access my e-mail account from home which has made the system much more useful for me.

M1-4-h: When I am in my weekly class of CIE, I immediately check my e-mails to see if I have any concerning the module or any other module and secondly to see if I have any e-mails from friends or family. This is really the only time that I use e-mail, as I am not very good at communicating using computers. I am often promising to send e-mails to people and never getting round to it, but the fact that I check my mailbox whenever I get the chance shows that I would like to use e-mail more frequently.

M1-5-m: When I first got my e-mail I was not that interested. It was not until I swapped addresses with my friends who had gone to other universities that I began to use it. E-mail became very important to me as it enabled me to keep in touch with then easily. The only drawback about this e-mail is having to constantly delete unwanted mail. I have now opened up an account with microsoft hotmail.

M1-6-l: normally i check my e-mails every monday and thursday night usually to find that it is full of administrators messages and messages about womens hockey. I always check the e-mails from my friends first and normally don't bother with anything else except the messages from George of course.

Level 3 Females: **Levels and patterns of use**	*Level 3 Males:* **Levels and patterns of use**
F3-1-m: I make an effort to check my e-mails at least twice a day. I devote about an hour at a time viewing and replying to e-mails dependant on the importance and time that I have spare e.g. whether it is a lecturer or friend. When it comes to prioritising my e-mails, I normally view the e-mails related to my subjects or course, before viewing circulated messages on the distribution lists or e-mails from my fellow students.	***M3-1-m:*** I check my college e-mail more than three times a day and when staying on a computer for long, just keep the Outlook open so new messages arrive instantly. The same goes for Netscape Mail (I use it when my OST file screws up), I set the automatic message check and load every 7-10 minutes or so. Other existing e-mail accounts I have are checked at least once a day (unless the servers go down, which often happens with two of my accounts). As for prioritisation of mail, the Outlook has a nice feature of colouring messages according to user set criteria. Messages that arrive to me only appear in different colour from the rest, so I check them first. The same procedure (but not colour) applies for messages sent to IM3 list, so I check them either after mine or even first. I do read all messages sent out to mailing lists which included my address (except for obvious advertising spam and the looping ITC messages, which receive a straight SHIFT+DEL). I also try to daily check forums and discussion/msg boards that I attend. More often I do that in mornings and evenings.
F3-2-h: I check my college e-mail about 2 or 3 times a day depending on how long I am in college for. Upon arriving at college it is usually the first thing I do. If there are a number of e-mails, I usually scan for any urgent messages, that is messages that relate to what I plan to do that day or are marked urgent. Then I systematically go through the e-mails and either action them, delete them or file them. In addition, I check the relevant newsgroups a couple of times a week. If I am not in college then I check my college e-mail account from home in addition to checking my personal e-mail account regularly.	***M3-2-h:*** The amount of time I spend online varies with whatever tasks I have to complete, although I will also typically spend ten to fifteen minutes a day just surfing around. I check my e-mail accounts at least three times a day during the week. Typically morning, noon and night. Regardless of when I have performed the previous check, I always check one last time before I leave for the end of the day. At weekends I check once on a Saturday night and once on a Sunday night. If I am expecting an important message, I would check more regularly, whichever day it was. When checking e-mails/newsgroup messages I always look for messages from lecturers or messages flagged as urgent first. After these messages have been looked at, I then look at any other messages subject lines and prioritise based on that.
F3-3-m: When I am in at Queen Margaret, I check my email at least twice a day. This is something I have always done, since first year, and will continue to do so. I check the other email accounts that I have once a day, as these messages will not be of as much importance. The only problem with this is that I am not in every single day, and it is sometimes difficult to get access to computers, especially during assignment time. To prioritise my messages, I usually check who has sent the email first, and then what the title of the email is. This is so that I can open any emails that have been sent from tutors first, and then I can focus on others.	***M3-3-1:*** I always check my e-mails a few times every day. I have been doing this since first-year. What I regularly do is open up the messages, look through the senders and subject of the messages and read the most important ones first. The others I save util whenever I feel like reading them. I usually save e-mails unless they are totally useless for future reference.
F3-4-1: As the IT centre is always busy and sometimes impossible to get a computer it is difficult to make plans and stick to them. When I do get a computer I would alway check my e-mail first. I would scan it and delete all messages which I did not think were relevant to me. I would go on to reading mail from lecturers and classmates to see if they contained anything important. I would deal with external friends' messages later.	***M3-4-m:*** I keep Outlook open whenever I'm on the University computers and set it to check for new e-mail fairly often. I use colours to highlight e-mails from friends and lecturers which I read first. I also have several "rules" set up to divert less important e-mails into folders where I can read them later. I also have several other accounts with web based e-mail providers which I check four or five times a day.
F3-5-h: I try to check my e-mail at least once a day. If I am in college I tend to check it about six or seven times. I try to methodically work through each e-mail I receive. However, time does not always permit this, so I scan my messages by subject and/or author. For example if I am about to go to a class I will look for messages relating to that class. Relying on subject headings can be unreliable as quite often the author replies to a message and does not change the subject heading. My main objective is to keep my Inbox empty. I find it quicker to just move and delete what is there and be sure that I have not previously dealt with it. As a member of a discussion list I sometimes receive many messages, if I am very busy I will move the list e-mails to another folder until I have time to look at them. I set aside time to check my e-mail accounts because it is good netiquette to respond to or acknowledge e-mails from others.	***M3-5-h:*** I check my E-mail at least three times a day. This is a habit i have had since first year. I would check it when i arrive in the morning, check it again in the afternoon and again before i leave college. When i am working on the computer i tend to leave Netscape open so i can check my inbox anytime. As for prioritisation of mail i tend not to do this, i just read the mail as it arrives to me in the inbox.
F3-6-1: I feel that CMC like all aspects of college work must be planned properly. It is essential to prioritise. It would be a good idea to set up folders for all the likely messages you will receive. I feel that it would depend on what exactly you use your email for and this would serve as a basis to plan and decide which messages should receive urgent attention.	***M3-6-1:*** Generally, I don't make any sort of organized plan concerning the use of computers or e-mail. The messages I always deal with first, though, concern WDP and PR, the two modules which utilize the e-mail system the most. Once I hit those two, I generally go through and erase many of the messages I've seen before.

App.3.2 **Useful message sources:** *How, from your own experience, would you compare the usefulness of messages you have received from, on the one hand - the lecturers teaching you, and on the other hand - your fellow students? Try to think of and briefly describe examples of kinds of messages you may have found useful from each of these two sources.*

Level 1 Females: **Useful message sources**

F1-1-m It is useful for lecturer's to email students as it is quicker and easier than having to look on a message board, also more students are more lickly to check their mailbox than a message board. As for mail from students it's handy if you need to get in contact with someone really quickly, for example, if you dont live in halls and you need to get in contact with someone there, but you dont know where they stay, or vice versa.

F1-2-1: I think the messages I have recieved form lecturers and students have been very useful. For example, I have recieved messages from lecturers telling me of cancelled lectures and I have recieved messages from students arranging meetings,etc.

F1-3-1: I have found that the useful messages I have received tend to have com from lecturers. They may have been about tasks that had to be completed or lecture times or notes. I haven't necessarily found the messages that have come from students particularly useful, mainly because there haven't been many. When there has been some they have generally been about sporting events that I am not interested in.

F1-4-m: I've received two or three messages from the lecturers themselves. The are a great help, in that they allow us to plan around cancelled lectures, or amend course reqs. as for Mark Percival's second Popular Music essay title. Messages from students are often funnier, though :)

F1-5-h: I actually haven't received too many e-mails from lecturers other than from George McMurdo, but those have been quite useful. They are to the point, and targeted to the students that actually need the information given in the e-mail. Others just send out e-mails to the entire student population, when they only need to reach a few. This also goes for fellow students - some have been good at using the relevant available mailing lists or making their own, while others just don't seem to care who needs the message and whose mailboxes it will just contribute to filling up. Really annoying! Again good intentions, but does not always work as well in practice.

F1-6-h: I found the emails sent by George McMurdo for the CIE very useful as there were loads of useful web page addresses in it, which made it easier to work on your task. He described problems that other students had in his really clearly emails and responded to them in an informal and clear kind of a way, so that made it easier to detect poblems and solve them. What I found useful emails from fellow students were the ones that gave me specific information on where we were supposed to meet, how to solve certain problems with certain tasks, etc.

Level 1 Males: **Useful message sources**

M1-1-h: Apart from the repeating messages, my email has proved to be quite useful, we were notified of a class night out by our lecturers. So far I have not used the college e-mail to keep in touch with other students but mainly because the ones I need to keep in contact with are the ones I see everyday, I am sure that this will change in the coming years especially when we start to make course choices and people move away from halls of residence. The e-mails from George McMurdo have been useful in the computing and information module. Is it possible for library to notify you of overdue books on e-mail, if not this would be quite a useful alternative to sending out letters to your house.

M1-2-1: The email that I receive from lecturers is usually regarding course wo notes or class time changes etc. This is obviously useful in the continuation of the course. However email from other students is usually less useful as it is usually just to kill time for this person or to send funny stuff around.

M1-3-m: My use of the e-mail system differs greatly depending on whether it is for communicating with lecturers or friends. When used for friends, it is especially useful for planning meetings for group work, planning social meetings or for simply keeping in touch. When used to communicate with lecturers it is useful for keeping up to date with class times and getting notes for classes ahead of time.

M1-4-h: I have found e-mails from lecturers very useful as they are usually to the point and relevant to things I am studying. However, some student e-mails are not relevant and not necessarily intended for me. I often get e-mails that have been sent to the wrong destination, i.e my seminar group, or sent to everybody in the campus as a result of poor understanding of the use of e-mails.

M1-5-m: I think the e-mail is useful for situations where a lecturer can not take a lecture and can e-mail their students well in advance. This has saved me from going to class and waiting outside for ages to find out I could have been doing something else. Students can also e-mail each other to tell them what is going on.

M1-6-1: I have always found the messages from lectures alot more useful than ones from fellow students but their ones are, alot more amusing and enjoyable to read. While lectures send ones which are informative and help you, i dont look forward to a e-mail about cie as much as i do a joke from a fellow student.

Level 3 Females: **Useful message sources**

F3-1-m: E-mails from Lecturers are mostly relevant and beneficial to me unless it is about a particular module that I have not undertaken. E-mailing can be used to clarify queries e.g what room a lecture is in, to actually dealing with part of an assignment. E-mailing from lecturers are useful as they can provide you with further work e.g. readings or important information regarding your week to week lectures or seminars. Recently, I have been e-mailing Kathy Buckner concerning a few changes in my placement, I felt that a meeting was not required and it could be addressed over the e-mail, this was useful to me. When considering fellow students, it can be a quick and useful method of communicating something to a large audience, however most of the time, I feel that they are not relevant to me.

F3-2-h: Messages from lecturers are generally useful as they can contain information relating to a particular module (course lecture notes or prompts/reminders for things to be done), the IM degree or something relevant to either a module or the degree (professional bodies, committee meetings or awards to be won). Messages from fellow students can at times be very useful as information and solutions to problems can often be circulated via year lists or among the group you are working in, or from one student to another. So both sources can provide useful information and irrelevant information, so you need to judge the message and not just the source.

F3-3-m: The messages from lecturers are almost always of importance. The information contained in these could include details of the forthcoming lecture, module details, assignment specs on general messages. I recently received an email from Jim Herring stating that he had a list of times outside his office door for us to make appointments with him to discuss our assignment, so this was obviously very useful. Messages from students are generally not important. Most of the time it is about items for sale, jokes, rooms for rent etc. The most recent one I received was a chain letter telling me to send out 10 messages or not so nice things would happen. This was swiftly deleted!

F3-4-l: Generally messages from other students are to let you know about group work or what topics they are picking for specific things. Lecturers on the other hand are more inclined to mail you about submission dates or aspects of work that you have to do. I don't think you can compare the two as they are both useful in their own way.

F3-5-h: I find each e-mail author has a different agenda. A QMUC lecturer for example often uses discussion lists to inform their students about their module. It s often quite formal but very useful especially if they are cancelling a 9.15 class! A fellow student however is often sending a query or an extra bit of information about a module and more often than not a wee bit of gossip!

F3-6-l: I feel that messages from lecturers are very important because they ca save a lot of time; for example if a class was cancelled then it would be very helpful if the lecturer was able to send this information to the class beforehand. As for messages from other students I think that this depends on the content of the messages; for example it can be very useful in relation to group work projects, although it can also be very annoying as regards messages which are just sent out to no particular user.

Level3 Males: **Useful message sources**

M3-1-m: Messages from lecturers are no doubt useful, as they'd directly relat to the course. For example, assignment specs, room changes, later amendments to assignment specs, etc. Messages from students, on the other hand, could either be useful or not-so-useful. There could be times when students actually provide better info by asking lecturer to clarify something and then passing response onto e-mailing list to all fellows, who might be wondering about the same subject as well.

M3-2-h: E-mail messages from lecturers are often very important. Lecturers te not to use e-mail unless this is the case and the student is required to know or respond to something. Fellow students' messages are more likely to be less important (except in the case of coursework issues, for example, groupwork meetings). I received an e-mail from Denny Collie concerning times to meet to have a one-to-one tutorial for my B.I.S.M. assignment. As Denny Collie is only in on Mondays, it would have been very difficult to arrange this with him otherwise. I received an e-mail from a fellow student concerning changes to be made to a piece of group coursework which we were working on. As the student was in Northern Ireland when she sent this, it would have been difficult for me to get it from her otherwise. Often messages from other students (to the "All Students" list are not of use to me (for example, the latest hockey practice times) but occasionally there is something useful for sale or to know about.

M3-3-l: It really depends. I invariably read messages from the lecturers as i usually turns out to be useful, i.e. assignment information, lecture notes, etc. Lecturers such as Jim Herring and Virginia Cano are (usually) pretty good at sending useful information via e-mail. However, they do occasionally send irrelevant information on the e-mail. As to whether student e-mails are useful, again it depends. When i am doing group work the e-mail often proves invaluable for maintaining contact with the other members, distributing information and arranging meetings. Students often pass along some useful information using e-mail. However, a lot of the messages that students send are irrelevant. They send out jokes, advertisements etc. These messages are occasionally amusing and interesting but are rarely useful.

M3-4-m: The value of a message from a particular source depends on a lot of things and in my experience messages from students have never been any less useful than those from lecturers. In a module where online delivery is emphasised then e-mails from that lecturer are obviously important but other modules usually use e-mail/web pages etc. to reiterate points they've already made in class or in printed notes. The conversational aspect of student e-mail shouldn't undermine it's usefulness, when you're discussing work then the messages themselves are important but when you're just chatting you're networking and having fun. So, in a way, no message is really unimportant.

M3-5-h: The usefulness of lecturers e-mail? They are of good value they help clarify questions or doubts students have with lectures or coursework. Others are informative and help us understand the subject better. An example of this s when our marketing lecturer e-mailed the class an electronic article related to electronic sales. Student e-mails on the other hand are most of the time 'junk'. Rarely is there a message from the student that helps you out, mostly they are trying to sell something or passing on chain mail. One useful e-mail i remember receiving from a student was about a question they had about an assignment and they e-mailed the reply they got from the lecturer to the class and it helped us all.

M3-6-l: As I said a little bit in aspect 2, I have found it very valuable to have information about classes on the e-mail system. Emma Wood was out of town for a week, and she was able to reschedule classes for that week, by getting a hold of many of us at once, and getting our feedback on which days would be good for us. It was very helpful.

App.3.3 Message destinations: *How do you feel about e-mailing to your lecturers - by your own choice, as opposed to instances in which perhaps a coursework task requires you to? E-mail makes lecturers easily 'accessible' or 'approachable' in a sense, but is this so in reality? How would you feel about e-mailing a lecturer on a coursework matter, or something more 'conversational' compared with e-mailing a fellow student?*

Level 1 Females: Message destinations	*Level 1 Males:* Message destinations
F1-1-m I don't mind emailing my lecturer's if I have to. It is better than making an appointment and it is also quicker. So for practical reasons it is much easier for me to do this if I have to. ***F1-2-1:*** I have never e-mailed any of my lecturers yet as there has been no nee to do so. If I have a problem I would go and see them personally. I would have personal matter. ***F1-3-1:*** Atually although this may sound strange I prefer to e-mail a lecturer particularly about a coursework matter rather than having to meet them face to f them much more approachable particularly if you want to ask a question. ***F1-4-m:*** I've never emailed my lecturers, to discuss or otherwise. It is a good idea in that it guarantees that your message is sent, but it does not guarantee that it will be read as fast. However, since email is a major form of communication within QMUC, I would suppose that it is a useful idea :) ***F1-5-h:*** I have e-mailed lecturers several times, mostly having to do with questions about current assignments. I think it is a unique opportunity to get i them fast and without having to search the Campus. On the other hand: What if th their e-mail that often? And what if they don't bother to read yours, or let alo to it? I think it's a great way of communicating, but for it to work properly, i that everybody makes an effort. Unfortunately that is not always the case... ***F1-6-h:*** I personally prefer face to face contact. Using email to ask something seems so very impersonal. It (this impersonal side) is handy during newsgroups, I find. But when it comes to asking someone a favour I prefer approaching someone in person. So that restricts me sending emails to lecturers.	***M1-1-h:*** So far i have had no reason to e-mail any of my lecturers, but i dont see that it would be a problem, most of my teachers are available for face to face meetings if i need to see them, so i think the option of being able to e-mail them is an advantage. Sometimes you may only need to ask them something simple whivch doesn't require such formal meeting,so an e-mail would be perfect. As long as lecturers remain available to the students, e-mail is a perfect alternative. ***M1-2-1:*** I have had to e-mail lecturers on several occasions regarding not bein able to attend classes etc and I have no real problem with it. However, I would not be inclined to use e-mail to lecturers in the same way that I email other students ***M1-3-m:*** I would be reasonably comfortable using e-mail to communicate with lecturers, I have used e-mail for some time for business purposes and so can appreciate its time saving advantages. But, One must be sure that everyone will check their mail at least once a day and this is where problems may arise. ***M1-4-h:*** I have never e-mailed my lecturers. This is probably because I am unfamiliar not only with e-mail techniques but with my lecturers as well. If I wish to contact my lecturers I will see them in person as I see this as a more respectful and personal way of dealing with someone in that position. ***M1-5-m:*** I like the idea of being able to e-mail my lecturers because it means I have any quores or difficulties with the course I can ask questions without being embarrassed or feeling stupid. I have not yet used this facility but I no doubt will in th e next semester. ***M1-6-1:*** Personally i like to actually meet the lecturer and talk over any problems which i have with the course or any pieces of course work, because you can question and ask for something to be explained again.. However, it is good though to have the facility for emergencies, and can be a great use if you need immidiate help.

Level 3 Females: Message destinations

F3-1-m: I feel it is easier to communicate in most circumstances by e-mail. Normally, when I e-mail a lecturer - when not actually required to - I find it easier to prepare the question or query that I want to ask and make more effort towards phrasing it. I feel that it depends on the actual lecturer, whether he/she responds quickly or whether it would be more suitable to approach them personally. Lastly, I believe that with the use of e-mail, it helps to avoid disrupting the lecturer. When he/she is viewing e-mail, they are devoting the time to deal with and reply to the e-mails, however, it is hard to assume that a lecturer is not busy and can be interruptedin an office.

F3-2-h: If I need to communicate with a lecturer then I will either e-mail the or talk to them face-to-face. My decision on which communication method to use depends on the message content, the lecturer in question, the circumstances and the time factor. Some lecturers respond quickly and efficiently to e-mails which is great and does make them 'accessible' in the contactable sense. Whilst others are slow to respond or do not respond and the face-to-face communication method promotes an immediate respond. The benefit of e-mails in relation to course work is that you have a record of your communication. I have e-mailed lecturers on matters relating to 'course work' and something more 'conversational'.

F3-3-m: This is something that I do on a regular basis, both for course work for any general queries that I may have. I feel extremely comfortable about emailing lecturers. It definitely makes them more accessible, for example if you had an important question and the lecturer was not in their room, you can email them for which they can reply as soon as they can. Problems only occur when the lecturer does not check their email very often, or if they don't reply to messages sent. However, in my experiences this is not a problem. I don't email fellow student's that often, probably because I see them during classes, but I would for any matters of importance, not general chat.

F3-4-1: I would much rather e-mail a lecturer than talk to them personally. I find it more comfortable and I can be more inquizative about what I say and make sure I include everything. I believe that they are far more approachible and accessible this way. I think you can e-mail lecturers on a conversational level if you can talk to them on a conversational level.

F3-5-h: E-mailing a lecturer adds an extra dimension to student/staff communication. It is a fun method of sharing information whether it is trivial or important news. It seems a much less intrusive and time efficient method to communicate compared to organising appointments and disturbing someone in their office. Maybe it is because we can write in note form rather than full sentences! It is important to remember that when e-mailing a lecturer you are still talking to another person and not to another computer.

F3-6-1: I feel that email is very important as regards lecturers as they tend to be quite unattainable at times. When you are completing course work it is often useful to be able to send a quick query to a lecturer instead of trying to arrange a time to suit both yourself and the selected lecturer.

Level 3 Males: Message destinations

M3-1-m: If encounter a problem or a particular question about an assignment, then I'd e-mail a lecturer asking for information. I think that's as legitimate as e-mailing to comply with a module specific requirement. That's what the e-mail is for, after all :). Lecturers easily "accessible" by e-mail? Hmm... could be. But that would probably depend on the nature of the request/query. There could be lecturers who take long to reply or prothvide very short info - these are the cases when it's better to approach them in class or their office. E-mailing to a lecturer on a coursework matter seems something natural, doesn't it? I try not to bother fellow students though, unless required by module (group work matters, etc). Something more "conversational"? Yeah, that would probably be easier in e-mail, but that all depends and could vary among individual cases. The same could be done with a fellow student, if appropriate (e.g. related to course work, university matters, etc). :)

M3-2-h: I feel totally comfortable e-mailing lecturers. I think that being ab to e-mail them does make them more accessible, although I don't really mind whether I e-mail them or speak to them in person. Although sometimes it does depend upon the lecturer, the question and the degree of feedback that might be required by the answer. It does not matter to me whether I e-mail lecturers about coursework matters or just to chat about something, although I make it a point not to do both in the same e-mail. If the coursework matter was urgent I would rather try to find and speak to them in person, however occasionally in these situations, e-mail can turn out to be faster if the lecturer is proving difficult to track down.

M3-3-1: I rarely e-mail lecturers with questions. Usually, when I want to tal to them I prefer to meet them face-to-face. If I had a specific query that would only require a short answer then I would e-mail them the question. I also use the e-mail often for making appointments with lecturers. It can be useful to use e-mail to contact a lecturer who is not in college every day but my personal preference is not to use it.

M3-4-m: I've never had any problems e-mailing lecturers either with course related stuff or more conversational stuff, although the latter depends on the lecturer. I don't really think I've ever been aware of thinking any differently of e-mailing a lecturer instead of another student although I suppose I send more conversational stuff and less work stuff to other students whereas with lecturers it's the other way round.

M3-5-h: I feel totally at ease with e-mailing lecturers as long it is a valid reason relating to the course or assignment. I think this is just the same as part of a coursework task. In some cases it makes them more accessible but this depends on the lecturer as for more approachable i think this is not the case. I feel e-mail is not the same as seeing them face to face as with e-mail the message is sometimes misunderstood or you have forgot to say something etc and you then have to e-mail again. Where in 'reality' you are having a chat and things seem to flow better and you ask more questions as time passes that you may not have asked over e-mail. E-mailing a lecturer on a course work matter seems totally natural, that is one of the reasons for e-mail after all. As for 'conversations' i tend not to use e-mail for this purpose with students or lecturers as i would rather do this in 'reality' e-mail for me is more of a message sender and receiver than a means of chatting.

M3-6-1: I think it's great to have access to lecturers through e-mail. I'm fairly comfortable writing e-mails, but haven't really had a need to do so since I've been here. I do, however, appreciate the fact that the lecturers can get a hold of us simply and quickly if a class or schedule is changed.

App.3.4 Valuing CMC categories: *What kinds of information delivered via CMC - either by e-mail, newsgroup conferences, or Web pages - do you find most valuable, and why? Are there categories of information you can think of which it would be valuable to have provided, which isn't at present.*

Level 1 Females: Valuing CMC categories

F1-1-m I would find that emailing information about lecture's and tutorials better than up on notice boards. You are more likely to pay attention to your inbox than a notice board. I would say that I find email most valuable to me or I would not be able to stay in contact with my friends as regularly as I am able to through email.

F1-2-l: I find the messages concerning my Computing workshop most valuable as they let me know where I should be in my work and each task is explained. This helps me a great deal. I can not think of any other information I would need to have provided.

F1-3-l: I have found e-mail very useful indeed. In particular the e-mails fro certain lecturers giving us the lecture notes for the next week. This is very useful when you cannot make the class. It is also a useful way of contacting lecturers with urgent questions.

F1-4-m: I would say that email and Webpages are the things I find most helpful in the realm of Computer-Mediated Communication. Email, because we are told the lessons for the following week, as for the CIE module, and webpages... well, because they give us access to other people's sources of information - that is to say, they allow us to know things that we may have not known before, and that's very useful.

F1-5-h: Extremely hard question! It depends on your individual situation, I guess! I mean, right now I would definately say that E-mail is the feature I'd keep if I had to chose right now, because it's such a great way to keep in touch with your friends & family - even lecturers and fellow students. As a student, however, Webpages are really useful as a source of information for your studies (in addition to all the fun stuff hehe*), so I want that too. Newsgroups are in my opinion the most expandable of the three, but I really find that they're helpful to my studies as well! There probably are a lot of aspects of information that would be good as CMC, but I can't think of any right now, so...

F1-6-h: I personally find information in the form of links to other pages (with more explanation) very valuable. Just one click on your mouse button and there you are, more information. Brilliant ! I like it in e-mail, web pages, news groups, you name it... I like it ! George's e-mail I found very valuable as they contained links as well, so you could go back to the Workbook of CIE 1, if you forgot to take your own Workbook handout or you could check out all these colour numbers for (the background of) your home page, etc. So more links *Please* (I'm a curious person you see)!

Level 1 Males: Valuing CMC categories

M1-1-h: The emails sent by George McMurdo have been usefull in completing the computing and the information environment course as I found the module handbook very badly designed and not very clear. the few e-mails i have had from other lecturers have been useful too, e.g. I was notified by e-mail that Emma wood was not in last week and I had been hoping to arrange a meeting with her, this saved me the time of trying to find her. The newsgroups are also quite interesting but I think the links to the nifty fifty web addresses have been useful. I think that there should be more links to sites that relate to the courses that we are doing. for example i spent ages trying to find useful sites for my Media practice class, some links or addresses provided by the tutors would have benn helpful.

M1-2-l: The mail received from lecturers regarding course work or lecture note for an upcoming task are probably the most useful. Some lecturers web pages give information regarding the course or assignments due in giving advice or guidelines. The newsgroups are not especially useful since I never used them.

M1-3-m: For me, the single most important e-mail I receive is the lecture outline from Jim Herring. This allows me to prepare in advance for the class. If this was available for more of the classes (not necessarily all of them) it would be very useful.

M1-4-h: I often get e-mails from George McMurdo which are very helpful as they relate exactly to what I am using the computers for. However, I don't get many other regular e-mails, and so it is difficult for me to comment on the usefulness or the interaction.

M1-5-m: I think the most valuable information that is sent via e-mail is information that your tutors and lecturers can send you before classes. This means that you can look up things in advance which helps your studies. A good idea would be if it was possible to retrieve messages off a message board if you accidently deleted them.

M1-6-l: I always found the e-mails from George particularly useful as they ke me on track as to where in the book i was supposed to be and how much time i had to do each task. I think that the tasks which were put on the jimmy pages should have contained more information and help as to how to complete the various tasks.

Level 3 Females: **Valuing CMC categories**	*Level3 Males:* **Valuing CMC categories**
F3-1-m: I find that all these sources of communication are very valuable and help to improve and advance the ease of communication. However, I am likely to consider e-mailing the most important as I use it on a day to day basis and consider e-mailing one of the most effective methods of CMC. On the other hand, it is only effective if replys are sent back. Newsgroup discussions are also important, especially when it is a topic of concern or interest to the individual.	***M3-1-m:*** Generally, info we get by e-mail / WWW would be closer to one's needs than, say hard-copy sources. Time crucial information is better off by e-mail, if one doesn't have recepient's phone number. This year's WDP subject books happen to be useful, as a few of them deal almost directly with areas overlaping other modules' assignments: e.g. there're subject books by IMJ students that deal with HCI and usability issues - just on topic for HCI assignment :).
F3-2-h: This semester I have found the Scout Reports and the Search Engine Reports the most valuable as a source of current information covering Search Engine developments (my research topic). If it was not delivered by CMC then I would probably never see the reports. In addition the information provided via e-mail messages and web pages that provide links to other sites or just simply provide relevant information at the right time are valuable. With reference to categories of information that would be valuable to provide via CMC, I can't think of any at the moment.	***M3-2-h:*** I find that the most valuable type of information delivered by CMC is information relating to coursework issues. It is this information which I require most importantly. Whether it be e-mails and newsgroup messages concerning groupwork and assignment deadlines or WDP assignment specifications and step-by-step guides online. There are no categories I can think of at the time which are not provided for.
F3-3-m: Using email and the World Wide Web to send, receive and analyse data extremely important and valuable. I was able to get in touch with fellow group members in an assignment through email, as I did not have their phone numbers. Surfing the web to find ten "bookmarks" for my WDP assignment also greatly helped me, as I decided to do my Healthcare assignment on the same subject - Data Protection in the NHS.	***M3-3-l:*** I find the World Wide Web and the e-mail invaluable for distributing information. They are great for distributing up-to-date information on a wide variety of sources. E-mail is useful for group work, of which there has been a lot in this smester, due to everyone having access to it. It is quick, effective & allows access to people whom it would otherwise be difficult to contact. The World Wide Web has been invaluable this semster and has provided a gret deal of information for my own web-page for the WDP module.
F3-4-l: I think that the most valuable kind of information delivered via CMC would probably be related to your course, for example, assignment specifications, reading lists, submission dates etc. This way, the information is always accessible to you and you do not need to worry about losing paper formats.	***M3-4-m:*** The web is my favourite information source since it is so large and ca be searched reasonably well. E-mail is best in my opinion for personal and time critical information. I expect my e-mail to be personal to me or of use to me. I have found newsgroups very helpful for putting questions to larger groups. I can't think of any kinds of information that I'd like to have delivered via CMC that aren't already.
F3-5-h: Up to the minute real time information is the most valuable to me. A look at the CNN website to find out up to the minute news. There are also e-mail alert services that announce changes in websites and news bulletins. CMC provides many ways of keeping the user up to date. For example Teletext and local radio stations can now be accessed via the Internet anywhere in the world. I cannot think of any category that the Internet does not cover. The past twelve months alone have seen the Internet grow at a fantastic rate.	***M3-5-h:*** I find WWW info most valuable, e-mail and newsgroups etc are helpful a useful as well in time situations. I think this because there is such a variety available on the WWW that it is of great help and benefit in my course. Doing my top ten for WDP showed just how much information there is available at our finger tips the only problem being shifting through it all. I don't think more information would be valuable just better quality and an easier way of finding it. I can not think of an area than is not represented on the WWW
F3-6-l: In my opinion I find that information which either confirms meetings with lecturers and other students regarding course work is very valuable.I also find that the actual knowledge that the lecturer is only an e-mail away should I need to contact him is also very reasurring. I do not feel that there is anything at present which is not included in the e-mail system that could be provided for.	***M3-6-l:*** The only information I have found interesting is through the WDP assignments and the Scout reports. I remember a while ago, though, that there was a Netsurfer magazine, and I found that very interesting. It hasn't been on in a while, though, so I've been mainly interested in just finding out what is going on in WDP.

App.3.5 Opinions about computing: *Do you feel it is important to have the opportunity to experiment with new kinds of computer systems which may be available? Or, do you alternatively feel that the important thing is to get your various course-related tasks done and that the technology is not that important, so long as it's adequate for the tasks which require it?*

Level 1 Females: Opinions about computing

F1-1-m I think you should have both. The college should have the technology i all of the workshops for what ever level of computing you are studying or using. There should also be the technology available to those who want to use it, as the work place and society becomes more computer dependant I feel it's important to know about this technology.

F1-2-1: I think it is very mportant to be able to experiment with new kind of computer systems as it will help you to understand it in more depth. I also think that the course-related work is just as important but experimenting will help with this.

F1-3-1: I feel that although at the moment all I want to concentrate on is getting the tasks completed and frankly couldn't care less about the technology, it may be useful in the future to be exposed to different types of computer technolgy. This would have to be done when we are all a little less panicked about assignments- now is not a good time to confuse things further- but I feel it could be important since we may have to use other types of technology in the workplace.

F1-4-m: For me, it is very important to have the opportunity to be able to loo at, use, and experiment with different, newer, types of programs and facilities. The computing world is changing all the time and that's not to say that programs we use now will become upgraded or even somewhat outdated in the future.

F1-5-h: I think that as long as your equipment is suitable for the taks it is ok, but I also like to have the opportunity to learn new things and see how the tasks might be done easier. It's also important with reference to future employers; they might require you to have vast knowledge of all sorts of different technology, and not just the one that gives you the minimum of what you need for the task at hand. The developments within computer technology is so rapid that it is imporssible to keep up to date. But certain features should be followed up by the educational institutions so that the students aren't too far behind already when they graduate!

F1-6-h: I think it is in our advantage to be able to experiment with new kinds of computer systems. It doesn't have to mean that you _have_ to use them, but at least you _know how_ to use them, so that you don't have to panic when you're confronted with that new technology, let's say in your future job. And I think that we as Communication Studies students really should know what is going on in the ICT (Information Communication Technology) world, because we will have to work those new technologies available in the future (in the mass media, in the advertisement business, etc.), whether you like it or not. Experimenting with new kinds of computer systems also means getting more comfortable with them. So definitely thumbs up if you ask me !

Level 1 Males: Opinions about computing

M1-1-h: I think it is really important to experiment with new computer systems and software. The reason i choose this course as opposed to other courses was that i thought as it was a more vocational course and would probably give me a better chance of a job at the end. For this to true i need to keep up to date with the current technology in computers which is so important in the workplace. Being experienced with current technology in computers will give me an advantage when going for jobs.

M1-2-1: I think that it is important for people to get to know various differe types of system however all the machines available should be set up so that the person has the choice what system to use. It is true, however, that the technology is not so important as long as it is capable of doing what has been set out for the person to complete the task.

M1-3-m: I believe that, due to the incredible number of computer systems available and the rate at which these develop, that it would be counter-productive to try to learn all of these. It is more important to have a firm grasp of the ideas behind them and learn about the individual systems as and when required.

M1-4-h: I think it is very important that a module like this is available so that people become more familiar with computers. In the working world, computers are prominent in most lines of work, and if you are not experienced with computers then you will be left behind in the big bad world.

M1-5-m: I think it is good to be able to use different types of technology. After all in a few years the things that seem a bit over the top will be what we use everyday. However I also think that it is important to get the course work done as efficiantly as possible therefore if you can use old technology then why not?

M1-6-1: Personally i think that both getting the tasks done and experimenting with various systems are important as both are important. However at this stage i feel that it is important that all first years concentrate on getting the tasks done and leave experimentation till later on in the course.

Level 3 Females: **Opinions about computing**

F3-1-m: I am a believer of experimenting, when it is conducted within the righ envirnorment at the right time. It is fair to say that my main aim working with computers, especially at the end of term is to get the work done. However, when doing the IM degree, I feel that it is expected that graduates are aware of differing and advanced software and technology and would be a benefit to say that we have been involved in some way or another with the most recent and innovative.

F3-2-h: In general most students including some IM students would probably agr with your later statement that the important thing is to get their course-related tasks done and that the technology is not that important. However in order for student computing skills to be transferable and of relevance, particularly IM students, then in addition to industry standard computing systems, the opportunity to experiment with new kinds of computer systems which may be available, should be available within QMUC. This is of particular relevance for those students who wish to work in this area and thus need to expand their computing skills and knowledge.

F3-3-m: I enjoy experimenting with new systems, finding out about new ideas, technology and developments. I would be happy to use any new or old systems.... HOWEVER The most important thing is that the system is reliable. At the end of the day, during the assignment time I want a system which will not crash on me, do what I want it to do, and print out an end product. As I'm not a computer expert, reliability is of number one importance, but why not have the opportunity to experiment as well?

F3-4-l: I am not very experimentally minded when it comes to computers - they confuse me alot. I feel, for me personally, that you should get your course work out of the way first before you start doing other stuff. You should however know how to use the technology that you have to use.

F3-5-h: I feel it is very important to be aware of how technology is changing be able to access, learn and be kept up to date about new technology. It is imperative to an Information Management undergraduate. Getting various course-related tasks done is important. However in an interview or on a job application a prospective employer probably doesn't want to know if you got 55% or 65% in a module. What they do want to know is did you pass it and are you already trained in the technology they use within their organisation?

F3-6-l: I feel that in the my chosen profession it very important to constantl keep in touch with new developments in technology. There should be an opportunity to pratice on packages which are not included in the course work. In the emerging world of information technology it is also very important to a have a platform of skills working with most of the best known packages in the working world

Level3 Males: **Opinions about computing**

M3-1-m: If I understand the question correct, then, I think, training for lat "hot" technology could be included into IM course as a separate module. I might be a little wrong, but for the today's Web-driven (e-commerce) environment where everything seems to be striving for that "e-" prefix, knowledge or at least familliartiy with UNIX (and its variations) operating system is crucial. Why? Because the core of the Web is on UNIX servers. Vast ammount of scripts for CGI and SSI stuff appear to be written for UNIX-based platforms. How about re-equipping that Room 566, currently Mac lab, into a UNIX lab? :)) As for course-related side, recent types of NT glitches, user profiles go screwed and this time not only for Outlook but the general settings: printers, defaults for MS Office and IE. That's why lately I notice printers halt demanding different paper format... That's, of course, doesn't really allow to get even the course work done.

M3-2-h: I feel it is very important to experiment with new types of computer systems (maybe get a chance to use UNIX (certainly new to us) or Linux) but I feel that the most important thing is definitely to get course-related tasks done. The technology is not as important, as long as it IS adequate to complete the task and works properly when required to do something.

M3-3-l: I feel that the most important thing is to get the work done, forget about the system. However, I think that a certain level of experimentation is useful and should be encouraged. I think the computer systems available should most of all be reliable. I think that some of the network problems we have had this year have been caused by the transition to the new system in the IT centre. I don't know what the answer is, but if I had to choose between getting the work done and expermenting with computer systems, I'd choose getting the work done.

M3-4-m: I think experimentation with new systems would be a great benefit to students. While it's certainly true that most of us worry first about getting our work done on time and handed in no matter what systems we're using, I can't help but think I'm not the only one who wonders what will happen when we're out in our first job confronted with a system that runs differently, has all different applications associated with it and doesn't break down a lot. I'm not sure I could cope.

M3-5-h: I think it is good to have some experience with other computer systems althought the main aim for students is to get the work done and not to think about which system we are using. If there was a larger range of systems for use to choose from it would give us valuable experience for when in placement or in full time work after college. At college is a good time to experiment with new and different systems as when you go into the work place there is no time for this and you are expected to have at least basic knowledge of the system they use.

M3-6-l: I found it quite difficult to adapt to the computer systems here. I'v done graphic design in the states, and am used to working with high power platforms like adobe photoshop and illustrator. Paintshop and Photoeditor are dinosaurs, and hardly user friendly.

App.3.6 Comparing CMC with face-to-face: ***Do you find it valuable that in CMC you have the ability to reflect before responding at a time when you are ready to? (That is, compared with a face-to-face seminar situation where your response would have to be fairly immediate.)***

Level 1 Females: Comparing CMC with face-to-face	*Level 1 Males:* Comparing CMC with face-to-face
F1-1-m I think with things like email, it gives you the time to properly thin over what is being asked of you before you reply but it depends on the question but a seminar is still the better of the two as it is more personal and direct. ***F1-2-1:*** I think it is valuable to reflect before responding as it gives you ti to find things out in depth and be able to work at your own pace and submit an answer when you are ready to do so. This is valuable as you will not be put on the spot. ***F1-3-1:*** I do think this is an important feature of CMC. It means that you hav the luxury of being able to give a considered opinion rather than just having to say the first thing that comes into your head. Also in a face to face seminar situation you have the problem of feeling that the tutor is waiting for you to reply and you feel pressured into speaking without thinking properly when someone is staring at you! Or am I just paranoid?! ***F1-4-m:*** It's useful to be able to reflect more than you would do with normal communication methods. I think I like it better than traditional communication methods - it's somehow easier. In this way, you can perhaps have the opportunity to say more than you would normally do, through the use of written words. ***F1-5-h:*** To me, there is no "right or wrong" answer as to which type of communication is better. In some cases it is a clear advantage to be able to think through your answer before you reply, which means that CMC is a good way of communicating, as it usually doesn't demand an immediate reply. It does depend on the situation and the context, though. Some times it is easier to communicate what you want verbally, as just changing your tone of voice might alter the meaning of what you're saying. Also humans pick up a huge percentage of communication through body language, which is obviously hard to achieve through writing an e-mail! There is technology that allows you to see and hear the people you are communicating with through computers, but this is not exactly widespread at the moment. I expect that it will become more and more common, though. We are getting more and more options as to how to communicate with eachother: Face to face, letters, faxes, e-mails, chat programs, etc. This way we can chose more and more what is the most appropriate means of communicating in a given situation. ***F1-6-h:*** I think it doesn't only depend on the person, but also on the situatio If I take myself for example. If I would want to let my dad know the directions of how to drive from the east of Edinburgh to Costorphine Campus I prefer sending him the details by email than going through a whole list over the phone. It is faster by email and I know he checks his email every day and I know that the message is far more clear than if I would have told him in person. If you want to reach someone because you need a lot of detailed information it would be an advance to be able to use e-mail. But if you really want to get to know someone I still think the 'old fashioned way' of meeting people in person is the best thing to do.	***M1-1-h:*** Depending on the situation, if you unsure of a topic or subject CMC would allow you time to do research and give qualified answers. However I still prefer face to face contact and have enough confidence in myself to give fairly immediate responses in most situations. I believe that CMC is a useful device but only in conjunction with interpersonal contact. ***M1-2-1:*** It is quite useful that there is time to think about a response so tha what you say is actually what you mean and a confused jumble of words which just confuses people. ***M1-3-m:*** Yes this is an important benefit of using e-mail. You have time to thi about your answers and can therefore appear more knowledgeable, there is also less risk of saying something totally wrong and embarrassing yourself. ***M1-4-h:*** I think this aspect of computers is very helpful for me. Often in face-to-face seminars, there is an uneasy silence, as people do not want to make a fool of themselves in front of their class. It is a lot easier to have the opportunity to edit what you wish to say and get it just right. ***M1-5-m:*** I do think it is valuable. It gives you time to think and write down your ideas and then see if they still look good after time. However in a one to one then I would probably say something i dont mean. ***M1-6-1:*** being able to think and reflect about what you have to say is definat an advantage. It allows you to stop and think about what you are doing and saying and gives you the opportunity to make sure that what you are saying is correct and also lowers the chance of you makin a fool of yourself.

Level 3 Females: **Comparing CMC with face-to-face**

F3-1-m: In my opinion, there are 2 sides to this point. On one hand face to face communication allows a student to ask several questions and may also ask additional questions on the basis of the answers given. Another circumstance is that some people are not too good with replying to questions on e-mail and prefer personal communication. However, I feel that with the use of e-mail, it is possible for a student to actually put thought into what he/she is trying to ask or state. It is also easier to phrase questions and not get lost, which could happen when face to face.

F3-2-h: In CMC, it can be valuable and advantages to have the ability to refle before responding to a message / request. Particularly as your answer / words are then 'set in stone' and could be misconstrued. Take these 8 aspect messages for example, because they become a permanent record you then take more time and care with what you are saying. In a face-to-face seminar the responder may feel pressurised to respond and just say the first thing they think of. They would however have the benefit of seeing the requesters body language which may provide additional information to assist them with their response/s.

F3-3-m: Both computer mediated communication and communication face-to-face h their advantages and disadvantages. Obviously communicating by, for example, email allows you time to think about what you are going to say, which may produce a better end result than having to hurry and respond under pressure. However, it is rather 'cold', and you cannot sense the respondents reactions to what you have written. Face-to-face interaction allows you to gain an instant response, and you can tell their feelings by their body language. The down side is having to think quickly about what you will say, and you can end up saying things you didn't want to, or not saying things you should have.

F3-4-l: Both ways have their advantages and disadvantages obviously. CMC allo you time to think and say exactly what you mean and get it right however, a reply may take some time. On the otherhand, a quick response may not be the correct response as the person has not had long enough to think it out properly.

F3-5-h: In some situations the time that CMC provides for us to reflect is invaluable. However while studying a module face to face seminars can provide thought provoking discussion. I find it more interesting to see the real facial expressions of folk rather than the ones they type in :-) Maybe now I am used to using newsgroups I will try and find a suitable one to join and experience some online banter!

F3-6-l: I feel that it is very important for the lecturer to form an approachable relationship with the student so that they are not hesitant in contacting the lecturer should they need to ask any questions. Although as mentioned before it is also useful to be able to consult with the lecturer without having to meet them face to face.

Level3 Males: **Comparing CMC with face-to-face**

M3-1-m: One side, yes, I feel comfortable at times that I'm not required to respond immediately, with CMC. You have the time to give more proper thought and weigh arguments better. Another side, however, might turn a disadvantage of CMC - that's when you're the one expecting response. The responder might take ages to get in touch or fail to do so altogether. Then, the 'long-suffering' 'technology' could even be blamed for distraction of communications. If that, go figure which router or server chewed-up the message...

M3-2-h: I do find it very valuable when communicating through CMC that I have the time to reflect and properly structure and word my response, especially when responding to lecturers and other "official" messages. I find however that despite this, the instantaneous "action and reaction" of face-to-face contact can be good as well. Face-to-face contact allows questions to be answered and clarification to be provided immediately, which helps speed up the learning process in seminars.

M3-3-l: I think that it is good that, with CMC you have time to reflect and to present yourself as you would wish. Face-to-face communication has to be fairly spontaneous and that can be stressful. However, with face-to-face communication you can explain more fully, you have a better interaction with the recipient and you can get a more immediate reply. If a user requires a straightforward answer to a particular query, then CMC is fine. However if the user requires any kind of in-depth interaction than face-to-face dialogue is required. Both however have their value.

M3-4-m: I think the time to reflect on your reply offered by CMC over face to face communication is incredibly valuable since you can take the time to word your questions properly and be sure of a better response. Of course face to face conversations have the benefit of being more likely to yield valuable information that you weren't aware of. For example, if you take the time to word a careful question you might get a yes/no reply whereas if you are actually talking to someone you might get a more conversational response in which you learn a lot of other things besides what you originally wanted to know.

M3-5-h: Yes I feel this is a valuable and positive part of CMC. The ability to think about what you have just done or are about to do, helps you to think that little bit deeper and with the extra time lets you be better prepared and structured in your response. The extra time to reflect and ponder also puts the responsibility on you, if mistakes were made this time allows you to investigate where they happened and how to solve them.

M3-6-l: I like the fact that I could be out of town for the weekend, come back and be able to see exactly what was going on in class by reading the e-mail from G. McM. This lack of face-to-face interaction was valuable in that manner, as well as if I ever had questions during the week, I could just e-mail George at the exact moment of the question, rather than have to hunt him down to ask it.

App.3.7 Attitudes to CMC: *An idea often proposed as a benefit of CMC is allows greater equality of participation. Does this match your experience? Can you identify instances from your experience of using CMC where you have been put off participating for some reason.*

Level 1 Females: Attitudes to CMC	*Level 1 Males:* Attitudes to CMC
F1-1-m At first when I had to use email I didn't know anything about it, this makes you nervous as everyone else seems to know so much more. Getting to know how to use things like email and the internet is a benefit for everyone. It is easier to communicate with people sometimes and faster, also for finding information for essay's and presenations it makes life alot easier. ***F1-2-1:*** I think CMC does allow greater participation because everyone in the workshop is participating to certain areas such as newsgroups. I have been put off participating when I have not fuuly understood what I was supposed to be doing. ***F1-3-1:*** I think that it does allow for greater equality of participation since using CMC is for some quieter people a lot less intimidating than in a situation where they are surrounded by other people and have to express their opinions. In the beginning when I came to QMUC I was very nervous about using basically all aspects of CMC due to lack of experience, I feel now that I am beginning to gain a bit more confidence. I therefore think that it does allow greater equality of participation but only when the technology involved is made accessible to everyone and when education is offered to everyone on the use of the technology. ***F1-4-m:*** I think CMC certainly does allow greater equality of participation within the computing world. It puts everyone on a more equal footing than they would perhaps get with normal methods, such as seminars. I think it is perhaps easier to communicate like this. ***F1-5-h:*** I think that CMC does create a greater equality in some areas, but in opinion it also creates new classification systems. Though it might no longer be the social status or shyness that are the "separating" factors, there are other factors such as computing skills to substitute them. I think that CMC does offer the opportunity of more equal participation, but not everybody will want to or be able to take advantage of it. ***F1-6-h:*** I don't think CMC necessarily has to mean more equality. Yes, it can help people who are shy or introvert to express themselves, but I don't think that's what it's about. In the CMC world there are other rules that count. In the 'face to face world' people judge each other mainly on their interpersonal communication skills, as in people who can express themselves really well verbally and/or physically are looked up to, more than people who don't have those qualities. Therefore, it's not really equal. In the 'CMC world' it's the ones who can express themselves well in typing things that get the credit. In the 'CMC world', for example in a chat room, people tend to respond more to chatters who type very quickly, don't make many/no spelling/grammar mistakes and also can express themselves very well via the computer. That would have to mean, that someone who isn't such a good speller/ writer/ typer is not treated equally to the ones who are good.	***M1-1-h:*** This could be true in many situations, people who lack confidence in class situations or a shy to express their opinions can do so in CMC. They can have their thoughts and ideas read by everybody without having to do so personally. I can relate to this when using CMC, i dont like phoning my sister in Canada in case i have to speak to her arsehole husband, so i e-mail her insted, problem solved. ***M1-2-1:*** In a CMC discussion every one who has access to the computer can contribute so people who are quite shy have the same chance to contribute as people who are not shy and do not care so much what people think of their opinion. ***M1-3-m:*** I think this may be relevant for people who may be apprehensive about speaking in class, possibly for the reasons highlighted in aspect 6. I have never been apprehensive about using CMC but in saying that I wouldn't be put off speaking in class either!! ***M1-4-h:*** This matches my experience as I can look at what other people are commenting on and adjust my opinions concurrently. It is possible to put over your opinions without facing the prospect of instant ridicule. ***M1-5-m:*** When I first started my computing module i was a bit intimidated by it all. I rarely used the internet as I did not have a computer at home. I would sometimes take a more back seated approach. However now i feel much more confident and I can participate in class knowing that I understand what I am saying. ***M1-6-1:*** There were occasions where i did feel wary of using the computers because i did not understand what i was supposed to do, but never to the extent where i refused or was scared to participate. Generally i have been happy to learn about computers and so have been happy to do all tasks.

Level 3 Females: **Attitudes to CMC**	*Level3 Males:* **Attitudes to CMC**
F3-1-m: I feel that CMC does give most students an opportunity to equally participate. I think that this helps certain people who are not great communicators, when it comes to personal face to face basis, this aspect allows most individuals to participate without feeling any inequality whatsoever. I cannot think of an example that has put me off participating within CMC. However, when it comes to paticipating within discussion groups, I would not feel like I had anything of value to say, therefore would keep away. ***F3-2-h:*** CMC allows the opportunity for equality of participation but this does not always mean that all participation is equal. My own experience of this relates to the UKOLUG discussion list where as a member I have the same opportunity for equality of participation. However as a new member to the discussion list and to the profession I felt that my contribution would not be on an equal footing / level of participation. It was only after persuasion / encouragement that I posted a message after a lot of thought into the usefulness of my contribution (rather than just asking for information) that I carefully worded my message. ***F3-3-m:*** When you are using email or discussion groups, it is obvious that nob can see who you are or know everything about you, so eveybody is in the same boat as far as age, sex or class is concerned. It is rather off putting generally when the systems are not working as they should, such as not being able to log on, crashing half way through etc. The gamble that you take when in a discussion group is that the person who describes them self as a research assistant for a certain company may in fact be something completely different - you just don't know. They can provide valuable information though. ***F3-4-l:*** CMC can develop a sence of participation especially if you are participating with people of an equal level. Discussion may or may not add to this sense of participation. From Experience I have seen that sometimes in discussion lists people ignore you and do not even pick up on what you say - that can be a bit of a let down. ***F3-5-h:*** I think there is equality of participation for those who can get acces the appropriate technology to participate! Lack of access and lack of education leads to folk not knowing what different methods of communication are available to them. I have always steered clear of newsgroups until I studied the WDP module. But now I know what they are all about, I reckon I could pop up anywhere! ***F3-6-l:*** I often feel that communication via CMC is often hindered by a lack of knowledge on the users part. Many people including myself find that the instructions given to complete some forms of CMC communications are often vague and unhelpful. This would deter many users from using CMC to its full potiental.	***M3-1-m:*** When using discussion forums, boards, IRC, etc. often it does seem li everybody out there (inc. you) are all of the same equality. There's no age, gender, status, race, location, ... nothing... But that's with environments where users' identification is via nicknames/handles. But that could be different with e-mail where it is 'usually' required or accepted normal to use real names (at least more meaningful than one word 'nicks'). Also, e-mail might be the less informal type of CMC. Have I been put off participating using CMC? Yes, a number of times. Mostly due to technical problems (sure, let's mention, one more time, the QMUC ITC experiences with non-starting Outlooks and non-compatible Netscape Mails). ***M3-2-h:*** I believe that CMC does allow greater equality of participation. Anyo is able to participate (as long as they have the correct equipment) in (most) discussions in newsgroups or e-mail discussion lists. However the problem with this is that (as always on the web) there is no real validity provided for what someone says. Someone claiming to be a nuclear physicist could be a ten year old boy - although admittedly, the charade would probably not last long in a newsgroup discussion. I am often put off asking questions of people in newsgroups because they always seem to know much more than me. Either that or there has been a flame war going on between users or they have been deep in conversation about the subject I wish to ask a superficial question about. ***M3-3-l:*** I think that the advantage of CMC is that no-one out there actually knows who you are. As a result people can only make judgements related to what you write on the list. This means in theory that CMC allows for greater equality then might be possible elsewhere. However, in my experience, a lot of lists are populated by real specialists on a subject. This can cause a lack of confidence, the perception that all the other members of the list know so much more about the subject then you do. However it can be useful having access to the knowledge of these experts. ***M3-4-m:*** I'm not entirely sure that CMC does allow greater equality of participation. I can think of several instances where I have ventured into a newsgroup or mailing list and found it to be little more than a clique, or worse it turns out to be in the middle of a flame war. Neither particularly beneficial to any pretence of equality. Having said that there are just as many newsgroups and mailing lists that are great fun and where people are treated well. But I think there however the potential is there for greater equality and I think in some cases that the potential is enough. ***M3-6-l:*** I haven't been here long enough to reply. However, the fact that it i less personal than a class where interchange is face to face, was a bit to get used to at first. I've never been afraid to use the e-mail system to contact a lecturer here, but I haven't really had the need to do so either.

App.3.8 Present and future use: *There are many ideas about extending the use of CMC in education, at least partly to make it more 'cost effective' and deliver learning to more students. If student-staff ratios (SSRs) were going to increase anyway, would extending the use of CMC in an effective way - NOT simply putting a lot more information online - help maintain the quality of learning which might otherwise be expected to decline as SSRs rise? How do you feel about extending the use of CMC, and which factors are most important in influencing your view?*

Level 1 Females: **Present and future use**

F1-1-m I think there should be an extended use of CMC, it is important for everyone to know how to use computers, this may improve level of communication between students and staff. I dont think that everything should be heavly dependent on computers though but they should improve things so that there is better levels of communication.

F1-2-1: I think extending the use of CMC would be a great benefit to both students and staff. I think the most important factors are that students would recieve improtant information online which would increase the quality of learning.

F1-3-1: I feel that extending the CMC available is a great idea. I think that it could up to a point compensate for the increase in student staff ratios. I do however think that there is a place for face to face tution even in this day in age particularly for students who may be struggling, in these situations it is important that staff are available as far as possible to offer the help and support needed. In that sense then I do not feel that CMC can ever fully replace meeting staff face to face on occasions.

F1-4-m: I think that the amount of CMC in education should be allowed to increase. Newsgroups such as this one have proved to be very useful to me. CMC should be used as both an aid to the teacher through websites and communication with other schools/educ. facilities as well as helping the student through the use of newsgroups, email, and websites over the WWW.

F1-6-h: I definitely do think CMC should be more accessible for everyone. Especially now that technology develops so fast. For many people it is a way to gain more chance for getting a job. It is not only useful on the work floor (as many employers probably would agree with me) but you can also use your knowledge of CMC for your private life. You can get to know more about certain interests you already have and you can communicate with friends and family (for example when you're living abroad). I personally think everyone should have some basic knowledge and skill for using the computer. If people are going to use it or not is up to them, but having the knowledge and the skills would definitely stimulate people to use the computer more often and it would give them more confidence (unbelievable, but there are so many people still 'scared' of using the computer: "Oh, I'll never learn it !", "Oh, I already know I'm going to break down the computer.", etc.).

Level 1 Males: **Present and future use**

M1-1-h: I think it is really important that they expand the use of CMC in education. Understaning CMC is going to be really important in the workplace and is an area of communictions that is going to expand in to the future. At present their is still to many people afraid of computers and CMC, this is obviusly a failure by the education authorities to teach the relvant subjects. In my opinion the cost should be a secondary issue, (although I know that it never is) as CMC is an ideal complement to education.

M1-2-1: The idea of putting more information online to try and keep up the quality of the teaching is a good one as it will enable the college to grow with out loosing its standing however this should not be allowed to degenerate into distance learning or limited teaching time given over to classes.

M1-3-m: Altho i do feel that CMC is a usefull teaching/learning tool, there is no way that it can replace face to face teaching. I would be really angry if money being spent on computers was used as an excuse to have less staff support for students.

M1-4-h: I think this would be beneficial to students if the quality of information was upheld. The main benefit this semester has been that things are to the point and not too confusing. If the module was extended work wise, then the quality and relevance may be diluted. It may be beneficial to have more staff to students, as some work has led to a few people struggling and not being able to have their queries answered immediately.

M1-5-m: Yes I think it is important to expand. Even although this can be costl many students would be very glad of it and im sure it would be used to its full potential.

M1-6-1: I think the extension of cmc has both advantages and disadvantages. would certainly be useful for mor people to learn about computers and how they work and their place in society although it is possible that student staff relations would become more distant with them relying on computers for communication.

Level 3 Females: **Present and future use**	*Level3 Males:* **Present and future use**
F3-1-m: I feel that technology - CMC - helps to enhance communication, but I d not think it would be beneficial to replace the lecturers fully. I think that it is possible to aid teaching with the help of CMC and can be seen as an attribute, but teachers should be available for advice etc. The sort of factors that influence my view is that computers would have to be fully reliable - whicxh i can say are not, face to face interaction on a social basis is needed and lastly, there is not the correct facilities e.g. no of computers. ***F3-2-h:*** The factors which most influence my view about extending the use of CM in education are probably my concerns about losing the face-to-face contact with lecturers and fellow students (that I find invaluable) that the 'cost cutting' rather than the 'cost effective' route may eventually lead to. Yes, CMC has many benefits and advantages to offer, provided everyone has the technology they need or access to it. They can then work on their studies in their own time (within the set time limits), in the comfort of their own home or in a place of their choosing but from personal experience of distance learning it can be lonely out there with no face-to-face contact. ***F3-3-m:*** I think it is plain that the most important thing in education is to ensure that teachers know what they have to teach, that the students learn what is required, and that the student/staff ratio is sensible. Computers can never replace teachers, but they can help. My own experience is I was never really taught much about computers, in fact I had never used the Internet before I came to QMUC. More computers are required in schools, and they would help teachers and students, but of course financial restrictions will determine the outcome. ***F3-4-l:*** Having looked at IT in Education for the WDP module it is clear that will benefit education and many people are all for the idea and trying to push for it. Many people wonder why computers are not widely used in eduaction anyway as it will benefit pupils. On a personal level, I believe that computers will improve learning but will never actually take over from a real person. ***F3-5-h:*** If student-staff ratios do increase it will become even harder for the lecturer to find time to speak to all the students on an individual basis. The use of discussion lists and newsgroups would help this. I think there is some scope for extending the use of CMC to benefit the students. However I feel it is important that it is kept as a learning aid and not an alternative to face to face teaching. ***F3-6-l:*** I feel that this would be a good way forward. Although I also feel that there are a number of areas which would need to be addressed if this is to happen. Proper training must be provided and the information which is to be made available should be of high academic quality.	***M3-1-m:*** Can't really comment much on SSRs and CMC use increase since I'm not very informed about IT penetration in UK Education. Still, human teachers shouldn't be replaced in any case. However, the exercise books (hard-copy), blackboards, notice boards and diaries could be replaced by IT - as well as other "old" elements. As for the life in general, I do expect increased use of CMC in future. That's mainly up to hardware now to become more accessible to households and every individual. The sofware, concepts (i.e. e-mail, discussion lists, IRC, VoiceMail, InternetPhone) and technologies (Fibre-optic, wireless infrared/microwave, satellite, DSL, ISDN) all seem to be good enough in current state and ready to serve society. Of course, increase of implementation of those is bound by expenses involved... ***M3-2-h:*** I feel that it would help to maintain the quality of learning. As SSR increase, so it will become more difficult for the staff to get information to all students to the same degree. Extending the use of CMC would enable staff to communicate with all students more effectively, although I do not feel that CMC methods could ever completely remove the staff/student personal interaction. The most important factors are those of e-mail communication and web-based learning for students. These areas are very important and useful and are coming into effect more and more. ***M3-3-l:*** I think that the use of computers will inevitably rise in the future. don't know for certain, what the deal is but I do know that school pupils are being encouraged more and more to use computers for their learning. When I was in school (four and a half years ago), computer use was still seen as a minor addition to education and a seperate field all on it's own. It was not until I entered college that I had any information or use of the Internet. I think the risk is that pupils may lose the benefits of face-to-face interaction with their teachers. I think this would prove damaging to them both academically and socially. In a higher-education facility, computers can prove useful for distance learning and as an information tool but it still cannot repalace the benefits of face-to-face communication. ***M3-4-m:*** I think that expanding the use of CMC in learning is potentially brilliant but it has to be thought through with the right frame of mind. However online learning is only ever as good as the teacher behind it so it has to be remembered that online learning isn't a quick fix or something to lessen the load on teachers but rather a different way of teaching. Overall though I think online learning has a lot of potential and I'd like to see more of it. ***M3-5-h:*** My view is that teachers can not be replaced by use of CMC and Interne learning. The use of CMC is very good but to try and use it instead of teachers would have a negative effect in education. CMC alone in Education is a worthy asset, it allows more contact between students and teachers and helps disseminate information but the main learning tool and apparatus must still be schools and teachers. My aim argument against CMC is that the personal contact is forgotten and the classroom could become a part of education history. There can be no argument that the use of CMC is beneficial and helpful in neglected Education system today but i feel it can not be extended much further without the need for restructuring and redefining an education not designed to cope with the increase use of technology. ***M3-6-l:*** I think the CMC is pretty-much the wave of the future, and, if used intelligently, I don't see why it couldn't be a more cost-effective way to teach! you could reach more students, more quickly and cheaply and always be accessible to questions.