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Changing to an information technology culture: Preliminary results of a
comparison of staff of an Australian Faculty of Education with selected
school leaders

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ABSTRACT

In the rapidly changing world of information technology, there is pressure for educators to acquire competencies and understandings in using new information technologies for their own as well as their students' learning. Australian university academics have had access to new information technologies such as electronic mail, discussion groups, file transfer protocols and other on-line services for some years through AARNET whereas school leaders have had limited access to related services. Has access to these services influenced a change towards an information technology culture? Have educational leaders become more 'information literate'?

Data from the first phase of a longitudinal study of the concerns about, and actual use of, computer-mediated-communication (CMC) by a large university Faculty of Education will be examined and comparisons will be made with preliminary interview data from school leaders in the initial stages of implementing on-line approaches to their own teaching and learning. Issues involved in changing to an information technology culture such as perceptions of its impact, the approaches used to acquire skills and understanding, the role of change facilitators, impediments to, and incentives for, change, and the actual levels of use of computer-mediated-communication will be explored in this paper.

PROGRAM DESCRIPTION

Topic: New information technologies in education

Keywords: electronic mail, computer-mediated-communication,
implementation of change, information technology, educational leaders

BIO-DATA

Dr John Schiller is a senior lecturer in the Faculty of Education at the University of Newcastle, NSW, Australia. In his previous role as Head of Instructional Design and Development in the Centre for Learning and Teaching at Newcastle, he assisted staff in using flexible approaches to teaching and learning in which traditional distance education techniques were combined with information technology applications. He was a recipient of one of the first Committee for the Advancement of University Teaching (CAUT) grants in which he developed these approaches in teaching educational administration. He currently teaches courses in educational leadership and management in which these approaches are being explored.

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INTRODUCTION

Academics in Australia have had free access to electronic communication in the form of email, FTP, newsgroups and other on-line services through the Australian Academic and Research Network (AARNet) since 1990. Developers intended that AARNet would "... increase academic and research productivity by facilitating the processes of collaborative effort, the dissemination of ideas, information access, and information flow" (Bruce, 1994:24). During this same time period, most government schools in New South Wales were connected to "Keylink" an on-line network, used for school on-line banking and email. In its initial stages, "Keylink" did not provide a gateway to the Internet. "Keylink" was originally intended to provide a means of electronic communication between schools so that teachers and students could communicate electronically. In the last two years, the introduction of a graphical interface called the World Wide Web (WWW) on the Internet has brought significantly different opportunities for increased use of computer mediated communication (CMC). Furthermore, the educational possibilities for use of CMC to enhance teaching and learning have been promoted. This poses the question: to what extent is CMC currently being used in schools and Faculties of Education?

Use of e-mail in higher education has been promoted in Australia for some time (Dekkers & Cuskelly, 1989) although little research has been conducted to determine its impact on teaching and learning in higher education (Bruce, 1994). The rapid growth of AARNet (the Australian Academic and Research Network) as a significant computer mediated communication system providing access to Internet, illustrates ways in which communication between academics is changing dramatically. Currently AARNet enables free access by Australian university academics and postgraduate students to Internet. Moreover, recent reports on higher education in Australia have recommended use of alternative approaches such as e-mail to teaching and learning so that greater

flexibility can be offered to students wanting to undertake university courses on campus as well as off-campus (Johnson, Lundin, & Chippendale, 1992; Tinkler, Smith, Ellyard & Cohen, 1994; Tinkler, Lepani & Mitchell, 1996).

The pressure on universities to be involved in high technology teaching and learning is immense with some leading academics warning that Australian institutions would become obsolete in "... advance culture of cyber learning unless they kept pace with the new communications media" (Monash academic warns, 1996). Similar pressure is being placed on teachers and principals in schools. For example, use of information technology in teaching, learning and management was one of four key priority areas in NSW in 1996.

But is using CMC for teaching and learning as easy and straightforward as implied in these reports, the popular press and in many computer publications? Do myths of technology as easy solutions to teaching problems, as a substitute for people, or as a means of saving time or money persist in universities (Meredyth & Thomas, 1996:10)?

This paper reports on preliminary results of the first phase of a longitudinal study of use of CMC by a Faculty of Education at a regional university in NSW, Australia and comments on the perception of initial use of CMC by selected school leaders in the same region.

Lack of research in use of cmc

Although relatively little data exist on actual use of CMC for

teaching, learning and management in educational settings, the small number of investigations indicate difficulties in effective implementation. For example, barriers identified by an interested minority of strongly committed group of academics recently is that first hand experience and active involvement is necessary but that lack of technical skills, lack of technical support, costs, insufficient time, and workload arising from use of new technology prevent more widespread use of CMC (Hesketh, B. personal email communication, 12th September, 1996). Informal discussion with colleagues also highlights a lack of incentives for greater use of CMC.

Similarly, a bewildering state of affairs in terms of use of CMC exists in schools as indicated in a recent survey "... the overall picture that emerges ... is of considerable unevenness in development within sectors and from State to State or territory" (Tinkler, Lepani & Mitchell, 1996:9). For example, although schools in some states of Australia already have connection to the Internet, in NSW, all schools currently only have a dial-up connection via modem through "Keylink" but do not necessarily have full Internet access. Moreover, the use of this form of communication is very uneven in that a recent survey indicated that although schools had a modem, in some cases it was not

even connected (Schiller, 1995). The same study found considerable complexities in teachers obtaining access to communications technology and software within their school and that among senior teachers or school leaders, knowledge and experience with computers ranged from no experience at all to extensive experience with a variety of software applications across various platforms. However, the majority stated that their computer skills were very basic and limited to preparation of student tests and occasional preparation of papers (Schiller, 1995).

These issues highlight the complexity of Australian telecommunications in the education sector which tends to be fragmented and changing (Williams & Bigum, 1994).

Reasons for undertaking this study

It is in this context of unevenness of implementation of CMC both within and between educational institutions, that this exploratory study evolved. In addition, increased pressure to use CMC in teaching and learning has come from recent National reports (e.g. Tinkler, Lepani & Mitchell, 1996). Moreover, the NSW State government has made a commitment to connect every school to the Internet by the end of 1996 (Tinkler, Lepani & Mitchell, 1996:10). Yet little is known about staff attitudes, concerns about and current use of CMC in Australian schools and universities.

Use of CMC holds considerable promise as an effective means of providing more flexible interaction between academics because it is not constrained by either time or distance, but the initial implementation stage can be daunting for lecturers and students (Schiller, 1995).

Establishing this form of communication is far more complex than implied by many of the writers who advocate CMC as a cost-effective and appropriate means of interaction. Problems in using electronic technology in higher education, such as developing appropriate infrastructure, providing support services and devising effective implementation strategies should not be overlooked or underestimated (Tinkler, Smith, Ellyard & Cohen, 1994)

Therefore, this paper examines the following question: "To what extent do members of a Faculty of Education and school leaders have concerns about and use computer mediated communication to assist with teaching, learning and management processes?" However, before outlining the details of this study, an overview of the context in which the study has taken place is necessary.

CONTEXT FOR THIS STUDY

Faculty of Education

A small proportion of academic staff in the Faculty of Education at the University of Newcastle, Australia, have had access to on-line services for at least the last four years through connection of their office

computer to the University's ethernet network. Several other staff had modem connections to the University's mainframe computer. However, the majority of academic staff within the Faculty of Education did not have access to on-line services from their offices although these services were available in computer laboratories and in the library. During the latter half of 1995, ethernet cabling was provided to the office of every academic staff member of the Faculty of Education who was located in the main building. All staff were encouraged to attend courses on email using the newly adopted, Eudora system and on use of the World Wide Web. Copies of Eudora, Netscape and software access to the University-wide network were installed on every staff member's office computer and the promise was made that there would be no more paper memos distributed within the Faculty from the beginning of the new year. At the same time, the three academic departments of the Faculty were abolished by the newly appointed Dean of the Faculty of Education to form a new, single department Faculty consisting of 76 academic staff.

At the beginning of the academic year in March 1996, six Physical Education staff did not have on-line access as their offices were located in a separate building with no ethernet access. Similarly, 10 Special Education staff did not have ethernet access and depended on modems in their offices to access on-line services. The new Dean promoted use of computer mediated communication to enhance the speed of communication between staff and used email as the major means of distributing information to staff. He also encouraged the use of on-line approaches to improve the teaching and learning opportunities within the Faculty. It was in this context of a significant change in organisational structure, improved infrastructure and support for CMC, and the influence of a new academic leader of the Faculty that this project to explore the concerns about and uses of CMC by academic staff was undertaken.

Department of School Education

Informal contact with local school principals through professional associations and through comments from school leaders undertaking postgraduate courses in 'Information Technology and Educational Leadership', coupled with a longitudinal study of implementation of computer education in seven primary schools in the Newcastle area (Schiller, 1995b), indicate that educational leaders have considerable concerns about the impact of information technology on teaching, learning and management in schools. Lack of appropriate skills, costs of hardware and software, changes to workload and the unknown effect of connecting to and using the 'information superhighway' pose significant threats as well as offering new opportunities in education. Very few school leaders appear to have access to the Internet and most expressed concern about how to integrate uses of CMC into their daily lives. Recent emphasis at a State level on using CMC through 'Agenda 96', a government statement of educational priorities, and the reorganisation of the State Department of School Education from nine regional units to

40 district administrative units with changed relationships between schools and the central state administration, has resulted in changed emphases on the use of CMC in schools. It is in this context of significant organisation change and increased pressure to use CMC for teaching, learning and management purposes in schools and universities

that this study was undertaken.

METHOD

As this is an exploratory study, a variety of techniques were used to gather data from the members of the Faculty of Education and from a variety of school leaders.

Department of School Education

Semi-structured face-to-face and telephone interviews were conducted with a number of key players to obtain insights into the current nature of and the extent of use of computer-mediated-communication in schools and within the NSW Department of School Education. Based on work undertaken in earlier studies (Schiller, 1995a, 1995b) the interview sought opinions what information technologies are currently being used by educational leaders at school and district level, what use is being made of these technologies, current issues of concern, future plans and examples of 'best practice' in use of CMC by educational leaders. Interviewees were selected from acquaintances of the researcher and included a primary and a secondary principal, a District Superintendent, a District Information Technology Consultant, a State Director of School Technology, a District Technical Support Officer, and a Project Officer with a National Professional Development Project for School Principals.

Faculty of Education

A more in-depth and systematic set of data-gathering procedures were used to determine baseline data for the use of CMC by the Faculty of Education. Previous experience with the Concerns Based Adoption Model (CBAM), (Hall, Wallace, & Dossett, 1973). approach to investigating the degree of implementation success of an innovation had demonstrated its appropriateness for studying a change process over time (Hall & Hord, 1987; Schiller, 1991). The CBAM model places emphasis on individuals' concerns about an innovation. At the core of CBAM is the belief that individuals' concerns about the prospective innovation must be addressed in order for adoption of the innovation to occur (Hall & Hord, 1987).

One aspect of CBAM is the Stages of Concerns Questionnaire (SoCQ) which gives a profile of an individual's concerns about an innovation (in this instance, using e-mail and other networked CMC resources) so that training strategies can be designed and developed to address those concerns. The SoCQ can also be used to demonstrate the changes in an

individual's concerns over time. The SoCQ is one of three diagnostic dimensions of the Concerns-Based Adoption Model (CBAM). The SoCQ is a thirty-five item questionnaire which probes an individual's perception of an innovation and their personal feelings about the innovation. The seven stages are shown in Figure 1:

Figure 1
Stages of Concern

Stage 0 AWARENESS: Little concern about or involvement with the innovation.

Stage 1 INFORMATIONAL: General awareness of the innovation; concerned about general characteristics, effects, requirements for use.

Stage 2 PERSONAL: Uncertainty characterizes the individual; concerns about individual inadequacy, potential conflicts, personal commitment.

Stage 3 MANAGEMENT: Concerns regarding issues of efficiency, organizing, managing, scheduling, time demands.

Stage 4 CONSEQUENCE: Concerns about the relevance of the innovation for students, evaluation of student outcomes, changes necessary to improve student performance.

Stage 5 COLLABORATION: Concerns regarding coordination and cooperation with others in the use of the innovation.

Stage 6 REFOCUSING: Desire to explore universal benefits of the innovation; individual has definite ideas about alternatives to the proposed or existing form of the innovation

(adapted from Hall & Hord, 1987, p. 60)

Another CBAM diagnostic tool is Levels of Use (LoU) where as structured interview is conducted to determine the actual use of an innovation. There are eight levels of use as shown in Figure 2.

Figure 2
Levels of Use

Level 0 NON-USE: No action being taken with respect to the innovation

Level I ORIENTATION: The user is seeking out information about the innovation

Level II PREPARATION: The user is preparing to use the innovation

Level III MECHANICAL USE: The user is using the innovation in a poorly coordinated manner and is making user-oriented changes

Level IV ROUTINE: The user is making few or no changes and has an established pattern of use.

Level V BREFINEMENT: The user is making changes to increase outcomes

Level VI INTEGRATION: The user is making deliberate efforts to coordinate

with others in using the innovation

Level VIRENEWALThe user is seeking more effective alternatives to the established use of the innovation.

(adapted from Hall & Hord, 1987, p84)

RESULTS

Department of School Education

The interviews with a number of key people within the Department of School Education revealed that the majority of school leaders currently have little to do with computer mediated communication but that the imminent connection of every government school in NSW to the Internet (by the end of 1996) has resulted in increased awareness of the importance of CMC in teaching, learning and management of schools. Some interviewees have been using Keylink and Nexus for at least a couple of years but their use of email has largely been with assisting pupils use it to contact other schools or to obtain information from the service provider. When asked for names of other educational leaders who might also be using CMC, relatively few names could be put forward. All interviewees agreed that relatively little use is made of CMC by school leaders, particularly school principals. This perception was supported during the last data-gathering phase of longitudinal study of primary school leaders implementing computer education when principals expressed high concerns about insufficient equipment maintenance, office applications of computers, staff training, networking decisions, and insufficient student access (Schiller, 1995b). No mention was made of the school leaders themselves using computer mediated communications in their daily work.

The exception to the above pattern of relative little use of CMC was the District Superintendent and the District Technology Adviser. In

both cases they are regular users of CMC including email, World Wide Web and discussion groups. At the District level within NSW, there is a concerted effort for senior staff to use CMC through an intranet system 'Groupwise' for daily communication between Districts and senior staff at the Central level of the Department of School Education. As use of information technology is a high priority, both District level interviewees stressed the importance of them modelling the use of CMC with other educational leaders. They admitted, however, that use of CMC is still being resisted by many leaders and that the current software, hardware and connection infrastructure is still not accessible enough to encourage regular use. More widespread and systematic data-gathering is essential to determine the current use of CMC by educational leaders.

Faculty of Education - SoCQ Response rate

A Stages of Concern Questionnaire (SoCQ) was placed in staff mail boxes of all academic staff (30 females, 46 males) of the Faculty of Education, the University of Newcastle in April 1996 with a request to place the completed questionnaire in the researcher's mailbox in the same area. A reminder request to complete the questionnaire was sent to all academic staff via email four weeks later. In June 1996 a memo was sent to all academic staff who had not responded to the questionnaire. As all questionnaire forms had been returned with the academic's name attached (with one exception), identification of those who had not responded was possible. In the final request for a response, each person was asked if they would like another copy of the questionnaire or, if they would rather not participate in the study. Eleven staff elected not to participate. The response rate is shown in Table 1.

Table 1
Response rate for SoC questionnaire (n=76)

staff who completed questionnaire
47 (62%)

staff who did not wish to participate
11 (14%)

staff who did not respond
18 (24%)

Although the response rate of 62% (23 males, 23 females, one unidentified) is acceptable, a higher response rate had been anticipated due to two, personalised follow-up requests. As names had been voluntarily included on all questionnaires, closer examination of the possible reasons for not responding was possible. Seven of the 11 staff who responded, but chose not to participate, intend to leave the Faculty at the end of the 1996 academic year as a result of an early voluntary retirement scheme. Of the staff who did not respond, five staff were on sabbatical leave and eight staff intend to leave the Faculty at the end of the 1996 academic year under an early voluntary retirement scheme. In summary, of the total academic staff of the Faculty of Education continuing into the 1997 academic year, only nine staff (12%) did not complete questionnaires.

Demographic data

Demographic data were collected as an additional component of the 'Stages of Concern' (SoC) questionnaire. Staff were asked to indicate whether they had a computer at home and in their office, what they used the computer for and whether they had attended workshops on various

aspects of computer use. The results were as follows.

Table 2
Type of computer used by Faculty members (n=47)

	at home	at work
Mac	10 (21.3%)	10 (21.3)
IBM comp	31 (66.0%)	37 (78.7%)
Other	2 (4.3%)	-
NONE	3 (8.5%)	-

Table 3
Technologies used by Faculty members (n=47)

	at home	at work
wordprocessing	43 (91.5%)	43 (91.5%)
spreadsheet	10 (21.3%)	10 (21.3%)
database	10 (21.3%)	14 (29.8%)
email	10 (21.3%)	37 (78.7%)
Internet (WWW)	8 (17%)	24 (51.1%)

It should be noted that those staff who use software applications, other than wordprocessing and email, either at home or at work, tended to also use spreadsheets and databases and that greater use was made of spreadsheets and databases by male members of Faculty.

Members of Faculty were also asked to rate their ability to use various technologies on a five point Likert-type scale. The results were as follows.

Table 4
Self-rating by Faculty members in "ability to use technologies" (n=47)

	nonuser		novice user		intermed user		expert	
	0	1	2	3	4	5		
e-mail	5 (10.6%)	11 (23.4%)	7 (14.9%)	15 (31.9%)	8 (17%)	1 (2.1%)		
internet	10 (21.3%)	18 (38.3%)	9 (19.1%)	6 (12.8)	3 (6.4%)	1 (2.1%)		
wordproc	1 (2.1%)	2 (4.3%)	2 (4.3%)	15 (31.9%)	21 (44.7%)	6 (12.8%)		
spreadsh	20 (42.6%)	7 (14.9%)	5 (10.6%)	5 (10.6%)	3 (6.4%)	2 (4.3%)		
database	15 (31.9%)	8 (17%)	4 (8.5%)	11 (23.4%)	3 (6.4%)	1 (2.1%)		
computer	2 (4.3%)	2 (4.3%)	4 (8.5%)	23 (48.9%)	11 (23.4%)	3 (6.4%)		

NOTE: There were 5 (10.6%) missing cases for the 'spreadsheet' and

'database' category and 10 (21.2%) missing cases for the 'computer category'.

Members of Faculty were also asked whether they had attended workshops on use of software applications. The results were as follows.

Table 5
Members of Faculty who have attended software application workshops (n=47)

Workshop	No	Yes
wordprocessing	25 (53.2%)	22 (46.8%)
spreadsheet	39 (83.0%)	8 (17.0%)
database	41 (87.2%)	6 (12.8%)
email	14 (29.8%)	33 (70.2%)
internet	35 (74.5%)	12 (25.5%)

Members of Faculty were also asked to indicate which software applications they would like more instruction about. The Internet was the most requested (68%). However, more instruction in the use of spreadsheets, databases and email also received high response rates (approx 34% in each case). They were also asked the preferred format of instruction in using these software applications. Use of workshops was most popular (66%) with use of focus groups and individual instruction (44%) being much more popular than self instruction (19%). The desire for more workshops was expressed in a later questions which asked 'what do you need to understand CMC better' when workshops were identified the greatest number of times with 'time to practise and experiment' the second most frequent response.

To determine if any significant differences existed between male and female responses, a t-test was calculated from the responses to the question in which respondents were asked to rate their ability in using software applications. Statistically significant values from group t-tests were obtained in terms of use of email, internet and the computer as shown in the following table. Males rated their abilities significantly higher on these categories than females.

Table 6
Statistically significant relationships between males and females in their perceived ability to use technologies (n=47)

technology	gender	mean	t	df	p
wordproc	male	3.73	1.54	44	0.131
	female	3.26			
spreadst	male	1.35	0.13	39	0.898

	female	1.28			
database	male	1.52	-0.37	39	0.712
	female	1.70			
email	male	2.78	2.48	44	0.017*
	female	1.86			
internet	male	1.91	2.06	44	0.045*
	female	1.17			
computer	male	3.40	2.13	43	0.039*
	female	2.73			

* probability <0.05

Faculty use of computer-mediated-communication

To determine Faculty members' use of computer-mediated-communications (CMC) a variety of strategies were used aimed at determining a behavioural indicator of a lecturer's use of CMC as expressed through the Levels of Use (LoU) device discussed earlier. Ideally, each member of the Faculty was to have been interviewed using the LoU semi-structured interview technique but, due to time constraints and other workload demands, only 10 (21%) of the Faculty were interviewed.

Interviewees were initially selected at random from the staff list of those who responded (n=47) but several interviewees were selected specifically to obtain a sample of interviews across suspected different levels of use. During all LoU interviews, additional probe

questions were asked so that use of the major elements of computer-mediated-communication such as use of email, discussion groups, listservers and the World Wide Web could be determined separately. Following the initial interviews and from the data collected through the SoC questionnaire, it was decided to concentrate on use of email rather than include other forms of CMC. In focussing on one form of CMC it was thought that the data would be uncontaminated by consideration of different levels of use for other forms of CMC. Therefore, the following results focus on the use of email by members of the Faculty.

To assist in determining an email LoU for all staff in the Faculty (n=76) and to validate the LoU focussed interviews, several additional sources of data were used. Firstly, responses to the Soc questionnaire in which each person rated their ability on a five point Likert-type scale were categorised according to the LoU dimensions. Secondly, interviews were conducted with the Senior Lecturer most identified with providing support to the staff and with the Faculty Computer Support person. As these two people had personally assisted most members of staff with setting up and initially operating email, either in one-on-one or small group situation, it was felt that their assessment of 'non-user', 'beginner' and 'regular user' would be a useful indicator of use. Thirdly, informal staffroom discussions with the researcher about use of email were noted. Finally, phone or

face-to-face discussions were conducted, by the researcher, with individuals whose LoU was still unclear following use of the above strategies. The results were as follows.

Table 7

Levels of Use (LoU) of email by the Faculty of Education (n=76)

LEVELS OF USE (LoU)
number/percent

Level 0 - NON-USE
7 (9.2%)

Level I - ORIENTATION
-

Level II - PREPARATION
-

Level III - MECHANICAL USE
43 (56.6%)

Level IVA - ROUTINE USE
21 (27.6%)

Level IVB - REFINEMENT
3 (3.9%)

Level V - INTEGRATION
2 (2.6%)

Level VI - RENEWAL
-

Faculty concerns about computer mediated communication

Individual staff members' Soc profiles for Computer Mediated Communication (CMC) were calculated from the Soc questionnaires using the Soc Questionnaire Quick Scoring Device (Parker & Griffin, 1979, in Hall, George & Rutherford,) and combined to form a profile of staff concerns.

The simplest form of interpretation of profiles has been made by identifying the highest stage score (Peak Stage Score) for each member of staff. The higher the percentile score, the more intense the concerns at that stage. A summary of this data is shown below. The

intensity of concerns, as shown by the average Peak Stage Percentile Score, is very high and indicates a need for interventions to reduce these concerns.

Table 8
Frequency of Highest Concerns Stage (Peak Stage Score)

Stage of Concern	No. & %of staff	Av Peak Stage Percentile Score
0 - AWARENESS	25 (53%)	91
1 - INFORMATIONAL	12 (26%)	92
2 - PERSONAL	3 (6%)	95
3 - MANAGEMENT	4(9%)	93
4 - CONSEQUENCE	-	-
5 - COLLABORATION	2 (4%)	93
6 - REFOCUSING	1 (2%)	98

However, as the initial impression from these aggregated data is that the concerns of staff regarding CMC are limited to 'Awareness' and 'Informational' concerns, analysis was also made of the Second High Stage Score. 'Personal' concerns were high with 36% of respondents indicating this as a second high stage score. 'Informational' concerns appeared as high second scores (28%) as did 'Management' concerns (23%). Although this holistic perspective indicates that the Faculty as a group have considerable concerns about CMC centred around the first four stages, further use of these data is more appropriate if individual profiles are examined so that groups who have common high stage concerns can be formed for specific staff development activities relevant to their concerns. At the end of the study, when two sets of Soc data are available, a more sensitive interpretation will be made by analyzing the complete profile of percentile scores (Profile Interpretation) as indicated in the Soc manual (Hall, George & Rutherford, 1979, p.29). According to concerns theory, it is hypothesized that concerns about CMC will change over time in a "predictable, developmental manner" (Hall & Hord, 1987, p.70). It is predicted that in twelve months, concerns will have shifted to consideration of processes and tasks involved in actually using CMC, that is, there will be a shift to a higher proportion of 'management' and 'consequence' concerns. 'Levels of Use' data, which was collected several months after the Soc data, indicate that this progression of concerns has already occurred.

Opinion Leader/change Facilitator Questionnaire

To determine the influence of other people, each member of staff was asked to complete a series of questions about opinion leaders/change facilitators who may have influenced them in using Computer Mediated Communication (CMC). In the first part of this questionnaire, respondents were asked to name three people with whom they most talk regarding the use of CMC (such as email, World Wide Web, Internet). Results for this first question are shown below.

Table 9

"People with whom you talk regarding the use of CMC"

TALKED TO REGARDING CMC	Number of times mentioned
Academic Members of Fac Educ Senior Computer Lecturer	21
Computer Lecturer	11
Other lecturers	23
Faculty Support Staff Computer Technician	16
Other support staff	5
University HELP DESK	8
Colleagues at other Australian universities	9
Colleague at overseas universities	1
Listserver	1
Members of family	3

When asked 'why do you talk with these people about CMC' the most frequent responses were because of their knowledge, expertise, availability and accessibility. The type of help given by these people included providing advice about procedures, solving problems, giving explanations, providing support and encouragement and giving demonstrations or on-task assistance.

DISCUSSION

From examination of the data from the Faculty of Education at Newcastle, all staff who will be working in the Faculty in the next academic year are using computer mediated communication with email being the major use. As indicated in Table 4, 38% of respondents currently regard themselves as 'novice users' whereas 49% regard themselves as 'intermediate users'. A much smaller proportion of the staff are users of other forms of CMC such as WWW and listservers. Considering that twelve months ago only a small proportion of staff had an ethernet connection to their office, the implementation of use of email has been successful. This is in marked contrast to use of email by school leaders for whom CMC is essentially still a novelty. What factors have contributed to implementation success over the twelve months and what issues are still of concern?

Factors in successful implementation

The major factor in successful initial implementation of computer mediated communication within the Faculty of Education has been the development of appropriate infrastructure enabling every staff member to have CMC connections to their office computer. The availability of workshops, offered through the University's training and development section, as well as by several key users of CMC with expertise in the range of applications of computers in education, have provided opportunities to develop expertise in use of Windows, Eudora, Netscape and FTP. Most staff (70%) have attended workshops on the use of Eudora but claim that insufficient time and lack of follow up opportunities have restricted their acquisition of appropriate skills so that they tend to use email at a very basic level. For example, few staff appear to use mailbox folders, nicknames, or electronic signatures to make their use of email more efficient.

Several key members of Faculty, with expertise in CMC, have been change

facilitators in that they have provided support through one-on-one assistance, demonstrations and workshops. Written comments on why these individuals have been important in facilitating use of CMC focus on their acknowledged expertise, and, most importantly, their availability when needed. Prompt access to assistance on a specific aspects of CMC operation, appears to have been an important factor in initial use.

The usefulness of email was also an important factor in its acceptance by Faculty. Its asynchronous nature and its rapid, easy and economical means of communication has made it attractive.

The final important factor in the initial implementation phase has been the expectation of senior leaders within the Faculty, including the Dean, that everyone would use CMC. They then modelled its use in their own communication. They provided pressure at the outset of the implementation process through statements that there would be no further use of paper memos within the Faculty, but then use CMC extensively in their own communication with staff necessitating staff use of electronic communication, even if it was only at the level of reading messages and Faculty reports from the Dean via email.

Problems in implementation

The major concerns appeared to be: lack of technical skills, lack of sufficient technical support, and insufficient time to develop appropriate skills. Some staff would prefer a return to the use of paper communication because of these concerns. In discussion, lack of time to practise using CMC was major factor restricting its use. Most staff appeared to be aware of some of the ways of making use of CMC more effective but have deliberately not pursued these issues because of the pressure of other tasks and responsibilities. For those who are just beginning to use email, there is frustration that they do not

possess sufficient skills to make their use of email problem free. On the other hand, for those who use email and other forms of CMC regularly, there are expressions of concern about an increased workload from the pressure to read and respond to many messages per day, particularly from outside the Faculty

CONCLUSION

Through substantial improvement during the last 12 months in basic technological infrastructure such as Ethernet connections to an optic fibre communications backbone, provision of staff training through short courses, availability of technical support, installation of 'user-friendly' email software and a climate in which use of CMC is a high priority of the Dean and other senior staff of the Faculty, staff member's use of CMC has increased substantially, particularly in terms of using email. An implementation strategy in which the emphasis has been on using email rather than paper to communicate Faculty business has also been an important factor in improving implementation success.

However, due to budgetary restrictions in a time of severe university cutbacks of funds and the resignation of several key CMC facilitators within the Faculty, concerns about insufficient technical and inservice support remain high. Are there incentives to go beyond basic email usage? Furthermore, what of applications of CMC to teaching and learning? Very little use is being made of CMC for teaching or learning purposes although several staff are exploring use of email with students at the postgraduate level. Informal discussion with staff indicate that there may be workload disincentives in that the added pressure of the challenge of using new technologies in teaching

is just too much on top of competing demands for research, teaching and administration, sharpened by increases in student numbers and the requirements and expectations that have accompanied quality assurance and accountability arrangements. Will academics learn the pedagogies of flexible delivery of teaching and learning through CMC on top of these pressures?

Finally, to what extent does use of CMC change the way in which academics in education communicate? For example, is interaction between academics across universities faster and more frequent because of the ease of using email? In what way does use of email, listservers and the World Wide Web alter research productivity and influence changes in teaching methodology by facilitating the processes of collaborative effort, the dissemination of ideas, information access and information flow? More investigation is necessary to examine these issues over time. The intention is to conduct a follow up study of the same group of academic staff next year and to compare the results of this longitudinal study with those currently being conducted by a group

of colleagues in a similar sized faculty in Colorado, USA. As the American faculty was at a similar stage of development at the initial stages of this study, it will be interesting to compare ways in which members of a faculties of education change the culture of communication.

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