

# Strand 3: Networked Learning For Professional Development

Paper 4:

## Gender Differences in an On-line Learning Environment: A Case Study

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### SUMMARY

- This paper focuses upon the use of Computer Mediated Communication (CMC) in a specific learning context by a small community of postgraduate (M.Ed.) distance learners and their tutors. Content analysis of on-line dialogues was used to investigate learning and socio-emotional behaviour within this community. The data presented suggests that men and women took distinctively different roles in our on-line learning environment. Most significantly, the cognitive and metacognitive (learning) content of on-line seminar contributions by men and women was found to be similar, but

their social and interactive behaviour was significantly different. In particular, it was found that within a formal on-line learning environment men sent (on average) more messages than women; they wrote messages which were twice as long as those sent by women; and made more socio-emotional contributions than women. Women, however, were found to contribute more 'interactive' messages than men. This paper concludes that the application of CMC technology to a specific learning context may reproduce gender differences within a learning community.

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## Introduction

- This article explores gender differences and relations in a small mixed sex group of postgraduate distance learners working in an electronic learning (CMC) environment. CMC is becoming increasingly established as an important medium for teaching and learning in higher education (see, for example, Tolmie and Barbieri, 1997). Hence there is a concomitant need for academics to understand how to manage this medium so that its learning potential may be optimised. Our central aim in this paper is the examination and interpretation of dialogues between men and women in a CMC environment, with a view to beginning to understand some of their differences when engaged in a specific learning task. Other recent studies (for example McConnell, 1997) have looked at interaction patterns between men and women in educational CMC (such as turn taking and directing conversation), gender related language use (Herring, 1993) and general behavioural use and attitude differences (Yates, 1993). However there have, as yet, been few attempts to examine men and women's dialogue in asynchronous CMC in relation to their learning (see Herring (1996) for a further discussion of the current state of this research).

The research described in this paper was conducted in the Division of Education at the University of Sheffield during 1995-96. In it we have adopted an ethnographic rather than experimental approach, given the small number of students in the on-line events we are analysing. The project involved a group of 16 first year M.Ed. students and their tutors; this represents a ten per cent sample of the total 1995 entry group to the University of Sheffield UK. M.Ed. programme. The students were enrolled on M.Ed. programmes in either Educational Studies or English Language Teaching. All the students volunteered for the project and all were part of the Division's UK distance education programme (although, as well as the UK, students were based in Luxembourg, the Netherlands, Ireland, Germany and Finland). In common with many other distance learning centres, these students use mainly print-based materials, have only limited opportunities to meet

their tutors or other students and are relatively isolated, academically and socially. The group of students included 11 women and five men.

## Methodology

- During the course of the project, a range of data was produced. This included:
  - electronic diaries of the students' experiences of teaching and learning during the project;
  - transcripts of all contributions made to the discussion list which took place during the project;
  - a postal questionnaire administered to students at the end of the project;
  - a transcript of an informal group interview conducted during a residential weekend at the end of the project.

Between June 1995 and March 1996 the project group took part in two on-line seminars (during September 1995) and an organised social gathering (October 1995) as well as conducting a range of informal on-line discussions. The first on-line event was an introductory activity during which the project group of 16 students and their personal tutors (eight) were asked to post a message to the list introducing themselves to the rest of the group. While tutors accessed the discussion list using workplace facilities, students installed a modem at home and logged on to their Internet account in order to send and receive their messages. Five students (four women and one man) failed to complete this process.

Of the 11 students who sent an introductory message to the discussion list, nine (five women and four men) actively participated in subsequent project events. In addition, a male student from a Finnish University joined the project group and four of the eight tutors (two male and two female) continued to be actively involved in the project. The active project group therefore included seven women and seven men. A total of 270 messages was sent to the discussion list during the lifetime of

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the project. During this study, there was evidence of private e-mail correspondence between students and tutors. In some instances these were referred to in group discussions. We did attempt to monitor the level of these communications through the electronic diaries kept by students. However, this proved difficult to maintain and therefore private communications were excluded from the study. We are aware that they may be part of the 'glue' of our public on-line discussions.

## The On-Line Seminars

- The on-line seminars, which lasted two days, ran twice over a period of a week. A 'Chairperson' and an introductory 'Speaker' were appointed for both events. The transcripts from both of the on-line seminars were analysed using coding categories developed by Henri (Henri, 1992). We decided to use these categories for two reasons: firstly, they were designed to include significant aspects of discussion which were of particular interest to us (including both social and academic language indicators) and secondly, they were designed to be applied by teachers in on-line contexts rather than

used by researchers as purely empirical research tools. We felt that a demonstration of their utility would enable us to take a step towards more routine analysis of on-line discourse as part of the teaching and learning process. Their use involved breaking down the contributions made by seminar participants into 'units of meaning' and allocating these to appropriate categories (see Table 1).

The categories described in Table 1 were further subdivided for purposes of analysis into two codes for interaction (implicit and explicit); five codes for cognitive skill (elementary clarification; in-depth clarification; inference; judgement; strategies); three codes for metacognitive knowledge (person; task; strategies) and four codes for metacognitive skills (evaluation; planning; regulation; self-awareness). In addition, 'units of meaning' were analysed for surface and in-depth processing skills. Table 2 illustrates the percentages of contributions made to the seminar discussions in each of these categories (see Table 2).

Our analysis of transcript data from the on-line seminars suggested that the on-line learning community was distinctive in a number of ways. Firstly, the seminar discussions were characterised

Dimension	Definition	Examples of Indicators
Participative	Compilation of the number of messages or statements transmitted by one person or group	Number of messages Number of statements
Social	Statement or part of statement not related to formal content of subject matter	Self-introduction Verbal support 'I'm feeling great.....!'
Interactive	Chain of connected messages	'In response to Celine.....' 'As we said earlier.....'
Cognitive	Statements exhibiting knowledge and skills relating to learning processes	Asking questions Making inferences Formulating hypotheses
Metacognitive	Statements related to general knowledge and skills and showing awareness, self-control, and self-regulation of learning	Commenting on own manner of accomplishing a task Being aware of the emotional context of task completion

Table 1 A Summary of the Analytical Framework (after Henri, 1992)

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Analytical Category (after Henri, 1992)	Seminar 1	Seminar 2
Social	22%	25%
Interactive	28%	31%
Cognitive Skills (surface)	15%	12%
Cognitive Skills (deep)	28%	28%
Metacognitive Knowledge	3%	3%
Metacognitive Skills	4%	1%

Table 2: Contributions to Seminars 1 and 2 by Analytical Category

by significant amounts of social as well as academic exchange. We have described this as 'socio-emotional', as opposed to 'task-oriented', discourse. Secondly, the seminar participants demonstrated high levels of 'interaction' with one another, typically by referring explicitly, and responding, to arguments put by previous contributors to the seminar. While this tended to 'slow down' the pace of the seminar, during the project evaluation students indicated that they had appreciated this opportunity to engage with the views of their peers. We have described this aspect of on-line discourse as 'listening'.

## Male and Female Participation

- One of the early attractions of distance education was its presumed capacity to increase access and equity by removing some of the barriers to participation, such as attendance (George 1995). CMC has also been advanced by some authors as a powerful yet neutral tool for enhancing distance education's capacity yet further in this and related ways (see for example Dubrovsky, Kiesler and Setha, 1991; Kiesler and Sproull, 1992; Sproull and Kiesler, 1991; Weisband; 1992 for discussion of this 'equalisation' view of relations in CMC environments).

However, as Spears and Lea have argued extensively (Spears and Lea, 1994) these are problematic issues. Yates (1997) summarises these arguments extensively and suggests that, far from being free of the constraints of existing social relations, CMC

interactions may reflect them. Furthermore, male and female students may show different preferred learning styles (Turkle and Papert 1990; Philbin et al, 1995) which may extend to their use of information technologies such as CMC (Allen, 1995, Savicki, Kelley and Lingenfelter, 1996). Meadows and Watts, for example, in a survey of the use made of UK discussion lists by primary school teachers in the UK, found that over a two month period on one discussion list (UK Schools discussion list) only five women, compared with 35 men, actively participated in discussion (Meadows and Watts, 1996). Although, as the UK primary teaching profession is predominantly female, women might have been expected to represent the majority of users on such a list, female participation on this list was restricted to women who identified themselves as IT specialists.

Some significant differences in the access and participation of men and women students were noted in our own research with distance learners. In terms of access, we have already referred to the five students, four of whom were women, who failed to successfully 'get on-line'. In spite of a huge investment of tutor-time, we were unable to help these students to use the project facilities and, clearly, this raises equity issues in terms of access to the learning environment. Amongst the group of students who did successfully access the project technology (five women and four men), differential participation rates were evident. For example over the lifetime of the project male students contributed, on average, slightly more messages than female students: 18.4 messages compared with 15.9. However, male and female participation rates varied according to project events. In the early life of the project, men were more active than women. During the seminars, male and female activity reached an identical peak. There were also differences between seminars one and two in terms of male and female participation rates. In seminar one, the men sent, on average, more than twice as many messages as the women while, for seminar two, the mean number of messages per female student was slightly higher than for the males. After the seminar, male and female participation rates resumed their pre-seminar pattern, with men contributing, on average, more messages than women.

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One possible interpretation which was suggested to us by the general pattern of 'active' participation, outside the seminar events, is that the female students considered the nature and quality of their contributions more carefully than the men.

Another possible interpretation is that they may also have engaged in more self-censorship, within the context of the 'public forum' (i.e. the discussion list) than the men. We would also like to suggest yet another possibility, to which we shall return later, that women's contributions to the on-line community tended to be more task-oriented than socio-emotional (i.e. the rate of participation declined outside of the structure of a formal seminar event) and, conversely, that the men made more socio-emotional contributions to our 'electronic community' than the women. Clearly these can be no more than conjectures in a group size such as ours. However, we feel that these possibilities may be worthy of further investigation.

Men and women's participation rates within the seminar events (i.e. during September) were similar, suggesting an equal task-orientation in terms of gender. However, the difference in participation rates between seminars one and two (with men contributing more in seminar one and women more in seminar two) suggested to us that women may be hesitant about making early claims on electronic space. The mean length of messages sent to the second on-line seminar by female students was 159 words. Messages sent by male students were, on average, almost twice as long (351 words) as those sent by females. Similar findings have been reported by Herring who described messages from women in 'conference' contexts to be typically shorter than those from men (Herring, 1993). This might suggest that the linguistic environment of the on-line seminar does not privilege women who may, in fact, be disadvantaged by the lack of non-verbal cues (for a more detailed explication of this argument see Herring, op. cit. and Yates, 1997).

## Social and Academic Discourse in Our On-Line Community

- It is tempting to view the relationship between social exchange, interactivity, cognitive skills and metacognitive skills/knowledge as essentially hierarchical, with social 'chat' located at the base of a pyramid which culminates in the 'higher order' skill of metacognitive thinking. Within such a framework it could be argued that very little 'progression' occurred during the seminar, either individually (i.e. within the individual messages sent by students) or chronologically.

In an electronic environment, however, the relationship between social, interactive, cognitive and metacognitive discourse and learning may be rather more complex. For example, the fact that discussion is taking place within a wholly linguistic environment (where non-verbal communication strategies are not available) appears to influence the way in which participants contribute (a number of studies have explored this theme; for example, Rice and Love, 1987). The messages posted to the seminar were frequently characterised by detailed explication of thinking and ideas, often through the presentation of a series of examples in order to illustrate a point. This may reflect the fact that it is not possible, in an on-line environment, for the 'speaker' to simultaneously monitor the reactions of others (e.g. a questioning glance to indicate the need for further explanation or the nodding of a head to indicate a point has been grasped). The effect of this is often that, for purposes of clarity, a particular cognitive skill (for example defining terms) is rehearsed in a number of different ways. While such discourse may preclude 'moving on' to deeper processing skills or to metacognitive skills, the clarity of discussion, and depth with which ideas are explained, may offer a valuable learning experience to students, in terms of exploring their own thinking and that of their colleagues. It is the distinctive environment of the on-line seminar, we therefore suggest, which may support the two dimensions of on-line discourse - 'listening' and 'socio-emotionality' - that played such a critical role in the construction of our 'community' of distance learners. Our analysis of the project data suggested,

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however, that men and women may take distinctively different roles in these on-line processes. Although the cognitive and metacognitive content of seminar contributions made by men (37 percent and four percent) and women (40 percent and five percent) was similar, the social and interactive on-line behaviour of male and female students was significantly different. As well as differences in the number and length of contributions made by men and women, our data analysis suggests significant differences in the social and interactive content of messages sent to the on-line seminar by men (33 percent for 'social' and 26 percent for 'interactive' discourse) and women (17 percent for 'social' and 38 percent for 'interactive' discourse). In another study, Myburgh investigated women's participation in five 'gender neutral' discussion lists (Myburgh, 1994). Although the participation rates identified by Myburgh were similar, in terms of male and female participation, to those identified in the discussion list described here, Myburgh did not report significant differences in terms of the nature of contributions made by men and women.

## Student Reflections on Gender Differences

- During the lifetime of the project reported in this paper, we were not aware that 'gender' would be of interest to us - or indeed to the participating students. It was in the course of data analysis, some time after the project had ended, that we began to identify the issues reported in this paper. By that time a new on-line teaching and learning project, involving a group of 24 first year M.Ed. and Ed.D. students, was in progress. We had asked four students from our previous on-line learning project (i.e. from the group involved in the research reported here) to join this new project group as 'mentors'. These students were now in the second year of their distance learning M.Ed. course. Because, during the project, we had not anticipated that gender issues would become a focus of our research, we were keen to get an initial reaction to this possibility from on-line learners (albeit from a different group of learners to those who had been involved in the project). We therefore asked the new group of students, via a general question to the project discussion list, whether they thought

that gender issues may be relevant within an on-line environment. Initially the question did not stimulate much discussion and those messages which were received came, with only one exception, from students who had been members of the original project group (and who were now acting as mentors). All the messages suggested that gender was not considered important by on-line learners. It was only when we began to provide the students with our category and participation analyses, showing apparent differences in social style, that a much more extensive debate of these issues ensued among them.

## Conclusion

- The project data have indicated to us that our use of CMC had provided our distance learning students with additional opportunities for dialogue with tutors and peers. Students reported, through the project evaluation questionnaire, that their involvement in the project had helped to reduce their sense of social isolation and had made them feel part of a 'community' of learners.

Although some of the students in this, and a subsequent, project reported that they were unaware of gender-typed behaviour, our transcript analysis of project events suggest that men and women behaved differently in the on-line learning environment in terms of the frequency, length and style of their contributions to group discussions. In particular, we observed that men's contributions to discussions were, typically, more numerous and longer than those of women, and that the contributions made by men tended to include greater levels of social exchange than those of women. Women, however, appeared, typically, to be more 'interactive' than men, i.e. their messages included implicit or explicit references to previous contributions. We found no differences in the cognitive and metacognitive content of messages contributed by men and women.

We have suggested a number of possible explanations for the different behaviour of men and women in our on-line context including: the impact of the public forum on male/female discourse and the impact of the absence of non-verbal cues on male/female discourse. The on-line learn-

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ers with whom we shared the data generated by this research project - including some who had participated in the events described in this paper - offered further reflections on the differences in male and female behaviour described here; a number of these focused upon the nature of male and female social relations.

Our research suggests that, although CMC technology may be an effective way of building and supporting a community of postgraduate on-line learners, relations within such an environment may be significantly influenced by gender. We intend to pursue these suggestions with further research in order to develop teaching and learning strategies which help to optimise the opportunities for both men and women in mixed sex on-line learning communities.

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