Gendered Interactions in Computer-Mediated Computer Conferencing

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Abstract

Computer mediated conferencing (CMC) has been widely viewed as a valuable forum for providing opportunities for interaction among learners in a distance education setting. Interaction in distance contexts; however, is not well understood, and it has been argued that social markers are cued in online communications and that gender influences interaction processes and participation. Earlier research has identified two discourse types, epistolary and expository, that have been associated with gender. This study examined the discourse patterns and styles of 37 women and 27 men involved in a graduate course that used computer conferencing. Predicted patterns of discourse were found; women tended to use more epistolary or aligned type statements, and men tended to use more expository type statements. An investigation of satisfaction, commitment, and purpose for interaction indicated that level of satisfaction with interactions was similar, but evidence of gender-related purposive differences and a higher participation rate for men were found.

Résumé

Les conférences télématiques sont largement considérées comme un bon moyen d'offrir des opportunités d'interactions entre apprenants en situation d'éducation à distance. L'interaction dans le contexte de la distance, cependant, n'est pas bien comprise, et il a été avancé que les marqueurs sociaux sont déterminés dans les communications en ligne et que le genre influence les processus d'interaction et de participation. La littérature identifie deux types de discours, épistolaire et expositoire, qui sont associés au genre. Des formes prévisibles de discours ont été trouvées. Les femmes ont tendance à utiliser des énoncés épistolaires, alors que les hommes utilisent plus d'énoncés expositoires. Une étude de la satisfaction, de l'engagement et du but de l'interaction indique que le niveau de satisfaction avec les interactions était similaire, mais il y avait indication de différences dans le but reliées au genre et un taux de participation plus élevé pour les hommes.

Background

Computer-mediated conferencing (CMC) in distance education is an increasingly popular mode of program and course delivery that offers valuable and powerful opportunities for interaction and collaborative work

(Burge, 1994; Fahy, 2002a; McDonald & Campbell Gibson, 1998). However, what influences interaction patterns online and what contributes to successful experiences for participants are not well understood. Early researchers argued that this medium provided a uniquely democratic forum for interacting (Herring, 2000; Ferris, 1996), because users can operate without physical evidence related to sex, race, and class; today a growing body of research indicates that gender and other structural inequalities do exist and operate in this medium. This research argues that social markers are cued and that one's sex affects access and interaction processes online (Yates, 1997; Herring, 1996; Ferris). In a study conducted by Fahy (2002b), transcript analysis of online conferences in a graduate course showed gender patterns in communications. Additional research has also shown that the proportion of men to women in any given group can influence interactions and discursive practices of a group (Herring; Kanter, 1977), and that sex plays an important role in online experiences (Ferris; Gay, Sturgill, & Martin, 1999). This research raises questions about the influence of different and dominant discursive styles on communication patterns in an online environment and the influence of sex on participation and experience. This study focused on participation; discourse patterns; and commitment, satisfaction, and conversational purposes of learners in a moderated online environment as they related to gender and the gender composition of the group.

Review of the Literature

This literature review provides background information that speaks to the importance and significance of research into gendered interactions in CMC. It provides an outline of research into issues surrounding gender and equality in interactions, discourse styles, and conversational purpose to highlight research already done in this area and to demonstrate the importance of the research questions addressed here.

Participation

Early research on gender in computer-supported learning environments showed evidence that women possessed lower levels of computer literacy, ability to access technology, and confidence using this technology (Moffatt, 1997; Spender, 1990). More recent research suggests that this imbalance in access and literacy is disappearing (Gunn, 2003; Pastore, 2003). Although Yates (1997) claims that the issues related to access go beyond the procurement of technology, the social interactions in online communications pose further barriers and obstacles to equal participation.

Studies of online communication patterns have indicated that men exhibit higher participation rates than women (Herring, 1996, 2000). Herring's (2000) analysis of a computer-mediated discussion group com-

posed of 1,800 members found that the messages composed by men out-numbered those composed by women by a ratio of 6:1 and that the con-tributions of men were on average twice as long as those of women. An additional study of two online discussions with 16 first-year MEd students (11 women and 5 men) performed by Barrett and Lally (1999) also found similar results, where on average the men contributed 18.4 postings in contrast to 15.9 posted by women. Herring (2000) also argues that inequi-ties online go beyond unbalanced participation rates for women, who also receive fewer responses from others and do not control topics of discus-sion unless the clear majority of participants are female. Findings of in-equitable participation rates based on gender, however, are not universal-ly supported. Fahy (2002), in his study of moderated online course discussions, found that men and women participated relatively equally and did not find evidence of male dominance in these communications.

Communication Styles and Dominant Discourses

Research on gender patterns and interactions online have shown differen-ces in discourse types and styles of interacting for men and women and the importance of dominant styles in a group on the development of normative communications (Fahy, 2002; Herring, 1996). Using responses on two unmoderated listservs, Herring identified preferred styles of inter-action by gender, with women exhibiting more epistolary or interac-tionally oriented messages, and men using more expository and declamatory statements. These findings were corroborated by Fahy (2002) and Barrett and Lally (1999). Using the Transcript Analysis Tool (TAT), Fahy performed a study of sentence type and interactions in an online graduate course to explore whether gender patterns could be detected. This study found preferred interaction styles based on sex without the extreme forms of expository interaction (flaming and rudeness) found in earlier studies. Unlike Herring's study of unstructured listservs, Fahy explored an instructor-moderated graduate course. This is an important distinction, for it has been noted that moderated forums tend to produce less extreme types of behavior (Savicki, Lingenfelter, & Kelley, 1996).

Herring (1996) also found that dominant discourses influenced group processes. In this exploration of the schematic structures of electronic messages in two listserv discussion groups, evidence of a "list effect" was found whereby "the communicative practices of the majority of active participants become normative for the group as a whole" (p. 85). An assumption underlying Herring's study of discourse styles is that in-dividual electronic messages are internally organized passages that can provide useful insights about the structure and function of communica-tion. Using linguistic text analyses, the organization of texts can be evaluated to determine whether messages perform the function of exposi-

tion and reporting or of interaction. Results indicated evidence of a list effect in these two groups in terms of the female participants. However, there was less evidence of this effect for men. Although the men did adapt their discourse style in the female-dominant list, they did so by using the attenuated characteristics of form, modifications of style that use hedging, and expressing statements in the form of questions rather than adopting the interactional and personal orientation used by the women.

Commitment, Satisfaction, and Conversational Purpose

Gilligan (1982) argues that men and wonmen develop different ways of thinking, a claim that has profound implications for individual decisions made about the learning process and practical decisions for educators with program development and delivery. These different ways of thinking may also have an effect on how communications are perceived and delivered and may influence the underlying motivation for interaction in online learning environments (Gay et al., 1999; Ferris, 1996).

Women's desire to connect with others while pursuing distance studies has been cited elsewhere (Faith, 1988a, 1988b; Kirkup & Von Prümmer, 1990). From their survey of distance learners at the Open University, UK, and Fern Universität, West Germany, Kirkup and Von Prümmer suggest that women value opportunities for interactions with other learners more than men. Gay et al. (1999), in their examination of social factors influencing the learning environment, have also found that for women, the sharing of ideas and beliefs is an integral element of their learning process. Thus they believe that women "may have more positive attitudes in general about the educational value of peer communication and cooperation, leading them to value more highly environments, electronic or otherwise, that foster interaction" (p. 4). However, additional studies suggest that some women prefer to study in solitude and do not require or desire high levels of interaction (Kramarae, 2001; Wall, 2004) and that temporary disengagement from others can allow for important opportunities for personal reflection on learning that can be balanced with periods of interaction and collaboration (Wall).

Studies on learners' motivations and conversational purpose have not examined the combination of text analysis and learner perceptions. Further research into the study of gender effects in varying contexts is also needed to determine to what extent differences found are an influence of context or of gender. It is also unclear whether the list effects identified by Herring (1996) would be found in moderated conferencing contexts and under what conditions conferencing would meet individual and group objectives. Hence I chose to investigate the following research questions.

1. In online contexts, does participation vary by gender?

2. Were Herring's (1996) list effects apparent in a moderated environment?
3. Do commitment and satisfaction in conferencing activity vary by gender?
4. Is conversational purpose associated with gender in online conferencing environments?

Methodology

Design

I used a case study design based on convenience samples of three groups of learners enrolled in an introductory graduate course. From the participating institution, my exploratory design involved survey data from participants in three courses and secondary analysis of course online transcripts. The survey elicited participants' perceptions of the online process.

Participants. I used a convenience sample of three groups of learners enrolled in an introductory graduate course that included voluntary participation in three online conferences. An instructor moderated the conferencing activity. Volunteer participants gave permission for the secondary analysis of the course transcripts and filled in a survey. The three sections of the course were labeled A, B, and C. Section A was predominantly male, section B was mostly female for the first conference and uniformly female for conferences two and three, and section C had a relatively balanced ratio of men and women. By using students from three sections of the same course, I hoped to avert the possibility in CMC research that differences in findings might reflect differences in context rather than gender (Savicki et al., 1996). The study was given ethics board approval.

Transcript Analysis

To investigate whether any list effects were apparent, I analyzed the computer transcripts for structural and interactional exchange patterns. Structural elements explored included network size, density, and intensity. The interactional elements studied included content type, or preferred discourse style, and the exchange flow, which is a measure of the symmetry or equality of information exchanged (Ridley & Avery, 1979). Interactional features were measured with a tool for discourse analysis developed by Fahy, Crawford, and Ally (2001) termed the Transcript Analysis Tool (TAT).

The TAT, an adaptation of an analytic model developed by Zhu (1996), classifies sentences into five categories: questions; statements; reflections; scaffolding; and quotations, paraphrases, and citations. The level and progression type for each posting were coded. Preferred discourse styles as defined by Herring (1996) were analyzed with TAT categories that Fahy

(2000b) had determined were representative of the epistolary and expository conventions. The TAT indicators for the epistolary type are 1A (vertical questions), 1B (horizontal questions), 2B (referential statements), 3 (reflections), and 4 (scaffolding). Indicators of the expository type are 2A (non-referential statements), 5A (quotations and paraphrases), and 5B (citations, Fahy et al., 2001). Instructors' postings were not coded.

I coded each sentence in the transcripts according to the categories listed above, with an intrarater (code-recode) coding of the TAT completed with a 10-day interval. Intrarater reliability was calculated using Cohen's kappa (Cohen, 1960). Kappa values for the conferences studied indicated that the categorization of TAT types was consistent between the first and second coding with agreements ranging from 79-96%.

Survey Analysis Procedures

I used a cross-sectional survey to investigate participants' motivations, purposes, and perceptions of the online discussions. Items were adapted from a survey created by Herring (1996) and from information obtained from the literature related to persistence or nonpersistence, participant motivation, and perceptions of benefit (Cox, Clark, Heath, & Plumpton, 2000; Fahy et al., 2001; Gay et al., 1999; Herring, 1992, 1996; Kirkup & Von Prümmer, 1990; Kanuka & Anderson, 1998). A 5-point Likert scale was used to measure survey items and included categories *not at all*, *slightly*, *moderately, considerably*, and *very much*. The open-ended question asked participants to describe their satisfaction with the computer conferences in this course. The survey was piloted with nonparticipant graduate students to ensure face validity

I calculated the percentage of surveys returned to me and completed a descriptive analysis of the independent and dependent variables, as well as the standard deviations and range of scores for these variables. I also compared individual results with scores obtained from the transcript analysis by gender.

Results

In this study, I examined whether participation, satisfaction, commitment, and conversational purpose varied by gender; and whether preferred styles of discourse based on gender provided equitable opportunities for interaction.

Participation

To determine how participation was associated with gender, I explored the patterns of interaction in the conference networks. Network size presents important information about the amount of involvement and connection possible in a given network (Ridley & Avery, 1979). Network

size indicates the number of participants in the network. The network sizes were as follows: A (23), B (23 in Unit 1, and 22 in Units 2-3), and C (18).

Density values are used to determine the connectedness of the network and are calculated using the formula $D=2a/n(n–1)$ where a=the actual number of interactions observed, and n=the number of participants in the group (Berkowitz 1982). The density values for all the networks studied were small, with a high value of 45.7% in the smallest network (n=18), to a low of 9% in the network that was predominantly female. All the networks had the highest density value in the first conference, with declining values for the remaining two conferences.

Measures of intensity address not only the number of connections made in a group, but also the intensity and persistence of participants in their involvement with others (Fahy et al., 2001). Three measures of intensity were calculated for these networks: levels of participation, S:R ratios, and persistence.

The total number of postings overall was 210 for women and 216 for men (Table 1), although females represented 58% of the total student population. Most of the messages from women occurred in section B, the predominantly female group. This section had 22 women or 59% of all the women in all three sections, although 66% of their postings were made in this group. Section C represented a more balanced ratio of men to women. In this section, the men made 60% of the postings. The average length of messages posted by men was longer than that of women, with a total number of 4,942 lines and an average of 23 lines per posting. For women, the total number of lines was 3,378 with an average of 16 lines per posting.

Table 1
Number of Postings

| Unit | Section A | | | | Section B | | | | Section C | | | |
| | Female n=4 | | Male n=19 | | Female n=22 | | Male n=1 (Unit 1) | | Female n=11 | | Male n=7 | |
	Fr[1]	%[2]	Fr[1]	%[2]	Fr[1]	%[2]	Fr[1]	%[2]	Fr[1]	%[2]	Fr[1]	%[2]
1	6	10	57	90	87	98	2	2	28	40	42	60
2	5	14	31	86	21	100	0	0	13	38	21	62
3	4	8	48	92	34	100	0	0	12	44	15	56
Total	15	10	136	90	142	99	2	1	53	40	78	60

1 Fr= frequency.
2 %= percentage of total postings in each unit.

An S:R ratio is an additional measure that is used to assess the equality of the interactions in the network. This ratio represents the proportion of messages divided by the number of messages received. The S:R ratios for each section and each conference in these sections showed considerable variability. Overall, the S:R ratio was 0.87 for men and 0.78 for women (Table 2). In other words, for 0.87 messages sent, men received one message, and for 0.78 messages sent by women, one was received. The S:R ratios for each conference show remarkable variability, with a high of 1.7 for men in the predominantly male group (indicating that 1.7 messages were sent for each one received), to a low of 0.3 for the man in the predominantly female group. (This value shows the equivalent of one message sent for three messages received.)

The two lowest S:R ratios were for the numerically subordinate groups based on sex among a dominant group; for the women in Section A (S:R=0.63), and for the man in Section B (S:R=0.3). These values indicate that these "subordinate" populations received more responses for each one sent than for individuals who were part of the dominant groups and for individuals interacting in the network with the more balanced ratio.

Table 2
S:R Ratio

Unit	Section A		Section B		Section C	
	Female n=4 S:R	Male n=19 S:R	Female n=22 S:R	Male n=1 (Unit 1) S:R	Female n=11 S:R	Male n=7 S:R
Unit 1 S:R	6.7	57:52	88:121	2:6	28:38	42:66
Unit 1 Ratio	0.86	1.09	0.75	0.3	0.74	0.6
Unit 2 S:R	5:14	31:18	21:11		14:23	22:35
Unit 2 Ratio	0.36	1.7	1.9		0.61	0.63
Unit 3 S:R	4:6	48:51	34:48		12:8	15:22
Unit 3 Ratio	0.67	0.91	0.71		1.5	0.68
Average Ratio	0.63	1.24	1.12	0.3	0.95	0.64

1 S:R is a ratio where S=the number of messages sent, and R=the number of messages received. The ratio is a measure of the number of messages sent, divided by the number of messages received.
2 Overall Average: Male=0.87 Female=0.78.

Persistence is another indicator of the intensity of interaction in a network. The level of persistence demonstrates the extent to which students pursued a topic (Fahy et al., 2001). Initial postings were considered to be Level 1, with subsequent levels indicating the progression of the discussion. On the conferencing network, the levels of postings were easily distinguishable. By replying to one another and continuing the discussion thread, participants were demonstrating persistence that reflected the level of engagement and intensity in the interactions. Persistence levels reveal that approximately 50% of all postings were made at Level 3 and beyond. Only one third of discussion threads were terminated at Level 1, and 20% went beyond Level 5. Analysis of persistence in this study showed similar levels for men and women with the exception of the man in Section B. This participant, however, made only two postings.

Communication Styles and Dominant Discourses

Each sentence in the transcripts was coded according to the TAT categories, totaling 8,320 lines. Expository statements (2a) were made most frequently by both men and women, occurring almost 4.5 times more than citations (5b), the next most common TAT type. Scaffolding and engaging sentences (4) occurred almost as often as 5b statements. Relatively rare were occurrences of questioning (1a and 1b), personal reflections (3), and quotations and paraphrases (5a).

Style differences for men and women are depicted in Tables 3 to 5. These tables identify the occurrence of discourse types for men and women. For each of the three sections, women had a higher percentage of epistolary sentence types than men. Women also exceeded men in all epistolary occurrences with the exception of 1b, horizontal questions. The expository conventions showed higher percentages for men overall. In Section A, however, women had a slightly higher percentage of type 5a and 5b sentences than men, and in Section B the one man did not make a 5a statement; thus women's use surpassed that of men for this category.

To identify persistence in the style conventions of the men and women in these conferences, a proportion of postings with at least one occurrence of type by gender was calculated. It has been argued that persistence is a better indicator of communication style than frequency for it shows greater commitment to type (Ridley & Avery, 1979). For all three sections, the men and women studied in this course were inclined to persist in their initial discursive style.

Commitment and Satisfaction

Of the 63 students still registered in this course after the final conference, 47 students (74.6%) completed the questionnaire. Five respondents, however, did not complete the open-ended question. Questions about issues

Table 3

Occurrence of Epistolary Type by Gender: Section A

TAT Type Section A	Female n=4		Male n=19	
Epistolary Type	#	%	#	%
1a	5	3.5	28	1.5
1b	1	1	60	4
2b	12	8	115	7
3	2	1	24	1
4	34	23	176	11
Total	54	36.5	403	24.5
	Female		Male	
Expository Type	#	%	#	%
2a	63	43	981	59.5
5a	6	4	43	3
5b	24	16.5	214	13
Total	93	63.5	1,238	75.5

1. 1a vertical questions, 1b horizontal questions.

2. 2a non-referential statements.

3. 3 reflections.

4. 4 scaffolding.

5. 5a quotations and paraphrases, 5b citations.

related to computer technology asked about participants' feelings of competence using the technology, how easy their access to this technology was, and to what extent lack of confidence or experience influenced their participation in computer conferencing. Somewhat more women than men reported lack of confidence using computer technology; 21% of women cited this as an influence on participation, whereas only 9% of men reported this as an influence. For most participants, male and female alike, confidence and access to computers were rated high, and 74 % of respondents stated that lack of confidence was not an influence on participation. Constraints related to server difficulties or other computer-related problems did not appear to be important factors influencing participation, although these factors had a slightly higher influence for women.

In relation to the amount of participation in the three computer conferences, most participants perceived their levels to be within the average range, although women reported lower rates overall. Time constraints were cited as an important influence on the participation rates for both

Table 4
Occurrence of Epistolary Type by Gender: Section B

TAT Type Section B	Female n=22		Male n=1 (Unit 1)	
Epistolary Type	#	%	#	%
1a	43	3	0	0
1b	35	3	1	6
2b	125	9	2	11
3	25	2	0	0
4	185	13	1	6
Total	413	30	4	23
	Female		Male	
Expository Type	#	%	#	%
2a	745	55	11	61
5a	35	3	0	0
5b	162	12	3	16
Total	942	70	14	77

1. 1a vertical questions, 1b horizontal questions.
2. 2a non-referential statements.
3. 3 reflections.
4. 4 scaffolding.
5. 5a quotations and paraphrases, 5b citations.

men and women, although these constraints were cited as a greater influence for men.

A lack of confidence with the subject matter was reported as at least a *moderate* influence for 43.5% of men and for 29% of women. The majority of men and women did not report that having certain members dominating the discussion influenced their participation although for 20.5% of women and 27% of men, this was at least a *considerable* influence. In relation to the issue of commitment to other participants in gaining deeper understandings of the issues presented in this course, most responses for both men and women occurred within the average range, with more women giving higher ratings.

Overall satisfaction with computer conferencing showed considerable variability. The rankings given by women were relatively balanced above and below the rating of *average*. Twenty-six percent of men gave a rating of *below average* to *very low* compared with 37.5% of women. Men also had a higher percentage of *average* scores, although scores for *above average* to *very high* were similar for both sexes.

Table 5

Occurrence of Epistolary Type by Gender: Section C

TAT Type Section C	Female n=11		Male n=7	
Epistolary Type	#	%	#	%
1a	8	2	12	1
1b	15	3	49	4
2b	69	13	105	9
3	14	2	12	1
4	85	16	146	13
Total	191	36	324	28
	Female		Male	
Expository Type	#	%	#	%
2a	264	50	614	53
5a	9	2	47	4
5b	62	12	168	15
Total	335	64	829	72

1. 1a vertical questions, 1b horizontal questions.
2. 2a non-referential statements.
3. 3 reflections.
4. 4 scaffolding.
5. 5a quotations and paraphrases, 5b citations.

Responses to the open-ended question that asked respondents to describe their satisfaction with CMC were also mixed, ranging from reports that respondents were *very satisfied* to reports of *little or no satisfaction*. More positive statements about their online experience were given by women than men, although responses from the Likert question on this variable showed slightly higher satisfaction ratings for men. In the 47 surveys completed, 10 women gave some positive comments about the conferencing activity compared with only five of the men. These findings, however, must be viewed in the light of certain limitations of this study, as five respondents did not answer this open-ended question.

Conversational Purpose

Results for the survey showed remarkable variability in questions about purpose and motivation. Both men and women gave fairly similar responses about their collaborations with other participants in order to gain better understandings of the issues presented. Also, as members of the group, both men and women perceived their sense of belonging and

acknowledgment to be within the average range, although women gave more ratings at the extremes (*not at all* and *very much*). When asked if the online conference provided a forum for in-depth discussion, men gave a slightly higher rating to the importance of clarifying ideas through sharing them.

Women gave slightly higher ratings than men when asked if reading the comments of others helped them to clarify ideas and whether CMC assisted them with the achievement of their learning objectives. The men, however, gave slightly higher ratings for the educational value of these online interactions; 65% of the men gave ratings of *above average* or higher compared with only 54% of the women. Most women gave the purpose of reporting information a high rating, with only 16% reporting a rating of *slight* to *not at all*. For men, this purpose did not show much consistency. A higher percentage of men than women gave high ratings of at least *considerable*, although they also outnumbered women in reports of the two lowest ratings. As a purpose, promoting and maintaining relationships was given higher ratings by women.

Discussion

Results of the TAT analysis and survey items speak to the questions of whether styles of preferred discourse based on gender were evident and whether participation, satisfaction, and conversational purpose varied by gender.

Participation

Does participation vary by gender? Research on rates and patterns of interaction in CMC as they relate to gender have yielded inconsistent results. Many studies (Herring, 1994, 2000; Ferris, 1996; Savicki et al., 1996; Barrett & Lally, 1999) have reported higher participation rates for men. These assertions of male dominance in CMC were not supported in studies of moderated online discussions explored by Fahy (2002b), where conferencing activity in a graduate course showed relatively equal participation rates for men and women.

The participation rates in this study appeared to be influenced by the voluntary nature of the conferencing activity and the time constraints reported by many participants. The overall higher participation rate for men, however, was an unexpected finding that was not sufficiently explained in the survey items.

Constraints that influenced participation were present for both men and women, and reports of levels of satisfaction were similar. Also, participation for women appeared to be associated with the gender composition of the group, with participation rates for women in the predominantly female group exceeding those of women in the other two groups. Possible

explanations for this finding may suggest that there was some measure of male dominance in the interactions, although this was not found in studies completed by Fahy (2002a, 2002b), and Fahy et al. (2001) in similar moderated contexts. However, the online interactions explored by Fahy involved a course requirement for participation that was worth 10% of the final mark and resulted in relatively equal participation rates based on gender. This was not the case in this study. Von Prümmer and Rossie (2001) argue that gender influences how students approach the computer. Their surveys reveal that women experienced greater time constraints as a result of multiple commitments, which led them to view technology as a tool, whereas men spent more time working with or playing with the computer. This finding suggests that the voluntary nature of participation in this study, along with gendered approaches to technology, may then have led to the overall lower participation rates seen here for women. Coupled with the issues of time constraints and gendered approaches to technology, this finding may have also been influenced by the topics explored. Herring (1992) reported that participation rates for men and women varied according to topic discussions. In this study, topics explored in the predominantly male group and the gender-balanced group may not have garnered as much female interest and thus elicited less female participation.

Communication Styles and Dominant Discourses

Were Herring's (1996) list effects apparent in this moderated environment? This study did not find evidence of Herring's list effects. Although discourse followed predicted gender styles, no evidence was found of more expository conventions made by women in the predominantly male group. The predominantly female group had representation of only one male for the first conference; his contributions to this conference were not significantly different than the discourse styles of men in the other two conferencing groups. Fahy (2002) suggests that the absence of a list effect may be due to difficulties with this instrument, its coding categories, or its use.

Commitment and Satisfaction

How are commitment and satisfaction associated with gender? In terms of satisfaction with computer conferencing, Cox, Clark, Heath and Plumpton (2002a) found that women experience greater success, involvement, commitment, and satisfaction than men. Recent research (Gunn, 2003; Pastore, 2003) has also challenged views of disadvantages for women in relation to computer use, access, literacy, and confidence.

The open-ended question in this study showed more positive statements made by women than men about the online course components.

This may have reflected more positive experiences with CMC, although this was not supported by women's responses to the survey question on satisfaction. These more positive statements to the open-ended question could potentially be associated with discourse style rather than actual experience. Responses to the questions on levels of participation revealed slightly higher rates for men than women, a finding that was supported by results from the transcript analysis. Reasons for the lower participation rates for women in this study were not clear. For more women than men, issues surrounding computer use and access were a greater influence, and more women than men reported less acknowledgment of their postings. Transcript analysis, however, indicated that overall, women had a slightly higher S:R ratio than men so they received more replies for each message sent. For men, issues related to a lack of confidence with the subject matter and the perception that certain individuals were dominating the discussion drew higher ratings than for women. The participation for women as evidenced by transcript analysis showed that for women, the gender composition of the group was associated with levels of participation. The lower participation rates for women in Section A and Section C indicated that they showed less involvement and commitment to the interactions in the group that was predominantly male and the group that had a more balanced gender distribution. These results do not coincide with the results reported by Cox et al. (2001), which indicated that women had greater satisfaction, commitment, and involvement than did men.

Conversational Purpose

How is conversational purpose associated with gender? It has been suggested that conversational purpose is influenced by gender and that gendered ways of thinking affect how communications are perceived and delivered (Ferris, 1996; Gay et al., 1999). Kirkup and Von Prümmer (1990) reported results that indicated that women value opportunities for interaction with other learners more than do men and that sharing ideas and beliefs is integral to their learning (Gay et al., 1999). Herring (2000) argues that these gendered discourse styles in online communication are a result of the socialization of gender-related behavior.

In this study, the purpose of promoting and maintaining relationships and interaction was perceived as more important for women than for men, although the purpose of reporting information was not seen as more important for men than for women. The transcript analysis for these conferences, however, did support claims of gendered communication styles. Women exceeded men in overall use of epistolary-type sentences, and men exceeded women in the use of expository-type sentences. Measures of persistence in the use of these styles also showed that men and women in these conferences persisted in the use of these style conven-

tions. These findings support Herring's (1996) argument that the orientation of communication is gendered. However, higher participation rates for men in this study and higher ratings given by men for the educational value of online interactions do not support arguments that women hold more positive attitudes for the value of these communications or need to maintain higher levels of interaction.

Implications for Practice

Gendered style differences in communications are an important consideration in the exploration of interactions online; nonetheless, the research reported here does not indicate that one style of communication is inherently better than another. Rather, the effective use of a particular discourse style depends on the context and circumstances of the interaction (Fahy, 2002a). In this study, the two communication styles, expository and epistolary, appeared to blend well; however, participation rates and self-reports of satisfaction with the conferencing activity were less than favorable.

The participation rates appeared to be influenced by the voluntary nature of the conferencing activity and the time constraints reported by many participants. The overall higher participation rate for males, however, was an unexpected finding that was not sufficiently explained in the survey items.

No evidence of a list effect was found in the interactions for this study, although purposive and style differences based on gender were identified. These results raise the need for further study of CMC in educational contexts that may help to resolve some of the apparent paradoxes found.

Suggestions for Further Research

Finally, the findings in this study raise important questions that need further investigation. These include the following.

- Would the interaction patterns and satisfaction with conferencing activity differ if marks were awarded for participation?
- What effect does moderator presence have on participation and satisfaction?
- Does the amount and type of moderator activity produce different learning outcomes?
- What influence do different gender compositions in groups have on learning outcomes, satisfaction, and participation? Is this different for males and females? And beyond gender, what other factors influence communication style?

- How would participants' decisions to make use of epistolary-style conventions in online discussions influence the interactions that occur and the satisfaction with the online experience?

The hope is that the issues this study has raised for consideration both for those designing and moderating online courses and for researchers interested in the dynamics of online interactions in moderated course discussion will support and prompt further exploration and improvement of computer conferences as a supportive climate for learning through interaction.

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