Gender interactions in online debates: Look who's arguing with whom

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Gender interactions in online debates: Look who's arguing with whom

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Abstract

This study identified patterns in gender interactions to explain observed gender differences in participation. Nineteen graduate students were randomly assigned to opposing teams to participate in five debates on a threaded discussion board. When posting messages to the debates, students labeled their own messages to identify each message by functional move associated with argumentation (e.g. argument, evidence, critique, elaboration). Computer programs were developed to apply the method of event sequence analysis to identify patterns in the gender interactions. The results showed that females were significantly less likely to engage in argumentation with other females than with males, providing one explanation for why females might post fewer messages than males. Males were equally likely to respond to females and males, with males showing a tendency to engage in more argumentative exchanges with other males than with females. The interactions that initiated the least to most discussion were female-to-female, male-to-female, female-to-male, and male-to-male interactions, with male-to-male exchanges generating 36% more messages in discussion threads than female-to-female exchanges. These findings support Bakhtin's dialogic theory (Koschmann, 1999) that underscores the importance of conflict in social interaction and the relationships between utterances that drive the processes of inquiry and discourse.

Introduction

For web-based courses in higher education, the common interchange of ideas occurs mostly through threaded discussions (Khan, 1997; Shotsberger, 1997; Driscoll, 1998; Jeong, 1996, Davidson-Shivers, Muilenberg, & Tanner, 2000, 2001). The literature over the last decade or so documents the dynamics of online discussions by various forms of communication patterns, processes, and purposes (William & Merideth, 1996; Piburn & Middleton, 1998; Sherry, 1999). In recent literature, there emerge two areas of concern: The first is gender differences in online discussions and the second, being the development of higher-order thinking skills.

Online discussions are a means to examine gender similarities and differences in communication and interactions within and among gender (Davidson-Shivers, et al., 2000, 2001; McConnell, 1997; Wojahn, 1994). For instance, McConnell found that men tended to talk more and longest in computer conferencing with mixed gender groups, but noted that women were less disadvantaged in online discussion than in face-to-face. Ross (1996) also found inequity with less participation from females than males. By contrast, Davidson-Shivers, et al. observed opposite results. The authors found that the majority

female group had more substantive comments than did the majority male group during both threaded discussions and chats with small groups. Savicki, Kelley, and Ammon (2002) also revealed a reverse participation level between genders. However, in a later investigation by Davidson-Shivers, Morris, and Sriwongkol (2003) found that comments by male and female students were equivalent in types and in frequency in whole group threaded discussions and chats. Wojhan (1994) also reported that the length of communication of men and women to be relatively equal. Allen (1995) also found no differences between gender. Hence, the literature on gender communication in online discussions yields very mixed results.

To understand why these findings differ, future studies must examine group and gender interaction within specific instructional tasks, domains and theories (Mandl & Renkl, 1992). For example, developing argumentation skills within learners is a relatively recent focus for distance learning research (McAlister, 2002; Cho & Jonassen, n.d.; Jeong, 2003; Gundawarena, Lowe, & Anderson, 1997; Newman, Johnson, Cochrane & Webb, 1996). Argumentation is 'the collaborative use of transactive reasoning (including criticism, explanation, justification, clarification and elaboration of ideas), in order to investigate and evaluate evidence and alternative arguments (Kruger, 1993). According to McAlister, "academic practice draws on critical thinking faculties and reasoned argument to test out uncertainties, to extract meaning and to achieve deeper understanding" (p. 1). Argumentation involves cognitive processes such as reasoning, logic, evaluation, and elaboration which must be developed and practiced not only within discussions, but also in terms of written scholarship (Lipman, 1991, cited in McAlister). In order to develop these skills, students must be given the opportunity to discuss, examine, or question controversial issues and complex problems. Online discussion affords such opportunities while also providing students an opportunity to formulate their thoughts in writing.

Gender differences might also be better understood by shifting the analysis to a more process oriented account (Dillenbourg, 1996) and by examining patterns in message-response exchanges (Baker, 1999; Coulthard & Brazil, 1992; Pilkington, 1999) between males and females. Studies have found that male participants are more likely to engage in argumentation, confronting differences in opinions, and defending individual viewpoints and positions (Tisdell, 1993; Vanfossen, 1998). Women on the other hand have been found to be less likely to engage in open argumentation and confronting differences and disagreements. The question that needs to be addressed is how individual participation is inhibited or facilitated by specific message-response exchanges between members of the opposite gender compared to the types of exchanges made between members of the same gender. At this time, no studies have addressed this particular issue in studying the factors that influence student participation in online discussions.

The purpose of this study was to determine the factors that produce gender differences in students' participation in critical argumentation. By examining gender interactions within the context of critical argumentation in online debates, this study addressed the following questions:

1) Are there differences in participation between gender in online debates and argumentative discourse?
2) How likely are females to respond to messages posted by males? How likely are males to respond to messages posted by females? Are there differences in these response rates between gender?
3) What specific types of message-responses interactions are most likely to occur in the debates between students of the opposite gender and students of the same gender? How do these interaction patterns explain the observed differences in student participation?

Method

Participants

The participants (n = 19) were graduate students from a major university in the Southeast region of the U.S., with 8 being female and 11 males. The students were enrolled in an online graduate course on theories of learning and cognition.

Debate Procedures

Students were required to participate in five online debates using the Blackboard system and its threaded discussion forums. During each of the debates, students were randomly assigned to one of two teams to either support or oppose a given position. Team assignments were balanced across gender. Students were instructed to post arguments, evidence, elaboration, critiques, evaluations and other messages to support or refute arguments. Students were required to post at least four messages in order to receive full credit for each debate. The topics of debate in the online discussions addressed the assumptions of particular theories of learning and cognition based on weekly assigned readings. For example, students debated position statements, such as: 'Knowledge cannot be instructed or transmitted by a teacher - it can only be constructed by the learner' to study the paradigms of cognitivism versus constructivism.

Online Debate Messages

Students were instructed and required to label and categorize their own messages by response category. Table 1 lists the six response categories used in this study to scaffold the debates. These categories were derived from the results of a content analysis of online debates in a MBA course (Jeong, 2003a). A label assigned to each response category was inserted into the subject headings of each message posted to the discussions. Students were instructed to limit the content of each message to the selected response category. These procedures were necessary to establish the message as a clear unit of analysis for identifying and measuring message-responses sequences between gender and across response categories. Cohen's Kappa (0.68) was calculated to reveal good inter-rater reliability in the students' codings. Similar procedures have been tested by other researchers and developers of conferencing systems (Cho & Jonassen, 2002; McAlister, 2003) to constrain and label students' responses. Whether or not message labeling impacts student participation on one gender more than the other is a question that will need to be addressed in a future study.

Insert Table 1 about here

Students were also asked to identify their team membership by adding an O for Opposing or an S for Supporting at the end of each label (e.g. ARGs, ARGo) inserted into the subject line of each message. For the purposes of this study, the message labels were re-tagged with 'f' = female, or 'm' = male to identify the gender of the author of each message (e.g. ARGf, CRITm). Tagging the codes by gender (rather than by supporting versus opposing team) resulted in a total of 12 response categories.

An example discussion thread from a debate is illustrated in Figure 1. The actual text has been edited, paraphrased and abbreviated for illustrative purposes. Each message is labeled with one of the six response categories and by the gender of its author. The message-response sequences were determined by referring to the hierarchical structure of the threaded messages. For example, the opening message 1 (ARGm) received two direct responses in message 2 (ARGf) and message 6 (CRITm). Message 6 (CRITm) received two direct responses from message 7 (CRITm) and message 10 (ARGf).

Insert Figure 1 about here

Data Analysis

Event sequence analysis. The method of event sequence analysis (Bakeman & Gottman, 1997) was used to examine interactions within and between gender based on the response categories outlined in Table 1. Computer software (Jeong, 2002) was developed and used to download, tabulate and compile the student-labeled messages from the Blackboard discussion forums into Microsoft Excel. Another computer program (Jeong, 2003) was then used to tally the frequency of specific message-response interactions observed in the debates. Based on the observed frequencies, the program computed the transitional probabilities between response categories (e.g. ARGf→CRITm, ARGm→EVIDf) to determine the relative frequency of specific responses to specific messages. The *transitional probabilities* for all the observed interactions are displayed in the transitional probability matrix in Table 2. The table, for example, shows that arguments posted by females (ARGf) had a 75% reply rate – the probability of eliciting one or more responses from other participants. Of the observed responses to female's arguments, 11% of the responses were critiques from other females (CRITf) versus 17% from males (CRITm).

Insert Table 2 about here

Testing for significance. To determine if a transitional probability for a particular interaction was a significant interaction pattern, and not the result of chance alone, transitional probabilities were tested for significance using Z-scores to determine when an observed probability was higher or lower than expected chance alone (Bakeman & Gottman, 1997). Z-scores over 1.65 and below –1.65 were determined to be statistically significant based on an alpha value of .10 for this exploratory study. For example, the

ELABf-ELABf interaction in Table 3 shows a Z-score 2.21 (*n*=3, alpha = .10) to indicate that this particular female-to-female interaction occurred at a frequency that was significantly higher than expected chance alone. As a result, one can expect with confidence a .15 or higher probability (see Table 2) of an ELABf response to an ELABf message. Cell frequencies of 3 or higher was sufficient to establish statistical significance for any observed message-response interaction (Bakeman & Gottman, 1997).

Insert Table 3 about here

State diagrams. Transitional state diagrams (see Figure 2) were computer-generated directly from the transitional probability matrix (Table 2) to provide visual representations of the message-response interactions. The diagrams help to discern general patterns in student interactions, differences in patterns, as well as the general flow of events that transpired in the discussions. For example, the female-to-male diagram in Figure 2 show that 17% of responses to arguments posted by females were critiques from males. The critiques (posted by females) were often followed by male responses with more arguments (18% of the time) or evaluative comments (15% of the time) . Note that the density of the connecting lines depict the relative frequency of the responses.

Insert Figure 2 about here

Impact of interactions. To measure the impact of each gender interaction (male-male, female-female, male-female, and female-male) on the discussions and their ability to elicit subsequent responses to advance discussion threads, more computer code was written to perform lag sequential analysis to count the total number of threaded messages following each gender interaction. For example, the male-male interaction in ARGm->CRITm (see messages 1 and 6 in Figure 1) at lag0 and lag1 generated a total of five responses in two subsequent threads with two responses observed at lag2 and lag3, and one response observed at lag4. In contrast, the male-female interaction in ARGm->ARGf (messages 1 and 2 at lag0 and lag 1) generated a total of three responses (at lab2, lag3 and lag4) in subsequent threads. One of the reasons for conducting this analysis is because a previous study (Jeong, 2003) found evidence to suggest that more argumentative interactions (e.g. ARG->CRIT and CRIT->CRIT) generate significantly longer discussion threads than less argumentative interactions. If males are more likely to respond with argumentative responses than females, different gender interactions can be expected to differ in their ability to elicit responses that either facilitate or inhibit the continued growth of a discussion thread.

In this study, the overall impact of each gender interaction was measured in terms of the mean number of responses following each interaction within a discussion thread from lag2 and onward. See the results in Table 4. One limitation of this measure is that responses are counted multiple times as an outcome of one or more interactions

preceding the response within the same thread. The alternative of analyzing only the opening interactions of each discussion thread would result in a measure that would be based on an unacceptably and substantially smaller data set, thus reducing the reliability of the findings. Also considered in this study was the measure of *response rates* – the number of times an interaction elicits one or more direct responses (at lag 2 only) divided by the number of times the interaction is observed – which perhaps is a more straight-forward measure of impact. In the end, the mean number of responses was chosen to be the measure of choice because this measure was believed to provide a broader representation of the overall impact of each gender interaction.

Insert Table 4 about here

Theoretical Framework and Assumptions

The theory of dialogism (Koschmann, 1999) provides the theoretical framework and justification for examining gender interaction in terms of the relationship and transitional probabilities between messages and responses. Dialogic theory views language as part of a larger whole or social context in which all possible meanings of a word interact, possibly conflict, and affect future meanings. Meaning is produced not by examining an utterance by itself, but by examining the relationship between utterances. Secondly, meaning is renegotiated and reconstructed as a result of *conflict* in social interactions. Conflict is needed to drive inquiry, reflection, and articulation of individual viewpoints and underlying assumptions.

The implications of these assumptions is that the analysis of messages in isolation, as previous studies have done in comparing message frequencies between gender, provides insufficient information to fully understand the impact of gender differences in online discussions. Instead, the method of choice is to examine the relationships (or transitional probabilities) between messages and response with respect to the gender of the responders and the argumentative functions of the responses. As a result, *interaction* was operationally defined as a two-event sequence composed of a given message and a subsequent target response. The interactions of most interest in this study were those that centered around cognitive conflict, because the assumption was that conflict is the fundamental element driving discussion (and student participation) and the social construction of knowledge and meaning.

Results

Gender Differences in Number of Postings

The five online debates generated a total of 565 posted messages. Of these messages, 464 (82%) were posted as a response to another message. The mean number of messages posted by females was 26.4 (SD = 10.6), and the mean number posted by males was 32.2 (SD = 14.1), with females posting fewer messages than males. However, the difference in number of postings between males and females was *not* statistically significant, $t(17) = .974$, $p > .05$. Table 5 contains the overall mean number of postings between males and females,

as well as the mean number of postings within each of the six response categories (ARG, EVID, CRIT, ELAB, EVAL, OTH). No significant differences were found in mean number of postings between gender within each of the six response categories. Although not statistically significant, these results show the females overall tended to participate less than men in the online debates.

Insert Table 5 about here

Response Rates to Messages from the Opposite Gender

The analysis of response patterns revealed that females were more likely to respond to messages posted by males than messages posted by other females in the online debates. Females posted 49 replies to females versus 108 replies to males. The expected number of replies to females was 66.1, and to males, 90.9 based on the 11-to-8 ratio of male-to-females participating in the debates. The 108 observed replies to males was significantly higher than the expected 90.9 replies, χ^2 (1, $\underline{N}$ = 157) = 7.64, $\underline{p}$ < .05. A possible explanation for this finding is that the females were more comfortable confronting males than females with conflicting viewpoints – possibly because females perceive other males were more receptive to confrontations. Given that the discussions were conducted under a debate format, the females may also have felt more justified and re-assured in posting confrontational responses (particularly to men) given the performance expectations of the debate activity. If the discussions had been a more open-ended discussion, and not a debate, the expectations would be different and the women may avoid conflict altogether in their exchanges with both men and females.

In contrast, no significant differences were found between the rate of male responses to males versus females. Male students were equally likely to respond to messages from other males as they were to respond to messages from females. The males posted 120 replies to females and 187 replies to males. The expected number of replies to females was 129.3, and to males, 177.7. The differences in response rates however was not statistically significant, χ^2 (1, $\underline{N}$ = 307) = 1.14, $\underline{p}$ > .05. Although the difference was not significant, the observed response rates suggest that men had a slight preference to respond to messages from females rather than males. No explanations for this possible trend were evident from the given data.

Given that females were less likely to respond to other female students than to male students in the debates, a possible consequence of this pattern would be that messages from females would draw fewer responses than the messages from males. A lower response rate to women's messages would ultimately mean that women would be less likely than men to engage and participate in extended discussions. However, the results show that messages from females were just as likely to elicit responses (60%) as messages from males (59%). The equivalent response rates could be attributed to the slight tendency of men to respond to messages from females than from other males.

Patterns in Message-Response Interactions

The transitional probability matrix in Table 2 (as described earlier) provides some clues on explain how and why females were more likely to respond to messages from males than messages from other females. The upper left quadrant of Table 2 reveal only two significant interactions in female responses to females (ELABf->ELABf, ELABf->OTHf). In contrast, the lower left quadrant of the matrix reveals seven significant interactions in females responses to males (ARGm->ARGf, ARGm->CRITf, EVIDm->EVALf, ELABm->ELABf, ELABm->EVALf, EVALm->OTHf, and OTHm->OTHf). The difference in the number and nature of the interactions clearly show that females were more likely to engage in argumentative exchanges (ARGm->ARGf, ARGm->CRITf, EVIDm->EVALf) with males than with other females. These findings are to some extent consistent with the finding that women tend to have relational communication patterns that are supportive of women in their conversations (Tannen, 1994, 1990). These types of exchanges most likely helped to initiate and elicit subsequent exchanges in advancing a discussion thread, resulting in higher frequencies of other interactions (e.g. ELABm->ELABf, ELABm->EVALf, etc.) between males and females.

Although no significant differences were found in the proportion of male responses to males versus their responses to females, males appear to engage in more argumentative interactions with males than with females. A comparison of the interactions in the upper-right versus lower-right quadrant of Table 2 reveal this pattern. The upper-right quadrant reveal only one significant interaction (ARGf->CRITm) where males respond to females with a confrontational or critical response. Males also showed strong tendency to balance responses to females' arguments with evidence to support females' arguments (ARGf->EVIDm). In contrast, the lower-right quadrant reveals three significant interactions (ARGm->ARGm, EVIDm->CRITm, CRITm->CRITm) that were confrontational in nature. The CRITm->CRITm interaction in particular illustrates what is perhaps the highest level of confrontation among the other possible interactions. These findings are consistent with findings from previous studies (Tisdell, 1993; Vanfossen, 1998) – particularly with findings that men tend to have parallel types of communications with each other and persuade and argue points of view (Tannen, 1994, 1990).

The patterns in gender interaction can be more easily discerned by examining the transitional state diagrams (see Figure 2) of the female-to-female interactions to the male-to-female interactions. The female-to-female diagram illustrates the sparse level of interaction between females when compared to the male-to-female (female responses to male's messages) diagram where the interactions occur in greater frequency and diversity. The level of interaction is even greater and more diverse in the male-to-male interactions as well as in the female-to-male interactions. Other patterns can also be discerned from analysis of the diagrams. Among the four diagrams, the interactions with the highest response rates (depicted by the denser lines in the diagrams) appear to occur most often in female-to-male interactions (where males responded to females' messages). The interactions with high response rates in the male-to-male exchanges provide some evidence to suggest that the males tended to respond to other males by continuing a line of discussion (ARG->ARG, CRIT->CRIT, ELAB->ELAB, EVAL->EVAL, and OTH->OTH) rather than advancing a line of discussion by transitioning to a different response

category (ARG->CRIT, CRIT->EVAL, EVAL->ELAB) as found in the female-to-male diagram).

Given the females tendency to respond more often to messages from males, one of the implications of the findings is that both males and females may have competed for ideas and opportunities to respond to messages posted by males – particularly messages that were available and open to criticism. The tendency of females students to avoid argumentative exchanges with other female students combined with the competition to respond to messages from males could potentially lead to fewer opportunities for females to participate in the discussion. In addition, females prefer to initially watch and learn before becoming involved in the argumentation (Tannen, 1990), suggesting the possibility that the time required to reflect, compose and post a confrontational response may be greater for females than for males. In fact, the time required to post rebuttal to a criticism has been found to be significantly longer and twice the average amount of time to post a response in general (Jeong, 2003). Consequently, the longer a student takes to read, reflect and compose a response to a message, the more likely another participant will have stolen the opportunity to post a like-response. These types of circumstances might account for why females have been found to post fewer messages than males in online discussions. However, future research on average response times of males versus females will be necessary to confirm these speculations.

Impact of Gender Interactions on Subsequent Responses

The results in Table 4 shows that interactions in which males responded to messages (F-M and M-M interactions combined) elicited more responses and generated longer discussion threads than interactions in which females responded to messages (F-F and M-F interactions combined). The mean number of responses generated by male responses to messages ($M = 2.24$, $SD = 3.29$) was greater than the mean number of responses following female responses to messages ($M = 1.61$, $SD = 2.62$). This difference was statistically significant, $t\ (462) = -2.07$, $p < .05$. Note also that the female-female interactions generated 44.6% fewer responses ($M = 1.49$, $SD = 2.92$) than male-male interactions ($M = 2.69$, $SD = 3.32$), although this particular difference was not statistically significant. Because this study found women were less likely than men to engage in argumentation, the impact of male responses in gender interactions point to the important role of conflict in generating subsequent responses to advance discussion threads.

Discussion

In this study, women were found to post fewer messages than men in the online debates, which is consistent with previous studies that show women tend to avoid conflict (Tisdell, 1993; Vanfossen, 1998). However, the difference in participation was not statistically significant because this study also found the women were engaged in significantly more interaction with males than with other females. The analysis of the interaction patterns revealed that women not only responded more often to men's messages, but also responded in more argumentative exchanges with men than with women. As a result, the findings that women participate less because they avoid conflict is not entirely

accurate. Consequently, any observed differences in participation between men and women can be more accurately attributed to women's lack of conflict with other females and less on their avoidance of conflict with males. Furthermore, the observed tendency of women to respond more often to men's messages can create a situation where women have to compete for ideas and opportunities to respond to men's messages, potentially contributing to disparities in men and women's participation.

Disparities in participation between men and women might also be exasperated by the men's tendency to engage in more argumentative exchanges than women because argumentative exchanges are more likely to generate subsequent responses (Jeong, 2003) and opportunities to engage in further discussion. The lag sequential analysis in this study found that male-male interactions (where argumentative exchanges were prevalent) did in fact generate longer discussion threads than female-female exchanges (where argumentative exchanges did not occur). The results also show that male responses to any message tended to generate more discussion because of men's tendency to engage in more argumentative exchanges than women. As a result, engaging in argumentative exchanges creates opportunities for more discussion and participation, and avoidance of conflict results in fewer opportunities for participation. These findings are consistent with dialogic theory and its assumption that conflict arising from social interactions is what drives the processes of inquiry and discourse.

While some of the gender interactions observed in this study can have a negative impact on participation, other patterns can have a positive impact on participation. Women's tendency to post more argumentative responses to men's messages most likely contributed to the observed similarities in the qualitative nature of responses. The mean number of responses within each response category were not significantly different between men and women. Women posted just as many critiques as men. Conversely, the men's tendency to post critical responses to women's arguments also may have contributed to the similarities in participation because such responses can initiate and engage the women into subsequent discussion to advance viewpoints and to clarify conflicts. The possible outcomes of this female-to-male interaction is supported by the findings of the lag sequential analysis of the female-to-male exchanges were found to generate longer discussion threads than female-to-female exchanges. The implications of these findings is that students overall benefit when online discussion groups are balanced by gender. The findings also underscore the important roles of discussion moderators in fostering interactions between participants, and setting a comfortable and open atmosphere for exchanging different viewpoints.

One limitation of this study is that the findings can only be interpreted within the context of online debates and argumentation. However, the overarching theory and assumptions framing this study point to the importance of conflict in interactions required in many if not most collaborative activities. As a result, the findings in this study will likely be relevant to studies of gender interaction in other collaborative activities. Nevertheless, further investigations into student interactions in collaborative problem-solving, group decision-making, brainstorming, and exploratory discussions for example will expand our understanding of gender interaction, gender differences and similarities, and ways to improve student participation and learning outcomes. For example, discussions to wrap-up

debates and negotiate group consensus can generate entirely different interaction patterns and participation outcomes given the focus of such an activity is to generate agreement rather than disagreement. Furthermore, multiple experimental groups will need to be tested to compare discussions between mixed gender, all-male and all-female discussions in order to better understand gender differences. Finally, larger student samples and a larger corpus of discussion data will be needed to generate sufficient cell frequencies in the transitional probability matrices to interpret future findings with higher degrees of confidence. The methods and tools (e.g. data analysis software, sequential analysis, and student-labeled messages) developed in this study are solutions to some of the common problems faced by researchers in computer-mediated communication (Rourke et al, 2001; McAlister, 2003). These and other solutions will create unprecedented opportunities to conduct empirical investigations into complex social interactions in large-scale studies.

Overall, this study successfully applied the method of event sequence analysis to identify patterns in gender interactions that affect student participation. Event sequence analysis was specifically used to examine '*who* was talking to whom' and 'who was saying *what* to whom'. More work is needed in examining different argumentation models (as well as models for other collaborative activities) and message labels for scaffolding discussions, and how specific task requirements and contexts affect and explain *why* men and women behave the way they do in online discussions. More work is also needed to study other factors (the *how*'s and *when*'s) that are likely to affect gender interaction and participation. Vanfossen (1998) suggests that women post fewer messages because they do not wish to be perceived as dominating discussions. As a result, women may make up the differences by posting longer messages than men. Subtle differences in language and tone (Savicki et al., 2002; Mahoney & Knupfer, 1997), use of qualifiers and intensifiers (Fahay, 2002), the explicit versus implicit statements of positions and disagreements (Vanfossen; 1998) are additional factors associated with *how* messages and responses are communicated. Finally, the consequences of response time or *when* responses are posted on student participation must be examined given the possibility of gender differences in the amount of time required to respond to messages (Tannen, 1990). The impact of these as well as other factors on gender interaction patterns and the effects of these patterns on the quantity and quality of student participation provide directions for future research.

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Table 1
Coding Scheme for Online Debates and Gender

Codes*	Labels	Definitions
ARG	Arguments	Establishing arguments to support or oppose a given issue or position
EVID	Evidence	Providing evidence and examples to support a stated argument
CRIT	Criticism or Critique	Examine and find flaws or weakness in another's response
ELAB	Elaborate	Expanding on an idea provided by another
EVAL	Evaluation	Analyze and determine value of a response
JUDG	Judgment	State a judgment or position on a stated argument based on presented evidence and analysis
OTH	Other	Process comments or extraneous comments not relevant to the debate.

*Gender tags ‘f’ or ‘m’ were provided after code, meaning female or male respectively

Table 2
Transitional Probabilities between Two-Event Sequences Across Gender

	ARGf	EVIDf	CRITf	ELABf	EVALf	OTHf	ARGm	EVIDm	CRITm	ELABm	EVALm	OTHm	Replies	No Replies	Givens	Reply Rate
ARGf	.05	.06	.11	.02	.02	.02	.16	**.21**	**.17**	.11	.05	**.03**	63	14	56	75%
EVIDf	.04	.00	.13	.04	.00	.13	.13	.17	.13	.08	.04	.13	24	15	31	52%
CRITf	.09	.09	.09	.03	.03	.00	.18	.12	.06	.09	.15	.09	34	10	37	73%
ELABf	.05	.00	.00	**.15**	.05	**.15**	.05	.10	.05	.10	.10	.20	20	9	25	64%
EVALf	.06	.00	.00	.00	.00	.06	.18	.06	.06	.18	**.24**	.18	17	17	33	48%
OTHf	.09	.00	.00	.00	.09	.09	.09	.00	.00	.00	**.27**	**.36**	11	19	29	34%
ARGm	**.10**	.05	**.15**	.05	.06	**.00**	**.20**	.09	.12	.07	**.05**	.07	82	35	94	63%
EVIDm	.05	.05	.11	.03	**.13**	.00	.05	.05	**.21**	.11	.11	.11	38	20	45	56%
CRITm	.06	.06	.06	.04	.04	.06	.09	.09	**.22**	.13	.07	.09	54	15	52	71%
ELABm	.02	.05	.07	**.10**	**.10**	.02	.09	**.02**	.05	**.28**	.12	.09	58	21	60	65%
EVALm	.03	.00	**.00**	.08	.08	**.13**	.10	.05	**.00**	.13	**.23**	.18	39	22	52	58%
OTHm	.04	.00	.04	.00	.04	**.38**	.08	.00	.04	.08	.08	.21	24	29	51	43%
	26	19	37	22	26	27	58	41	52	57	48	51	464	226	565	58%

Table 3
Transitional Probability Z-Scores for Tests of Significance

	ARGf	EVIDf	CRITf	ELABf	EVALf	OTHf	ARGm	EVIDm	CRITm	ELABm	EVALm	OTHm	
ARGf	-0.31	0.97	0.99	-1.27	-1.49	-1.54	0.87	**3.55**	**1.69**	-0.31	-1.57	**-2.13**	63
EVIDf	-0.31	-1.04	0.84	-0.14	-1.23	1.44	0.00	1.39	0.21	-0.61	-1.02	0.24	24
CRITf	0.85	1.45	0.19	-0.51	-0.70	-1.51	0.94	0.62	-1.02	-0.64	0.87	-0.42	34
ELABf	-0.12	-0.94	-1.35	**2.21**	-0.12	**1.79**	-1.04	0.19	-0.90	-0.32	-0.05	1.32	20
EVALf	0.05	-0.87	-1.24	-0.94	-1.02	0.01	0.65	-0.44	-0.71	0.69	**1.82**	0.89	17
OTHf	0.51	-0.69	-0.99	-0.75	0.51	0.47	-0.35	-1.05	-1.19	-1.26	**1.87**	**2.72**	11
ARGm	**1.80**	0.39	**2.45**	0.06	0.21	**-2.48**	**2.12**	-0.11	0.31	-1.51	**-1.79**	-1.17	82
EVIDm	-0.10	0.38	0.61	-0.64	**2.11**	-1.60	-1.41	-0.81	**2.01**	-0.34	0.04	-0.10	38
CRITm	-0.02	0.58	-0.70	-0.38	-0.65	-0.09	-0.77	0.12	**2.73**	0.16	-0.75	-0.43	54
ELABm	-1.37	0.44	-0.32	**2.15**	**1.68**	-1.42	-0.96	**-2.04**	-1.56	**3.80**	0.46	-0.62	58
EVALm	-0.86	-1.35	**-1.92**	0.91	0.59	**1.95**	-0.44	-0.85	**-2.32**	0.11	**2.73**	1.45	39
OTHm	-0.31	-1.04	-0.71	-1.12	-0.31	**6.81**	-0.63	-1.57	-1.12	-0.61	-0.33	1.58	24
	26	19	37	22	26	27	58	41	52	57	48	51	464

Probabilities shown in bold were significantly higher than the expected probability by chance alone.
Probabilities in bold & underline were significantly lower than expected probability.

Table 4
Responses Following Gender Interactions in Subsequent Discussion Threads

	ARG-f	EVID-f	CRIT-f	ELAB-f	EVAL-f	OTH-f	ARG-m	EVID-m	CRIT-m	ELAB-m	EVAL-m	OTH-m	Total Responses	Interactions	Mean # Responses	Standard deviation
Female-Female	4	2	5	3	3	12	4	8	8	12	0	12	73	49	1.49	2.92
Male-Female	7	6	5	8	13	14	27	10	12	26	21	31	180	108	2.18	2.48
Female-Male	8	8	13	17	17	23	27	13	19	44	26	33	248	120	1.82	3.25
Male-Male	13	7	20	17	21	21	65	23	41	65	79	67	439	187	2.69	3.32
	32	23	43	45	54	70	123	54	80	147	126	143	940*	464	--	--

** The total number of responses following the observed interaction was greater than the total number of actual responses (n = 464) because each response was counted as a product of one or more interactions preceding the response within a given discussion thread.*

Table 5
Mean Number of Postings Overall and by Response Category

		ARG	EVID	CRIT	ELAB	EVAL	OTH	*Overall*
FEMALE	Mean	7.00	3.88	4.63	3.13	4.13	3.63	26.38
	STD	4.04	4.16	4.31	2.23	3.04	2.13	10.65
MALE	Mean	8.55	4.09	4.73	5.45	4.73	4.64	32.18
	STD	5.85	2.88	3.47	4.13	2.87	4.63	14.15
	T-Test	.530	.895	.955	.168	.665	.575	.344
	n	150	76	89	85	85	80	565

Figure 1
Example discussion thread with student-labeled messages

1 **ARGm:** To say that 'knowledge cannot be instructed or transmitted by a teacher, but can only be constructed by the learner' is an overgeneralization. It would make teachers obsolete.

2. **ARGf**: Excellent argument. It is the symbiotic relationship between teacher and student that enables learning to take place. The teacher must provide guidance to the learner.

3 . . . **JUDGm**: This is a well-reasoned commentary. I agree with these contentions, but I believe that what has not been explained is how a learner constructs new ideas stemming from new theories or perspectives. Although I side with the opposition, I believe there must be a middle ground that recognizes that learners can construct knowledge.

4 . . . . . **ELABf**: A self-taught person can only construct new ideas until they have learned the pre-requisite information and skills needed to construct the new knowledge.

5 . . . . . **OTHm**: Very well stated about the conditions of self-taught individuals. I thought that was a good comeback.

6 **CRITm**: What teachers transmit is not knowledge, but accumulated *information*. We use this information as tools to construct new knowledge. By analogy, we need access to tools and materials to construct a house. The transmission and access to tools and information simply facilitates the construction of a house.

7 . . . **CRITm**: But I would argue that teachers can and do transmit knowledge or information. What you are saying instead is that *NEW* knowledge (or building an architecturally unique house) cannot be instructed by a teacher and must be constructed by the learner. And that is an entirely different argument.

8 . . . . . **CRITf**: But not all learned knowledge is instructed. I learned how to build houses by mainly watching my father build houses and learned through practice. I never received any formal instruction.

9 . . . . . **EVALm**: From what has been said thus far, some learning result from instruction and some do not. From an epistemological standpoint, this is consistent with Constructivists' acceptance and synthesis of cognitive learning theories and principles.

10 . . . **ARGf**: Although there is truth to what you say, most of the skills and tools used to build a house is passed down from one generation to the next through and are not re-constructed. In other words, we generally try to avoid the mistake of always trying to "re-create the wheel".

11 . . . . . **EVIDm**: Your ideas are consistent with what Driscoll states in Chapter 3 of the textbook. Teacher input is important and so is their assessment of the learner's performance in order to ensure performance is to established standards.

Figure 2
Transitional State Diagrams of Interactions Between and Within Gender