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Instr Sci
DOI 10.1007/s11251-007-9042-5

Online but off-topic: negotiating common ground in small learning groups

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Received: 21 November 2006 / Accepted: 12 November 2007
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Abstract There is not yet a great deal of research in formal online learning environments focusing on the seemingly "off-topic" conversations that small groups engage in as they complete learning tasks together. This study uses the theory of common ground as a framework to explore what participants are talking about when not discussing the concepts to be learned and how participants negotiate common ground in distance learning environments, including their use of computer-mediated communication (CMC) tools. The e-mail, discussion forum, and chat transcripts of 10 small groups comprised of experienced distance learners were investigated using computer-mediated discourse analysis (CMDA), particularly attending to functional moves exchanged while completing tasks. Findings were as follows. First, groups talked more about off-topic issues such as logistics, social and technology concerns than they did the concepts to be learned. Second, they used the discussion forum more than chat or e-mail, but they did not vary much in their choice of mode for talking about particular topics. Finally, the groups established common ground through being explicitly responsive, responsible, and relational. Implications are that highly structured learning tasks should be balanced with more open-ended discussions that require less attention to logistic detail, students should be encouraged to attend to grounding strategies, and students should remain in the same groups long enough to develop such strategies.

Keywords Online discussion · Online learning · Collaborative learning · Distance learning · Common ground · Computer-mediated communication

Introduction

Computer-mediated communication (CMC) tools are now frequently used in educational environments to support collaboration between learners. In fully distance courses they are

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the primary, if not sole, means by which students talk and work together. In blended environments they can extend face to face conversations beyond the designated weekly class time. While collaboration among students is desirable for many reasons in educational contexts, research in the area of online discussions has tended to focus on how deep and substantial the conversations are from the standpoint of the instructor or researcher, with an emphasis on cognitive over other types of engagement (Garrison and Cleveland-Innes 2005; Gilbert and Dabbagh 2005; Wallace 2003; Zhu 2006). Results of these studies have often shown students engaging in a superficial rather than deep cognitive levels in online discussions. Practitioners continue to question how best to integrate discussions into online environments to meet learning goals.

Groups engage in conversations on a variety of subjects as they work together on assigned tasks. Previous research has distinguished between types of conversational contributions which are "on-topic", about the concepts to be learned, and those which are "off-topic" about procedures for completing the task. Curtis and Lawson (2001) analyzed the discussions of 13 students working in small groups online, noting that the conversations included such off-topic elements as planning, contributing, seeking input, monitoring and using social strategies. Stacey (1999) analyzed three groups comprised of 31 part-time graduate MBA students and found that groups spent their time on what could be considered both on-topic (clarifying ideas; obtaining feedback; sharing perspectives, resources and advice; seeking group solutions; negotiating meaning; practicing new language) and off-topic (providing emotional and technical support; conveying commitment to the group; changing roles as needed and managing group activities). Poole (2000) identified four categories of conversation in her study of an online graduate course: article/content (on-topic) and technical, procedural, and nonacademic (off-topic). Davidson-Shivers et al. (2001) used the analytic categories of substantive (on-topic) and non-substantive (off-topic). Within the non-substantive category they identified the subcategories of procedural, technical, and chat/supportive.

In any collaborative effort, however, these "surface" elements of the discussions, considered off-topic, likely serve an important purpose for the group. These elements have been characterized in a variety of ways in the literature. For example, Garrison et al. (2000) critical inquiry framework for analyzing online discussions includes indicators of social presence as well as cognitive and teaching presence. The social presence aspect includes emotional expression, open communication and group cohesion. Tu and McIsaac (2002) conducted a mixed-methods study of 51 graduate students to understand their perception of social presence. They identified three dimensions: social context, online communication and interaction as key to establishing a sense of community. Russo and Campbell (2004) investigated perceptions of mediated presence, analyzing 31 student responses on surveys and interviews. They found that frequency of interaction, participants' responsiveness, and the *way* participants talk impact how presence is established. Thus part of the off-topic discussions in CMC environments are to establish presence in the absence of physical co-location.

Negotiating common ground, or *grounding*, is a promising theoretical framework for understanding the way that participants talk during these off-topic conversations. Grounding may also shed light on how social presence is established. Common ground includes "mutual understanding, knowledge, beliefs, assumptions, pre-suppositions, and so on" (Baker et al. 1999, p. 33) that exist among people communicating together. Baker et al. go on to explain that grounding "is the process by which agents augment and maintain such a common ground" (p. 33). An explicit process of negotiation is needed to create and maintain the common ground for groups to go on together (Baker et al. 1999).

The way this occurs in formal text-based online learning environments has not been explored at length.

Clark and Schaefer (1989) distinguish between participatory (collective) and autonomous (individual) contributions to the common ground, emphasizing that individuals coordinate their actions through participatory contributions. This takes place through *presentations* of individual contributions and *acceptance* of these contributions by others involved in the communication. However, participants do not always explicitly request or provide feedback to each other regarding whether common ground assumptions are mutually understood. At any of four levels difficulties may arise and communication may break down, at level of: *contact* (indicating they are willing and able to continue the interaction), *perception* (indicating they are willing and able to perceive the message), *understanding* (indicating they are willing and able to understand the message) and *attitudinal reaction* (indicating they are willing and able to react and respond, accept or reject the message) (Allwood et al. 1992; Baker et al. 1999). Evidence of understanding takes place in several ways: by paying continued attention, by initiating the relevant next contribution, by acknowledging that one has heard, and by demonstrating and displaying understanding of what has been contributed (Clark and Schaefer 1989, p. 267). Not noticing a contribution made by another, incorrectly hearing the contribution, or not understanding the contribution may each lead to trouble in understanding.

Grounding is a particularly interesting concept in text-based CMC environments. In face to face conversations, grounding can occur quickly through non-verbal behaviors (such as nodding, making eye contact, or adopting a puzzled facial expression), but these cues are not available in the text-based online environments such as those provided by learning management systems commonly used by universities. In the early days of CMC, researchers felt that since CMC was a "lean" medium, with few of these cues available, any type of interpersonal relationship would be nearly impossible to establish (Rice and Love 1987; Sproull and Kiesler 1991). Since then, of course, this assumption has changed, and researchers are now attending to how social presence and immediacy are established in CMC environments. Dickey et al. (2006) point out that miscommunication in online environments often has less to do with the "lean" CMC medium and more to do with the lack of shared understandings.

In CMC environments "immediacy refers to communicative behaviors that reduce the physical or psychological distance between individuals and foster affiliation" (O'Sullivan et al. 2004, p. 469). In a synthesis of three studies they conducted in online educational environments, O'Sullivan et al. (2004) explore how immediacy is established through CMC in online educational environments, categorizing dimensions of approachability ("You can approach me") and regard for other ("I am approaching you") (p. 472). Nine dimensions of approachability (self-disclosure, expressiveness, accessibility, informality, similarity, familiarity, humor, attractiveness, expertise) and four dimensions of regard (personalness, engagement, helpfulness and politeness) are discussed. O'Sullivan found that "there continues to be a gap between the experienced and the inexperienced, and differences in experience may contribute to…miscommunication and all the problems associated with it" (p. 486). Thus attending to how experienced online learners establish immediacy and negotiate common ground is particularly important.

Nardi (2005) conducted an ethnographic study to explore the use of instant messaging among 20 participants in a work environment. She identified three dimensions of connection (defined as "state of communicative readiness"): affinity (small talk and humor), commitment (a sense of presence) and attention (negotiating availability for conversation). Nardi argues that the dimensions of connection differ from the theory of common ground in that

connection is about interpersonal relationships, whereas common ground is about pure information exchange. Nardi acknowledges that future research should integrate the two.

Baker et al. (1999) argue that different modes of CMC support and constrain conversations in different ways, and will likely result in different styles of grounding.

> Understanding how and when grounding leads to collaborative learning therefore requires detailed analysis of learners' *goals* in specific *situations* that motivate them to go further in their attempt to gain mutual understanding, of the extent to which *material and semiotic tools* that they use can be appropriated, and especially, of the different forms of mutual understanding that will need to be achieved by the learners with respect to these 'objects.' (p. 63)

Kirschner et al. (2004), Moreno (2006), Smith et al. (2003) and Zhao et al. (2004) also emphasize that CMC modes have features that support particular types of communicative tasks and that is worthwhile to examine how this occurs. Yet Vandergriff (2006) compared grounding techniques used by 18 advanced second language learners across face to face and CMC contexts and found no impact of the medium on grounding. Their study, however, narrowed the concept of common ground to four types of reception strategies (global reprise, specific reprise, hypothesis testing, and forward inferencing), which may not capture the nuances of how participants fully negotiate common ground.

Deciding which CMC mode to use for which components of the task is a major decision that online groups are faced with and is part of establishing common ground (Ahern et al. 2006; Baker et al. 1999; Clark and Schaefer 1989; Mäkitalo et al. 2002). Haythornthwaite et al. (2000) recommend providing multiple modes of communication for participants. Focusing on the communicative practices that take place through the technologies is key to better understanding the grounding process in CMC environments. As O'Sullivan et al. (2004) point out, "Less attention has been paid to the distinctive set of communicative possibilities presented by each channel, and how individuals conduct their interactions as they take into account, or creatively employ, a channel's characteristics" (p. 468). Kirschner et al. (2004) advise researchers to investigate what learners actually do when collaborating in CMC environments. This study takes a naturalistic approach to investigating how groups of experienced online learners work together in a text-based CMC environment.

In an educational context, there is some evidence that groups must create and maintain common ground in order to effectively reach learning goals. Mäkitalo et al. (2002) analyzed eight weeks of discussion among 68 preservice teachers and seven mentors. They found that participants need to explicitly use strategies of questioning, negotiation, providing evidence of understanding, positive willingness to continue the conversation, and supportive feedback. They found that these strategies were used more frequently in the deeper level discussions, suggesting that attending to grounding may be related to cognitive engagement. The Mäkitalo et al. study focused only on particular statements in the discussions (feedback and questions), and they suggest that future research look at full postings.

Mäkitalo et al. (2002) suggest that learners be instructed to provide explicit feedback to each other as part of grounding. Ahern et al. (2006) developed a software system (IdeaWeb) to explicitly support development of common ground among 13 science education students. Ahern et al. (2006) noted that establishing common ground takes time and while the software did support the process, moderators or teachers still need to be on hand to encourage full participation. This is consistent with other studies which have concluded that more overt facilitation of online groups is needed to "guide" them to effectively learn together online. An alternative perspective, however, is that groups often learn how to

work together through experience. Over time distance learning groups often *do* function without the instructor's explicit participation. What exactly are these groups doing? This study looks closely at this type of group.

Most studies have focused on the "on-topic" elements of online discussions from a cognitive engagement, deep learning perspective (Zhu 2006). Cognitive presence frameworks such as Garrison et al. (2000) have analyzed the quality of the conversations, but other elements have been explored less thoroughly. As Mäkitalo et al. (2002) and Avezedo et al. (2004) suggest, the ability to establish common ground may be related to the ability of groups to then reach deeper levels of cognitive engagement. How groups working together in online learning environments manage this when separated by time and space is of great interest. This study takes an initial step by exploring more fully how small groups of experienced online learners negotiate common ground while complete learning tasks in a distance environment. The following questions are explored:

1. What are participants talking about when they are "off-topic", that is, not discussing the concepts to be learned?
2. How are CMC tools used to negotiate common ground?
3. How are participants negotiating common ground when completing tasks at a distance?

Context and method

This paper reports findings from a larger study of small group interactions in an online graduate level educational psychology course at a large Midwestern University (Paulus 2005, 2006). The course, which lasted 12 weeks, covered theories of learning and teaching. This course was selected because the researcher and course instructor were already working together to design and develop the course and were eager to systematically investigate the student interactions during the course. During two-week units the 21 students were assigned to small groups to complete learning tasks in which they synthesized and applied the course concepts. Tasks were designed according to recommendations by Hathorn and Ingram (2002) for promoting collaboration. Groups could use any communication mode available in the university's course management system: e-mail, asynchronous discussion forums or synchronous chat. All tasks required the group to create and submit a final document to the instructor. The groups accomplished this task without instructor intervention. Each student also wrote a reflection about the learning experience after each task was completed.

Sixteen of the 21 students[1] enrolled in the course consented to participate in the study; thus a total of 10 groups were analyzed. (See Tables 1 and 2). These groups all completed the tasks without instructor intervention. All but two of the students (Alissa and Lola) had prior experience with online group work; all but three (Alissa, Lola and Jaclyn) were members of the same cohort, meaning they had worked with each other prior to this course. A professor from the educational psychology department and a graduate assistant taught the course, neither of whom were involved in the data analysis for this study.

[1] All participant names were replaced with pseudonyms prior to the start of data analysis. The name of the course management system has also been changed. This measure was taken to ensure confidentiality of the data for the protection of human subjects. Approval was obtained from the Institutional Review Board prior to the start of the study.

Table 1 Participants

Pseudonym	Gender	Occupation	Number of previous distance courses	Previous experience with this online learning environment
Alissa	F	Graduate student	None	Yes
Arthur	M	History teacher	Two	No
Carla	F	Social studies teacher	Two	No
Gregory	M	Media technician	Three	No
Jaclyn	F	Adult literacy coordinator	Four	No
Kyle	M	Math teacher	Two	No
Larry	M	Bilingual education coordinator	Three	No
Libby	F	Elementary teacher	Two	No
Lola	F	Graduate student	None	Yes
Michael	M	Elementary teacher	Three	No
Milt	M	Human factors engineer	Three	No
Ron	M	Social studies teacher	Two	No
Sariah	F	Technical writer	Three	No
Tonya	F	Corporate trainer	Two	No
Trevor	M	English teacher	Two	No
Trish	F	Educational consultant	Three	Yes

Table 2 Groups

Group	Size *n*	Group members
Apple	5	Gregory, Larry, Alissa, Jaclyn, Sariah
Lime	5	Libby, Kyle, Ron, Trish, Michael
Kiwi	5	Trevor, Carla, Milt, Tonya, Arthur
Fig	11	Libby, Gregory, Kyle, Larry, Alissa, Jaclyn, Ron, Trish, Sariah, Lola, Michael
Orange	4	Trevor, Gregory, Sariah, Michael
Tangerine	4	Lola, Libby, Arthur, Ron
Plum	4	Trevor, Tonya, Trish, Michael
Melon	4	Kyle, Larry, Jaclyn, Trish
Grape	3	Gregory, Alissa, Ron
Berry	3	Libby, Sariah, Arthur

This qualitative study was designed according to principles outlined by Merriam (1998), with a computer-mediated discourse analysis (CMDA) approach used to analyze the data. Merriam (1998) emphasizes that qualitative design is emergent. Iterative, dynamic techniques of data collection and analysis are often used by qualitative researchers. Data collected included the transcripts of all communication that took place among members of the 10 groups through e-mail, synchronous chat and in the asynchronous discussion forums.[2] Chat and forum transcripts were automatically archived by the course management system and downloaded into word processing and spreadsheet files for analysis after the

[2] Students were highly encouraged to communicate within the course system since a portion of their grade was based on team process; thus, it is believed that all communication that did take place was captured for analysis.

course had ended. All e-mail correspondence was saved by the instructor and students and sent to the researcher at the end of the course.

The CMDA approach of unitizing and coding messages according to their function in the conversation was utilized for data analysis (Herring 2004; Paulus 2004). Messages were first unitized into functional moves. A functional move is defined as the part of a message which serves a particular purpose, similar to what Henri and Rigault (1996) define as a speech segment: "the smallest unit of delivery, linked to a single theme, directed at the same interlocutor, identified by a single type, having a single function" (p. 62).

To answer the first research question (what the groups were talking about), each functional move was first coded as one of four topics: conceptual (related to the course objectives), logistics (related to completion of the task), technical (related to the communication tools being used), or social (e.g. small talk). The total number of moves in each topic category were tallied and compared across communication modes (e-mail, chat, and discussion forum) to answer the second research question (how the three CMC modes were used).

These four topic categories emerged from a pilot study (Paulus 2004) which was conducted with a small three-person online group from the same course the previous year. The purpose of the pilot study was to refine the data analysis methods. A code-recode procedure was used to establish stability in the coding of functional moves in the pilot study, since it is a potentially subjective aspect of the analysis (Herring 2004). Stability (also known as intra-observer reliability or consistency) "is the degree to which a process is invariant or unchanging over time" (Krippendorf 1980, p. 130). The researcher re-coded for functional moves several months after the initial coding was completed, finding 85% agreement between the first and second coding.

These four categories are consistent with those used in previous studies. Poole (2000) identified similar categories in her study of an online graduate course, identifying four topics: article/content (conceptual), technical, procedural (logistics) and nonacademic (social). Davidson-Shivers et al. (2001) used the topical categories of non-substantive (non-conceptual) and substantive (conceptual). Within the non-substantive category they identified procedural (logistic), technical, chat/supportive (social), and uncodeable.

To answer the third research question, the three categories (logistics, technical and social) were analyzed further to better understand how participants established common ground.[3] Each functional move was coded as to the role it played in the conversation. Analysis began by comparing the functional moves to the coding scheme developed during the pilot study, and this initial coding scheme was continually modified through a process of analytic induction, described later in this section.

Krippendorf (1980) outlines three types of reliability: stability, reproducibility and accuracy. Reproducibility was established through the use of two raters to analyze a portion of the data set to eliminate inconsistencies in the coding. Two raters worked together on the functional move analysis with the goal of reaching 80% agreement (Bauer 2000). The complete set of data from Group Orange (91 forum messages, 12 email messages, 95 chat messages) was analyzed by both raters. Group Orange was chosen because (1) the group used all three types of tools to communicate and (2) its transcripts represented 20% of the entire data set. The two raters first worked together to code a subset of messages until they were both comfortable with the process. They then worked independently to code 32 functional moves, and when they compared their results they had 72% agreement. The coders continued coding independently for 54 additional functional

[3] Further analysis of the "on-topic" conceptual moves is reported elsewhere (Paulus 2005).

moves, met again to compare their findings and had 87% agreement. The third round of coding yielded 86% agreement, the fourth round 77% agreement, and the fifth round 89% agreement. Overall the interrater reliability was 83% (236 out of 284 functional moves).

When the raters did not initially agree on the coding, the following negotiation process was used to reach consensus on how to code the functional move. First, each rater stated her reasons for the code she assigned based on the criteria. In some cases one of the raters readily agreed that the other coder was correct based on the criteria, and the move was coded accordingly. When the two raters felt it was not clear into which category a move fit, modifications to the coding scheme were made to resolve ambiguities as follows:

a. In most cases the category was redefined more broadly or narrowly to eliminate the ambiguity.
b. When multiple examples of a phenomenon occurred that did not fit the existing codes, a new category was added to the coding scheme.
c. When either of these modifications was made to the coding scheme the entire data set was recoded using the new scheme.

As a result of this process no functional move remained uncodeable. The final coding scheme is presented in the findings section.

Findings

Research question #1. What are participants talking about when not discussing the concepts to be learned?

A total of 2,552 functional moves were exchanged by the 10 groups. Of these, 1,563 (61%) were off-topic (non-conceptual). Table 3 outlines the topics discussed by the groups.

Logistic (1,003 moves) accounted for 39% of the total moves exchanged. Social moves (441 moves) were 17% and technology-related moves (119 moves) accounted for 5%. Thus, logistic and conceptual issues were equally attended to, but non-conceptual "off-topic" moves greatly exceeded conceptual moves.

Research question #2. How are CMC tools used to reach common ground?

Table 4 illustrates the non-conceptual functional moves which were exchanged in the three CMC modes: forum, chat and e-mail. The participants utilized the discussion forum more than the chat or e-mail modes.

Table 3 Functional moves

Topic	Description	Total moves	Percentage
Technical	Functionality and use of the communication tools	119	5
Social	Interpersonal exchanges (greetings, closings, small talk)	441	17
Logistic	Completion of the task	1003	39
Conceptual	Conceptual understanding of the content of the task	989	39
	Total	2552	100

Table 4 Topics by communication mode

Categories	Forum		Chat		E-mail	
	No.	%	No.	%	No.	%
Technical	65	5	51	18	3	3
Social	326	28	74	26	41	45
Logistic	793	67	163	57	47	52
Total	1184	100	288	100	91	100

In each of the three CMC modes the participants talked mainly about logistics, followed by social moves and then technical moves. A more detailed analysis of the choice of communication mode for completing parts of the task are reported elsewhere (Paulus 2005, 2007).

Research question #3. How are participants establishing common ground when completing tasks at a distance?

The functional move subcategories within the technical, social and logistic topics reveal that groups were responsive, responsible and relational with each other. They explicitly elicited and provided responses, they attended to their individual responsibilities within and to the group, and created and maintained relationships with each other. These subcategories and how they connect to the ideas of responsiveness, responsibility and relationship are explored next.

Technical moves

These moves concerned the functionality and use of the communication tools, such as reporting slow server connections or use of word processing features. Table 5 illustrates the subcategories: managing use of the tools (61%), supporting each other's attempts to use the technology (23%) and expressing emotions (17%).

Table 5 Technical functional move categories

Category	Functional moves	Examples	Number
Manage use of the tools	Express an opinion about tool use, explain a previous statement	*OH, IF YOU TAKE THIS TO EDIT IT: 1. I DID NOT turn on tracking. You should probably do that when you edit.*	72 (61%)
Support each other	Request or provide help or information about tool use, empathize, agree	*I too am having difficulty uploading messages and files.*	27 (23%)
Express emotion	Express frustration or dislike	*Forgot to attach the document. Dang, but I hate Courseline! In my opinion it's way off course in terms of usability!*	20 (17%)
Total			119

The most common functional move related to technology use was to manage the use of the tools (61%). For example, Trish and Trevor discussed the chat feature of Courseline:

> Trish: This is my first chat session using Courseline.
> Trevor: This is my second chat in courseline. Although I generally don't like it as well as [the previously used tool], this isn't as bad?
> Trish: Not as bad…but there are somethings [sic] missing on courseline that [the previously used tool] has…

Michael in Group Orange asked his group: "Should we create a posting for each question, then we could each post or reply within the question's sub-file?" This reveals a concern with effective use of how best to use the communication tools, and use of questioning to bring all members into the conversation, a responsiveness component of the grounding process.

Another indicator of responsiveness is the subcategory of supporting group members, which accounted for 23% of the technical functional moves. In Group Orange, Michael, for example, empathized with Trevor by posting: "I too am having difficulty uploading messages and files." Seventeen percent of the moves were emotive, which include expressions of frustration. These were often about the Courseline system, as we see in this post from Sariah in Group Orange: "Forgot to attach the document. Dang, but I hate Courseline! In my opinion it's way off line in terms of usability!" Trevor and Michael's Group Plum chat is another example of empathizing:

> Trevor: #$@% I just spilled beer on my keyboard
> Michael: Sorry to hear that Trevor.

The use of a new communication environment, Courseline, presented the students with some challenges. One major disadvantage is that it is not possible to modify a discussion posting once it has been entered into the forum. Alissa conveyed her frustration with this feature in Group Apple by posting: "I misspelled simile. Darn you courseline."

Another technical problem occurred while trying to upload certain types of attachments. The most striking example is this series of four messages posted by Trevor in Group Plum as he tried to attach an image file:

> 7/14/2002 7:10:14 PM
> …Could this somehow work for the advance organizer?
> 7/14/2002 7:13:54 PM
> I didn't think that last one would work but thought it was worth a shot. Click on the attachment to see the advance organizer I described in the last message.
> 7/14/2002 7:17:19 PM
> Getting frustrating, sorry. I really wish I could modify these so I wouldn't look so stupid, but I suppose the shoe fits.
> 7/14/2002 7:20:48 PM
> I'm sorry. I thought that would work for sure. It should have. Here is the word doc. this has been a lot of work for virtually nothing. Sorry. #^$(@&%!!!

Trevor never succeeded in posting the attachment, and Trish empathized with him: "Courseline is not the best online forum to use, is it???" In both Trish's response and Michael's response in the previous excerpt, we see explicit acknowledgement that they have "heard" the other, responding by providing the feedback needed for common ground to be maintained.

Social moves

There were three broad categories of social functional moves: politeness (49%), group cohesion (38%) and socialize/play (13%). Table 6 outlines the frequency of these moves.

Politeness moves were the most frequent type of social move, accounting for nearly half of all social moves. Closing moves, at the end of messages, were coded as politeness rather than group cohesion, however, elements of group cohesion were often evident in closing moves, as evidenced by these excerpts from Group Tangerine members as they began their work together:

> Arthur: I'm looking forward to this assignment!
> Libby: I look forward to working with you all and getting to know you more.
> Ron: I look forward to a smooth and enjoyable unit.
> Lola: …looking forward to start our team project.

Politeness strategies are opening moves for creating relationships among participants in the group. They ground participants in acceptable ways of interacting with each other, and ground them as members of the same community.

Responsibility to the group, as well as responsiveness, are negotiated through group cohesion moves which accounted for 38% of the social moves. Often these moves included expressions of encouragement such as "good job" or other general feedback on group member performance. Some groups even exchanged congratulatory messages via email after receiving a high grade on their projects. Both the group cohesion moves and the mitigate moves reflect awareness of prioritizing the group over the individual. Mitigating moves included expressions such as "just my 2 cents worth." For example, Libby initiated a discussion about assigning tasks in Group Tangerine, and ended her post with a mitigating move emphasizing her concern for the overall group process and welcoming additional ideas from the group [italics added]:

> …I was thinking that the person who does three should also combine the parts of the document into one whole. I know that Ron is out of town until Thursday—so this is just to get us started as soon as he gets back. *If either of you have another idea of how to go about the assignment share it—this is just what I saw—doesn't make it the only way :)*

This type of move establishes common ground by eliciting responses from others as to how best to go on together and emphasizes responsibility to the group. This balance between individual contributions and group responsibility was a regular feature of the off-topic conversations.

Least common was socializing (13%). Small talk is a way of creating and maintaining relationships among the group members. In this example Sariah and Libby exchanged some off task thoughts about Libby's coming new baby in Group Berry's discussion forum:

> Sariah: So…the bambino is coming soon (I'm assuming that's why you are distracted). I think I'd be jumping out of my skin if I were in your shoes (your feet haven't swollen too much have they—you can still wear shoes right?). :-)
> Libby: I've been very lucky—no feet swelling and I've only gained weight (although 30 pounds!) on my belly button (from the back I don't look pregnant).

Sariah is explicitly conveying to Libby that she empathizes with how an element of her personal life, expecting a baby, may impact her studies. This "off-topic" talk facilitates trust and connection through sharing common experiences and relationship building.

Another example of this occurred at the beginning of Group Orange's chat as the three participants exchanged small talk about the movie *Lilo & Stitch*:

Gregory: How was the movie, Trevor? That thing looks creepy in the commercials.
Trevor: It was a little scarier and sadder than I thought, but it ended happy. My 4 year old was a little sad
Trevor: They liked it though
Gregory: Sad? Does the monster eat the little girl? 🙂

Trevor: No he saves her from the aliens
Michael: Trevor, would you recommend it to a 7 and 5 year old?
Trevor: Yeah I think it is fine. The 4 year old liked it, my 6 year old was fine.

However, this type of small talk was not that common, accounting for only 2% of all functional moves (Table 6).

Logistic moves

Logistic moves were the most common and fell into six broad categories: take action (31%), report/manage the task (19%), initiate (17%), provide response (16%), elicit response (13%) and direct others to act (4%). These categories are outlined in Table 7.

About a third of the logistic moves fell into the take action category. By explicitly stating their intended action, members communicated what their individual contributions and responsibilities were to the group effort. They stated their availability for working on the task. For example, as this was a summer course several of the group members had vacations, family visits, holiday plans and other obligations outside the course. Explicitly communicating availability became important to the effective functioning of the group, as illustrated in Gregory's post to Group Grape:

Table 6 Social functional move categories

Category	Functional move	Examples	Number
Politeness	Open the conversation, close the conversation, introduce self, thank	*Just thought I'd say hi to my teammates for this unit. So "Hi" Gregory, Trevor, and Michael.*	214 (49%)
Group cohesion	Offer praise on skills, express confidence in ability, congratulate, apologize, mitigate own contribution, empathize	*Hey guys, just thought I'd offer congratulations on the great grade on our project! Kick back and celebrate for a minute or two… :') - Sariah.*	169 (38%)
Socialize/play	Small talk, tease, play, joke	*Did the boys enjoy the move last night? (I kind of want to see it too!).*	58 (13%)
Total			441

Table 7 Logistic functional move categories

Category	Functional moves	Examples	Number
Take action	Inform group of availability to work, agree or volunteer to take action, state preferences for action	*Trevor, I'm taking your version now and will make the edits and add Michael's reference.*	312 (31%)
Report/manage	Report on action taken, express uncertainty, provide contact information	*I'm even more confused on what we're suppose to do now.*	190 (19%)
Initiate	Express opinion or provide new information, make suggestion, elaborate on previous statement	*Should we each respond to the questions and merge them; each team member jots down ideas for each question, merge, and edit; or each member takes one question, merge, and edit; or some other approach?*	170 (17%)
Provide response	Evaluate opinion or suggestion, provide clarification or confirmation, make alternative suggestion	*We are dividing up the paper according to the three questions that we have been discussing. Question 1: Michael Question 2: Gregory Question 3: Trevor Wrapper*	157 (16%)
Elicit response	Ask what others think, request information, request clarification or confirmation	*Is this acceptable to everyone?*	132 (13%)
Direct others to act	Ask someone to act or ask for volunteers to act	*We still need your Weinstein and Mayer, 1986 reference. Please post it when you get back.*	42 (4%)
Total			1003

> Just wanted to let you know that I'm running a little behind, but I should get the readings done by Saturday. Next week is pretty open for me. I went home to San Antonio for a visit last week, and that cost me some study time. Food was great, though :)
> As far as chat times (if we decide we need them), I'm home by 4 PM each day, and off all day Thurs–Sat of next week. I generally go to bed at 10 PM (early riser), but anytime before that is fine.

Groups tended to state rather than offer to act, emphasizing quick, efficient decision-making and actions, as seen in these posts by Michael in Group Plum:

> 7/13/2002 11:10:38 AM
> I have the document. I will post when I finish. I am not sure how long it will take.
> 7/13/2002 2:17:05 PM
> This is taking some time. It is 2:27. I will keep it about another hour and then post it. I will let someone else work on it for a while. I plan on picking it up again later this evening.

These moves reflect both the responsiveness and individual contribution to the group effort.

The report/manage category had the second highest number of functional moves. In this category members would keep members informed of the progress they were making on the task, yet another element of responsiveness. For example, Ron in Group Grape reported:

"I'm posting what I have so far but I'm still looking at changing a number of things. We'll see. I'll check back in the morning for the rest." Ron gives an explicit timeframe and reports on his actions to the group. Members also clarified the task through restatements, expressing uncertainty about the task, or providing contact information for ease of communication, usually at the end of the process when time was of the essence. The asynchronous discussion forum was often used nearly synchronously as all members worked together, nearing the deadline and keeping each other informed about their individual progress.

The three broad categories of initiate, provide response and elicit response illustrate the process of exchanging ideas and information among the group members. The functional moves in these three categories reflect groups that are highly responsive to each other. Through initiating moves, group members expressed their opinions, made suggestions or further explained their points of view. These functional moves went hand in hand with eliciting and providing feedback from other group members, showing an awareness that they were indeed operating as members of a team in addition to acting individually. We see this type of exchange during Group Plum's chat.

> Tonya: How about this? I'll post my lesson plan. I'll read through everybody's colloquium summaries and try to put them into the right boxes and you guys add the ML/Schema stuff?
> Tonya: Sound like a plan?
> Trish: Sounds like a GREAT plan!
> Michael: OKay [sic]

Group members frequently provided evaluative feedback to each other, and the nature of this feedback was overwhelmingly positive in nature. Trish in Group Plum shared, "Tonya, Your suggestion sounds like 'the plan' for our group!!!!" Libby in Group Berry posted, "So…I agree with the idea of starting posting [sic] ideas, responses to others ideas, etc., all in character—and then we can pull that together into something." Finally, Michael in Group Orange commented, "Gregory, I read your message about everyone proofing the work of everyone else. I agree." The responsiveness of the group members to each other is notable as a means of maintaining common ground.

Handling disagreement or different opinions is important in any group endeavor. Thus, it was interesting to find that there were no explicit moves for "disagreement" found. The closest is the move of making an alternative suggestion. In the example below from Group Apple, Sariah volunteered to write a draft for the group. Alissa suggested a change in the content of the paper and also suggested a strategy for proceeding with feedback after which she elicited a response from the group:

> As far as I can tell our recommendations are primarily for the instructor. Should we also consider some recommendations for the learners? Any metacognitive stuff we should be pulling into this? What do you guys think? Sariah, you're very kind to offer pulling the initial draft together.
> What if after that, we all took turns looking at and editing (adding to it if necessary) the document. Would there be time?

Jaclyn had a different idea which she expressed and then elicited responses from others:

> I think for purposes of this assignment, we should focus on the instructor's strategies only, even though we know the students can't be passive receivers of information. I

> don't know if Sariah will have time to have us all take a look at the document before posting on Friday. If we all agree on the salient points to include, I'm for having her just roll with it. Any other thoughts?

Alissa then directed a message to Sariah to be sure that she is okay with this suggestion: "Sariah, is the above approach okay with you? I don't want you to feel like you're being dumped on." A few minutes later, however, Alissa realized she may not have been clear and could perhaps have been misinterpreted:

> I'm cool with not addressing the student perspective. I just thought I'd throw it out to see if it was something we overlooked. And I didn't mean to imply, Jaclyn, that you were "dumping" anything on Sariah. I just want to make sure she doesn't feel she is stuck with too much work. That's all.

Jaclyn replied: "Alissa: makes sense to me. sorry if you thought I was implying anything by my comment." This exchange illustrates a level of awareness and concern the group members have about how their communication is perceived by others, and the possibility for misinterpretation in a CMC environment. It also points to the difficulty of disagreeing with someone in an text-only environment. Presenting a different opinion, a challenge to an initial statement, or dealing with conflict becomes difficult territory to navigate unless common ground for such interactions has been established.

The category of direct others had the fewest number of functional moves, and they typically occurred at the very end of the group process when time was running short. Members more often volunteered to act or take action themselves rather than direct or request others to do so. Even when group members did direct others to act, they were very polite, as illustrated below by Trish in Group Melon: "Jaclyn, you offered to turn this in…tomorrow is HECTIC for me, so do you mind giving everything a "once over" and then handing it in?"

To summarize the findings, first, groups talked more about off-topic issues such as logistics, social and technology concerns than they did the concepts to be learned. Second, they used the discussion forum more than chat or e-mail, but they did not vary much in their choice of mode for talking about particular topics. Finally, the groups established common ground through being explicitly responsive, responsible, and relational.

Discussion

Grounding is the process by which "participants try to establish that what has been said has been understood" (Clark and Brennan 1991, p. 128). Clark and Brennan go on to clarify that how grounding occurs takes shape differently from one context and communication mode to the next. Both the purpose and the medium of a conversation impacts how grounding works. This study analyzed how students who had previous experience working with each other and in a text-based CMC learning environment participated in the grounding process. Of note is that common ground is not something that is reached definitively, rather it continues to be negotiated in each interaction. Even though these experienced online learners had worked together previously, they still had to spend considerable portions of the discussion negotiating common ground.

While Kirschner et al. (2004) suggest that different CMC modes have different technological, social and educational affordances, the groups talked mostly about logistics, followed by technical and social concerns in all three CMC modes. Less than half of the groups' functional moves were on-topic; that is, related to the content of the course. Yet the

remaining off-topic aspects of their discussions were not trivial or irrelevant. Rather, the findings reveal how experienced online learners engage in grounding strategies in a text-based CMC environment, thereby adding to our understanding of grounding processes in these contexts. The grounding strategies included indicating responsiveness, taking responsibility and maintaining relationships. Novice online learners may not immediately realize the importance of engaging in grounding in the explicit ways that are necessary in text-based CMC environments.

Responsiveness among group members, for example, is critical for establishing presence in the absence of physical presence. In text-based CMC environments responsiveness cannot be conveyed through facial expressions or non-verbal cues, but must be explicitly expressed. The functional moves of eliciting and providing response are consistent with the explicit process of *presenting* contributions to the group and *accepting* these contributions in further moves (Clark and Schaefer 1989). These communicative functions are one way that the participants explicitly conveyed their willingness and ability to (1) continue the interaction, (2) perceive the message, (3) understand the message, and (4) react and respond, accept or reject the message (Allwood et al. 1992; Baker et al. 1999). In the absence of these explicit indicators through conversational moves, communication breakdowns are likely to occur and hinder the efficient functioning of the groups.

Beyond simple responsiveness, the group members needed to find a balance between making individual contributions to the group effort as well as recognizing the primary importance of the group. The purpose of the communication is, ultimately, to complete the task. Understanding one's role as an individual in the context of a group task can take time. Smith (2005), in a qualitative cross-case study of eight small groups in the context of an online graduate course, found that groups experienced tension between a focus on the group and a focus on the self as they worked together online. Being able to both convey that they were taking responsibility as individuals and also acknowledging responsibility to the group, as seen in the group cohesion and mitigation moves, were important elements of grounding. The participants negotiated a balance between *participatory* and *autonomous* contributions to the task (Clark and Schaefer 1989).

In addition to being both responsive and conveying their responsibility to one another and the group, creating and maintaining relationships was an element of grounding. These students were part of a cohort group, and thus had established relationships with one another. Nevertheless, maintaining these connections was part of the group process. In their qualitative study of group development in online courses, McDonald and Gibson (1998) used content analysis to examine the discussion transcripts of 19 graduate students enrolled in an asynchronous online course. They found that interpersonal issues were very important, especially at the beginning of the course. While Nardi (2005) argues that common ground is about pure information exchange and not interpersonal relationships, making a distinction between the two may not be necessary or even possible. The very way that information is exchanged and how it is understood depends largely on the relationship between the participants. It is our understanding of who it is we are communicating with that spurs our use of grounding strategies. What we know about others is a result of relationships we have established with them.

Limitations, implications and directions for further research

There are several limitations to this study. First, only one course, with its 10 small groups comprised of 16 graduate students, was examined. As is the case with naturalistic studies,

any generalizations to other contexts are left to the reader. For example, since part of the students' grades were dependent on team process, generalizability is limited to similar educational contexts. Also, it is possible that backchannel communication was occurring among the students (e.g. telephone conversations or face to face meetings) which were not reported to the researchers. Every effort was made to encourage students to conduct all conversations within the CMC environment. This in itself was also a limitation, as without this requirement students may have opted to talk face to face (though this was not geographically possible for all groups) or on the telephone at critical junctures in their group process. Any part of the process that did take place offline was not taken into account for this study.

It may be unrealistic to expect groups in online environments to intuitively know how to work effectively and efficiently together while also engaging deeply with the course concepts. These 10 groups demonstrated an ability to complete the tasks, but they also had prior experience working with each other and within the constraints of a text-based CMC environments. Thus, practitioners may want to have groups work together long enough to establish grounding strategies, rather than changing group membership frequently throughout a semester.

Part of the challenge of working together in text-based CMC environments is that all contributions to the conversation must be made explicitly in writing, and it takes time not only for the novice online learner to realize this, but to make grounding part of their practice. Groups can and do function in CMC environments, and they can learn to use the various CMC tools to meet their needs. Yet grounding takes longer than it would offline. It is important for practitioners to provide enough time for the entire process to take place—from negotiating common ground to learning the concepts to finishing the task. This may be a considerably longer period of time than a novice online learner or instructor may suspect. Explicitly orienting new online learners to the need for demonstrating responsiveness, taking responsibility and creating relationships among their peers may accelerate this process.

There are several areas for further research. Since it is likely that shared prior experiences helped to facilitate the grounding process, more research with cohorts in online learning environments and how they develop grounding strategies over time could be particularly interesting. It has become almost conventional wisdom that collaborative groups should be given highly structured or complex tasks to focus learners' attention and/or provide scaffolding. An unintended consequence is that groups take a divide-and-conquer approach, essentially completing pieces of the task individually. Managing the logistics of the task becomes the focal point, and little time is spent explicitly talking about course concepts. It may be useful to balance structured collaborative tasks with open-ended discussions in which students can focus on "just talking" about the concepts in a more fluid way. It is also possible that such conversations are, in essence, occurring within the document as it is produced, as group members generate, read, respond, and revise drafts of the group's work. Investigating this process is an alternative method for understanding how groups learn together through discussions.

Examining the connection between grounding and learning is an important area for future research as well. Wegerif (1998) found that individual success in online environments depends on the extent to which students feel like "insiders" of the community. Insider status may be reached in part through grounding processes. Richardson and Swan (2003) found that a high perception of social presence correlated with high levels of perceived learning and satisfaction. McLoughlin (2002) found that high performing groups spent more time on process skills such as supporting group members and planning how the

group's time would be spent. She found that when groups spent time establishing when and how they would work together, including the timing of their communication with each other, they performed better. Exploring how the concepts of grounding, social presence and performance are interrelated may provide a comprehensive view of how groups learn to function in text-only CMC environments.

References

Ahern, T., Thomas, J., Tallent-Runnels, M., Lan, W., Cooper, S., Lu, X., & Cyrus, J. (2006). The effect of social grounding on collaboration in a computer-mediated small group discussion. *The Internet and Higher Education, 9*, 37–46.

Allwood, J., Nivre, J., & Ahlsen, E. (1992). On the semantics and pragmatics of linguistic feedback. *Journal of Semantics, 9*, 1–26.

Azevedo, R., Winters, F., & Moos, D. (2004). Can students collaboratively use hypermedia to learn science? The dynamics of self- and other-regulatory processes in an ecology classroom. *Journal of Educational Computing Research, 31*, 215–245.

Baker, M., Hansen, T., Joiner, R., & Traum, D. (1999). The role of grounding in collaborative learning tasks. In P. Dillenbourg (Ed.), *Collaborative learning: Cognitive and computational approaches* (pp. 31–63). Oxford: Pergamon.

Bauer, M. (2000). Classical content analysis: A review. In M. Bauer & G. Gaskell (Eds.), *Qualitative researching with text, image and sound* (pp. 131–151). London: Sage.

Clark, H. H., & Brennan, S. E. (1991). Grounding in communication. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 127–149). Washington: American Psychological Association.

Clark, H., & Schaefer, E. (1989). Contributing to discourse. *Cognitive Science, 13,* 259–294.

Curtis, D., & Lawson, M. (2001). Exploring collaborative online learning. *Journal of Asynchronous Learning Networks, 5.* Retrieved on April 7, 2007 from http://www.sloan-c.org/publications/jaln/v5n1/v5n1_curtis.asp.

Davidson-Shivers, G. V., Muilenburg, L. Y., & Tanner, E. J. (2001). How do students participate in synchronous and asynchronous online discussions? *Journal of Educational Computing Research, 25*, 341–366.

Dickey, M. H., Wasko, M. M., Chudoba, K. M., & Thatcher, J. B. (2006). Do you know what I know?: A shared understandings perspective on text-based communication. *Journal of Computer-Mediated Communication, 12*. Retrieved on April 7, 2007 from http://www.jcmc.indiana.edu/vol12/issue1/dickey.html.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 1–19.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *The American Journal of Distance Education, 19*(3), 133–148.

Gilbert, P. K., & Dabbagh, N. (2005). How to structure online discussions for meaningful discourse: A case study. *British Journal of Educational Technology, 36*, 5–18.

Hathorn, L. G., & Ingram, A. L. (2002). Online collaboration: Making it work. *Educational Technology, 42*, 33–40.

Haythornthwaite, C., Kazmer, M. M., Robins, J., & Shoemaker, S. (2000). Community development among distance learners: Temporal and technological dimensions. *Journal of Computer-mediated Communication, 6*. Retrieved on April 7, 2007 from http://www.asusc.org/jcmc/vol6/issue1/haythornthwaite.html.

Henri, F., & Rigault, C. (1996). Collaborative distance education and computer conferencing. In T. T. Liao (Ed.), Advanced educational technology: Research issues and future potential (pp. 45–76). Berlin: Springer-Verlag.

Herring, S. C. (2004). Computer-mediated discourse analysis: An approach to researching online behavior. In S. A. Barab, R. Kling, & J. H. Gray (Eds.), *Designing for virtual communities in the service of learning* (pp. 338–376). New York: Cambridge University Press.

Kirschner, P., Strijbos, J. W., Kreijns, K., & Beers, P. J. (2004). Designing electronic collaborative learning environments. *Educational Technology Research & Development, 52*(3), 47–66.

Krippendorf, K. (1980). *Content analysis: An introduction to its methodology*. London: Sage Publications.

Mäkitalo, K., Häkkinen, P., Leinonen, P., & Järvelä, S. (2002). Mechanisms of common ground in case-based web discussions in teacher education. *Internet and Higher Education, 5*, 247–256.

McDonald, J., & Gibson, C. C. (1998). Interpersonal dynamics and group development in computer conferencing. *The American Journal of Distance Education, 12*, 7–25.

McLoughlin, C. (2002). Computer supported teamwork: An integrative approach to evaluating cooperative learning in an online environment. *Australian Journal of Educational Technology, 18*, 227–254.

Merriam, S. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey Bass.

Moreno, R. (2006). Does the modality principle hold for different media? A test of the method-affects-learning. *Journal of Computer Assisted Learning, 22*, 149–158.

Nardi, B. (2005). Beyond bandwidth: Dimension of connection in interpersonal interaction. *The Journal of Computer-Supported Cooperative Work, 14*, 91–130.

O'Sullivan, P. B., Hunt, S. K., & Lippert, L. R. (2004). Mediated immediacy: A language of affiliation in a technological age. *Journal of Language and Social Interaction, 23*, 464–490.

Paulus, T. M. (2004). Collaboration or cooperation? Small group interactions in a synchronous educational environment. In T. S. Roberts (Ed.), *Computer-supported collaborative learning in higher education* (pp. 100–124). Hershey: Idea Group, Inc.

Paulus, T. M. (2005). Collaborative and cooperative approaches to online group work: The impact of task type. *Distance Education, 26*(1), 109–123.

Paulus, T. M. (2006). Challenge or connect? Dialogue in online learning environments. *Journal of Computing and Higher Education, 18*(1), 3–29.

Paulus, T. M. (2007). CMC modes for learning tasks at a distance. *Journal of Computer-Mediated Communication 12*, 1322–1345. Available at: http://jcmc.indiana.edu/vol12/issue4/paulus.html.

Poole, D. M. (2000). Student participation in a discussion-oriented online course: A case study. *Journal of Research on Computing in Education, 33*, 162–177.

Rice, R. E., & Love, G. (1987). Electronic emotion: Socio-emotional content in a computer-mediated communication network. *Communication Research, 14*, 85–108.

Richardson, J., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks, 7*. Retrieved on April 7, 2007 from http://www.aln.org/publications/jaln/v7n1/pdf/v7n1_richardson.pdf.

Russo, T. C., & Campbell, S. (2004). Perceptions of mediated presence in an asynchronous online course: Interplay of communication behaviors and medium. *Distance Education, 25*, 215–232.

Smith, R. O. (2005). Working with difference in online collaborative groups. *Adult Education Quarterly, 55*, 182–199.

Smith, B., Alvarez-Torres, M. J., & Zhao, Y. (2003). Features of CMC technologies and their impact on language learners' online interaction. *Computers in Human Behavior, 19*, 703–729.

Sproull, L., & Kiesler, S. (1991). *Connections: New ways of working in the networked organization*. Cambridge: Massachusetts Institute of Technology.

Stacey, E. (1999). Collaborative learning in an online environment. *Journal of Distance Education, 14*(2), 14–33.

Tu, C. H., & McIsaac, M. S. (2002). An examination of social presence to increase interaction in online classes. *American Journal of Distance Education, 16*, 131–150.

Vandergriff, I. (2006). Negotiating common ground in computer-mediated versus face-to-face discussions. *Language Learning & Technology, 10*, 110–138. Retrieved on April 7, 2007 from http://www.llt.msu.edu/vol10num1/vandergriff/.

Wallace, R. M. (2003). Online learning in higher education: A review of research on interactions among teachers and students. *Education, Communication & Information, 3*, 241–278.

Wegerif, R. (1998). The social dimension of asynchronous learning networks. *Journal of Asynchronous Learning Networks, 2*. Retrieved on April 7, 2007 from http://www.sloan-c.org/publications/jaln/v2n1/v2n1_wegerif.asp.

Zhao, Y., Alvarez-Torres, M. J., Smith, B., & Tan, H. S. (2004). The non-neutrality of technology: A theoretical analysis and empirical study of computer mediated communication technologies. *Journal of Educational Computing Research, 30*, 23–54.

Zhu, E. (2006). Interaction and cognitive engagement: An analysis of four asynchronous online discussions. *Instructional Science, 34*, 451–480.