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The Structures of Group Discussions in Online Chats

Allan Jeong

The rapid development in electronic communication technologies has required and resulted in new forms of group communication. Computer conferencing in particular has been shown to facilitate and increase communication and interaction among students when used in an instructional setting (Harasim, 1993). Most of these findings have hailed from studies on the use of asynchronous communication. Absent from this research is the evaluation of the effect of synchronous communication via real-time conferencing or online chats. As studies on the uses of asynchronous communication continue to grow, there is also the need to conduct a close examination of the effect of online chats and the ways they structure student interactions in online group discussions.

A particularly interesting characteristic of online chats, based on case observations described in this article, is the presence of simultaneous discussions that typically occur within a group discussion. This phenomenon is also observed in email where messages from one thread are interspersed with messages belonging to other threads. With asynchronous communication, however, students have the convenience of reflecting and later composing responses at their own pace. Online chats, on the other hand, differ from email and other asynchronous forms of communication. In online chats, students must communicate under the constraints of time. Students often have to compose responses while trying to keep pace with one or more rapidly developing discussions. This and other constraints found in online chats significantly affect the structure of communication and the ways students interact.

This article describes the nature of online chats in terms of how students structure their conversations in online group discussions. The descriptions are based on case examples of online chat taken from a graduate course that used computer conferencing as an adjunct to face-to-face meetings. Based on case observations, this paper provides a descriptive analysis and identifies some of the

conversational structures and processes that occur in online chats. The specific focus of this article is 1) to describe how the student discussions are structured, particularly how students participate and converse in and across concurrent conversations; 2) to discuss the factors and characteristics of the computer medium that contribute to the structures; and 3) to discuss how the kinds of conversational structures affect interactivity and student participation.

Case Study and Background

Online chats were observed in a graduate course on the subject of telecommunications in education during the spring of 1995 at the University of Wisconsin-Madison. Sixteen graduate students were enrolled in the class, which was taught by a professor with a teaching assistant. The course covered various issues relating to the use of the Internet, its effects on education, and issues of political authority, democracy, and freedom of speech. The class met intermittently seven times face-to-face in a traditional classroom and eight other class sessions conducted online during the course of the semester. In the online sessions, students communicated through a computer conferencing system that provided access to electronic file sharing, asynchronous mail, and online chats (FirstClass by Softarc).

In the online sessions, students connected from remote sites during the class meeting time. The majority of students were linked from their homes; a few connected from campus computer labs. Most of the online sessions were spent in small groups in separate chats to discuss the writing of class papers. The class was divided into five groups based on the different topics of discussion. In each group, students talked about issues and papers specific to their group. The messages posted in the group chats were merged and displayed in a single text as shown in Figure 1. A couple groups wrote collaborative papers and conductedtheir collaborative efforts during the online chats. The online chats typically lasted one to one-and-one-half hours, divided by a break.

During the group chats, the professor was able to read and track the group discussions. The professor participated in the chats to share comments and to ask and answer questions. For the most part the professor's participation was kept to a minimum so as not to disrupt the direction of a group's discussion. At the end of the online session, the students reconvened into the main classroom chat to close the session and to discuss the next week's agenda and reading assignments. Individual students often stayed online to continue private or group discussions.

In the face-to-face class sessions, discussions were focused more on readings. In these sessions the professor typically presented a lecture for a portion of the class, followed by a whole-class discussion on a given issue. Some time was also spent evaluating previous online discussions and sharing comments and

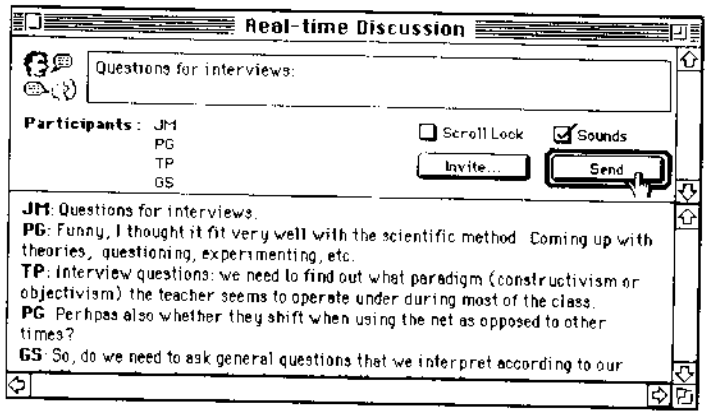

Figure 1. Screen from group chat.

individual experiences relating to the use of computer conferencing. At the end of these sessions, time was allotted for group meetings related to the class paper.

Between online and actual classroom sessions during each week, students used asynchronous mail to discuss issues related to their group topics and papers. Resources, references, and student work were also posted in the conference space using the file-sharing capabilities of the conferencing system. As a result, students were able to read the work of other students, provide comments and suggestions, share documents, and write collaboratively.

Method

Student Sample. The cases studied in this paper were taken from an online discussion that focused on the effect of the Internet on distance education. One chat session was selected from the middle portion of the semester, at a point when students had become familiar with the conferencing system. This group of students was engaged in writing a collaborative paper. As a result, a good portion of the chat involved the discussion and negotiation of topics and questions to be addressed their paper. Although other students in class often joined or lingered in the chats of the education group, the scope of the analysis was limited to the six students belonging to the group.

Qualitative Data. Qualitative descriptions of the sampled chat were obtained by reading and reviewing the transcript and analyzing graphic representations of the flow of discussion. These representations were generated be computer and were based on coded transcripts (see *Quantitative and Graphic Data* below). The focus of the qualitative observations reported in this paper center on the following questions:

1. What conversational structures are found in live chats? For example, how do parallel conversations take place simultaneously in live chats in a group discussion?
2. How and why do the various types of structures exist? Specifically, how do the various characteristics of live chats contribute to the conversational structures? For example, how does dependency on text-based communication and typing skills affect conversational structure?
3. How do the conversational structures affect the way students interact online? For example, can students participate in multiple yet concurrent conversations effectively?

Quantitative and Graphic Data. Quantitative and graphic data were produced to support the qualitative observations reported in this paper. Mostly, it was used to help identify patterns or directions for qualitative analysis. To obtain the quantitative data, a computer program (in Hypercard) was custom written to transcribe the chat into a coded format. Each message in the chat was coded by 1) the location of the message in the chat; 2) the author of the message; and 3) the number of messages separating the current message from a previously and directly related message. As a result, the coded data provided numerical representations of the relationships between messages.

With the coded live chats, the program was used to perform a quantitative analysis of the chat. In addition, the program was used to translate the coded data into a graph representing the interactions between students and the flow of conversation. The resulting graphs were examined in order to identify and distinguish conversational structures in the live chat.

Case Observations

A close examination of the graphic representation of the group chat revealed several types of conversational structures. A portion of a live chat is graphically represented in Figure 2. Four types of structures were observed in the discussions, with each structure influencing the extent of overlap between messages from concurrent conversations.

Linearly Structured Conversations. A computer analysis shows that merely one half of all messages occurred in natural succession, with each message derived from or acting upon its preceding message. In Figure 2, the linear conversations are illustrated by the continuous succession of short arches. From the graphs, linear conversations appear to occur periodically and vary greatly in length. Most linear conversations in this case appear to last a few messages in length before they are broken by new messages that respond to previous messages and follow a

different thread. A second observation is that the messages consistently alternate, frequently by student, and often involve several different students in a conversation.

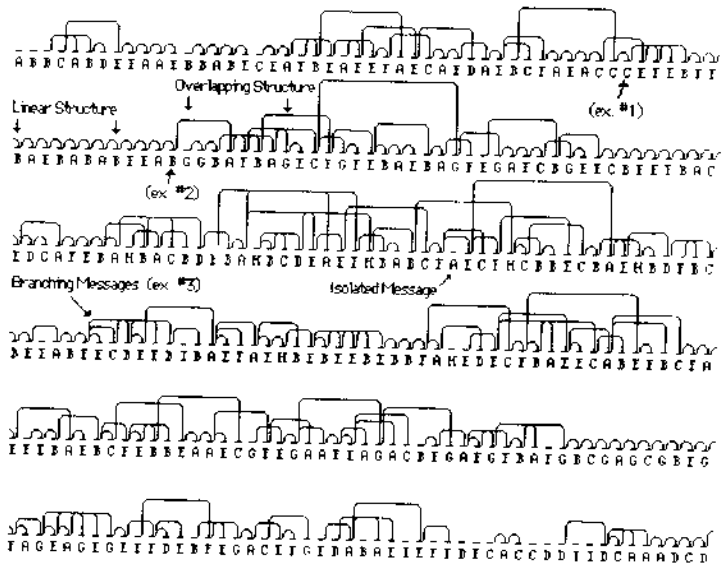

Figure 2. A portion of a live chat is graphically represented. The alphanumericcharacters in the graph identify the sender of the messages.

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Example 1 is a text illustration of a linear conversation proceeding in a natural succession of messages. Index numbers have been added to the text for ease of reference. In the discussion, students were negotiating a set of questions

for a teacher survey. The purpose of the survey was to determine if student use of the Internet in schools is shifting the pedagogical approaches of primary and secondary school teachers to a constructivist approach. The discussion begins in lines 44 and 46, where the topic of discussion and the ensuing succession of messages are prompted by the efforts of two students in the group, CC and FF. From lines 48 to 62, the discussion proceeds in a linear sequence. Following is a portion of the discussion:

Example 1. An illustration of a linear conversation proceeding in a natural succession of messages.

44 CC: Questions for interviews:
45 EE: Funny, I thought it fit very well with the scientific method. Coming up with theories, questioning, experimenting, etc. . . .
46 FF: Interview questions: we need to find out what paradigm (constructivism or objectivism) the teacher seems to operate under during most of the class.
47 EE: Perhaps also whether they shift when using the net as opposed to other times?
48 BB: So, do we need to ask general questions that we interpret according to our guidelines, or target questions toward both those 2 isms?
49 EE: I'm afraid if we target too much we will get the results we are looking for, so to speak.
50 FF: I feel we need to ask general questions, that we can later interpret.
51 BB: Yah—do we ask operational or theoretical questions?
52 AA: Perhaps we need target questions that look like general questions. I'm not trying to be cute, but we have to have a sense of what we're looking for.
53 EE: If we ask people to describe in as much detail as they will what they do, perhaps we can interpret from that without being too leading.
54 BB: So, what characteristics would we use to identify a constructivist teacher?

Analysis. This example illustrates that group discussions can follow (or appear to follow) a linear structure when 1) one or more students take the initiative to focus the group onto a topic of discussion; 2) an important or central point of discussion is raised by members of the group that captures the primary attention of all students in the group; and 3) group discussions are conducted without the explicit use of turn taking or the presence of a moderator, even with as many as five or more students participating in a conversation. The number of people participating in a discussion may be an influential factor in shaping the flow of conversation, especially the length that a linear conversation can be maintained. However, the influence of group size cannot be determined from a single case analysis and requires further research.

The linear conversations depicted in the graph also demonstrate that online chats can be highly interactive. The way that the messages alternate by student clearly demonstrates a high level of interaction in the online chats. Second, close examination of the number of participants in linear conversations in the graph shows that conversations were rarely conducted in monologue or in dyads, but involved many students within the group.

Simultaneous Discussions. When two or more discussions occurred simultaneously, messages from the discussions were merged and displayed sequentially into a single text on the computer screen. As a result, the sequence of messages from one discussion was broken intermittently by messages from another discussion producing overlapping messages. These overlapping messages were clearly evident from reading the live chat. In the group were six students who participated in the discussion. A quantitative analysis showed that the extent of overlap between discussions was 1.36 in the chat sampled in this case study. This number shows that there was more than one message on average separating two messages in a given conversation. The overlaps also occur during the 44% of the time when messages do not fall in natural succession. More specifically, 23% of the messages were separated by one message, 13% were separated by two messages, and the remaining 8% of messages were separated by three or more messages from different conversations. There were a few instances where more than ten messages separated a student's response to a previous message. Examples of these delayed responses are illustrated by the large arches in the graph.

An illustration of two conversations running concurrently and the way their messages are superimposed upon one another is shown in Example 2. In this example, the conversation from Example 1 is interposed by a new conversation beginning in line 64. The class instructor, GG, joins the discussion to screen students' questions and to offer assistance. The students realize that the instructor has just joined the chat midway into their discussion. As a result, students address the instructor to update him on the current discussion (lines 65, 67, 69, 71, and 72) as others continue the previous conversation (lines 66, 68, and 73). As a result, the sequence of messages from lines 62 to 73 is interspersed with messages from both conversations, as follows:

Example 2. An illustration of two simultaneous discussions generated independently.

62 BB: Yup—I don't know too many teachers who plan their lessons consciously around paradigms.
63 GG has joined the chat.
64 GG: Hi folks, any questions?
65 BB: Hi GG.
66 AA: Most do not, BB, but their attitude toward their students comes through pretty quickly. Hi GG.
67 FF: Hello, GG. We are discussing the types of questions we need to ask in interviews with practicing teachers.
68 BB: Yup—I hate to confuse the issue, but I always liked the analyses that start with the personality of the principal, then see how the school works as a function of that. Maybe we should interview principals!
69 AA: GG, we've also been talking about the paradigms that rule the classroom. We're focusing on two: objectivism and constructivism.
70 GG: one way to write these questions is to devise some yourself and ask teachers what they would devise.
71 EE: Devise what ourselves?
72 CC: I don't know if you've had a chance to read our outline, GG. We've decided to look at Internet usage in educational settings from a Constructivist viewpoint.
73 FF: I like the idea of the principals. . . . but will we be spreading ourselves too thin?

Example 2 illustrates how students are able to participate and alternate between two concurrent conversations (e. g., BB, AA, FF). AA, for example, posted separate messages to both conversations by addressing the messages with the names of their recipients (line 66 and 69). The technique of addressing messages (McCarthy, 1992) was often used by the students to maintain context and coherence in their messages when two or more conversations were taking place at the same time. In rare cases, a student might address two different conversations in one message (e. g., line 66). Most of these types of messages consisted of a short reply or simple acknowledgement to address one conversation, followed by a more lengthy reply to another conversation.

Analysis. The observations and the example above demonstrate that conversations often overlap and that reading them can often be confusing and difficult to follow. Furthermore, the challenge of maintaining coherence among the competing threads tended to limit the time available for a student to reflect

on and respond to previous messages. Nevertheless, students were still able to alternate and contribute to different threads. Individuals were able to participate in multiple discussions at the same time and were not necessarily restricted to a single discussion thread. General observations suggest that two factors allowed the students to participate in concurrent conversations, which may be unusual in a face-to-face context: 1) students were able to read and review earlier messages displayed on the screen and were able to choose which ones to respond to; and 2) the relatively slower pace of text-based communication allowed students the time to respond to more than one thread. These factors, in conjunction with the use of special communication techniques, reduced the challenge of following and participating in concurrent conversations.

Diverging Conversations

In the previous example of simultaneous discussions, the conversation was initiated by the introduction of a question, independent of the context of the ongoing conversation. In most instances, however, simultaneous discussions are produced from branching messages (see Figure 2) where students respond simultaneously to a given message. These often occur when one or more students simultaneously produce an individual response to thought-provoking comments or questions of another student. In turn, the branching of messages often lead to divergent conversations where some or all of the responses lead to discussions in separate threads on both similar and very different topics.

Example 3 contains an instance where a conversation diverges into three separate threads or trains of thought. A suggestion posed by one student generates responses from three other students. The three responses in turn generate three separate threads. The first thread (lines 156, 157, 159, 160, 165, 167) is maintained by three students and proceeds with the original topic thread in which the agenda is to create, and to a limited extent, evaluate (e. g., lines 157, 159) potential questions for a teacher survey. The second thread is a brief conversation between two students, FF and CC, in which there is an attempt to evaluate the student's suggestion (lines 156, 158, and 161). The third thread (lines 159, 162, 164) is pursued and maintained by a single student, in which the topic of the thread diverges far from the original when the student attempts to avoid any possible misunderstandings with CC for her exuberant remarks in line 159.

Example 3. An illustration of a conversation that diverges into three threads.

156 FF: I'm assuming that we will need some background on the teacher... degree, years teaching, etc.

157 EE: That's the kind of thing I like to hear. I hadn't even thought of that kind of stuff yet, FF.
158 CC: Does that background really matter?
159 BB: YES! I forgot that in the last survey I did, FF, and it kind of meant that the info I got didn't connect to too much of interest.
160 EE: Let's make a list of the basic things we want to know. Writing bird by bird, you know.
161 FF: I think that it matters if we want classroom teachers to connect with our article.
162 BB: Ooh—the YES was to CC's comment 3 up. That's the weirdness of this email for me. I really miss face to face.
163 II has joined the chat.
164 BB: The sequence of comments really matters! Let's deconstruct that.
165 AA: OK . . . attitude toward student autonomy and initiative. Does the teacher allow [students] to follow [their] interests and pursue what interests [them]?
166 EE: Huh?
167 FF: We will also need to know something about the availability of computers for kids and online time.

Analysis. This example and graphs suggest that the large majority of overlaps in conversations were the result of diverging conversations. These diversions appeared to occur frequently and to erupt rather spontaneously as responses were posted nearly simultaneously. These events could be attributed once again to the manner in which the pace of communication was reduced by the demands of communicating via text. The slower pace gave each student more time to compose a response. At the same time, however, the lack of physical and visual cues tended to make turntaking a difficult practice. Although its use was considered by members of the group, no explicit use of turn taking was observed. As a result, multiple responses tended to arrive simultaneously and without order, allowing conversations to diverge. As BB remarked in the example a few lines later, "I'm dangerous on email—responses shoot out and then they're gone."

Example 3 demonstrates once again that diverging and multiple conversations can be conducted concurrently and managed by the students. However, the example also illustrates some of the limitations in communicating via electronic live chats. When responses are posted simultaneously and messages begin to overlap, the result can lead to misinterpretations, breakdowns in communication, and problems with maintaining coherence in a group discussion. This was demonstrated by the comments of BB in Example 3, and her later remark, "That

sequence thing is a killer." Also noted was a comment from EE, who was one of two students (including AA) who tried maintain focus on the survey questions. "Yes, . . . we feel a little frustrated with ourselves for not being able to keep to a point, I think," said EE late in the group chat. Although group decisions are often difficult even in face-to-face meetings, the constraints of the computer medium seemed to have contributed to some of the "frustrations" expressed by the students.

Even as conversations diverge and overlap, the example shows that the central thread tended to dominate and continue its course in the group discussion. The diverging threads were short in duration and were not necessarily resolved or brought to closure. These observations suggest that conversations generally flow and shift around a primary thread or point of discussion, perhaps because of the need to maintain coherence in the discussions. However, sudden shifts or diversions can occur if 1) a topic is negotiated by members of the group or 2) an exceedingly provocative topic is posed by a student. Observations from other portions of the chat indicated that the discussions could be swayed back to the main agenda through the persistent suggestions of a few students (EE and AA)

Isolated Messages

There was a small number of instances where messages neither responded to a previous message nor provoked a response. These instances are denoted in the graph by the messages that stand disconnected from the surrounding messages. Most of these instances were messages from the computer system announcing the entrance and exits of students to and from the chat. In some cases, however, the system messages often initiated a series of greetings to the newcomers (e. g., Example 2, lines 63-66). In the other instances, messages appeared in isolation or out of context when 1) a student posted a short comment as a polite suggestion to steer the discussions into a new direction (e. g., "Now, about those questions . . ." by AA) or 2) a student posed a rhetorical question (e. g., "A thought . . .?") or 3) students posted disclosing remarks to update other students of their individual status, remarks that did not demand a reply (e. g., "I'm saving this chat").

Analysis. Because the occurrence of isolated messages was infrequent, this finding demonstrates 1) how conversations in live chats can flow spontaneously and yet continuously from thread to thread and 2) how messages beyond the context of preceding threads are almost always addressed rather than ignored or overlooked by members of the group. It was noted that this circumstance occurred even when messages overlapped in high numbers. This finding suggests that the potential confusion that can result from high numbers of overlapping

messages and conversations can be reconciled by the ability to review and consider previous messages continuously displayed by the computer.

Conclusions

The examination and analysis of the structural nature of the online chats, considering the factors that shape them, has identified some potential advantages and disadvantages of communicating synchronously in electronic text. The advantages and disadvantages described here were drawn from an analysis of graphic representations of the online chats, specifically designed to illustrate the conversational flow and interactions between students. Findings from the graphs were examined in greater detail through the analysis of samples of the five chats studied in the original text.

The main advantage of online chat is that it seems to promote highly interactive discussions because it allows for the participation of many students within the group and because of the short time span and the immediacy between responses. This observation is demonstrated by 1) the way messages frequently alternated by student as observed in the samples of conversations with linear structure; 2) the way students are able to contribute to multiple conversations at the same time; and 3) the way that messages often initiated branching responses from two or more individuals, reflecting the broad perspectives of individuals, and how the responses in turn initiated concurrent threads in the group discussion. This high level of student interaction is attributed to the existence of a brief time delay between the posting of a message and the posting of subsequent responses to the message. This time delay resulted directly from 1) the time it took to communicate via the keyboard and 2) the way the computer system required that the messages be composed and then sent all at once rather than displaying the messages letter by letter as messages were keyed in. The delay provided periods of time when students could review previous messages, then reflect and compose individual responses to those messages. In addition to the effects of the time delay, the lack of visual cues and protocols so often used to direct face-to face conversations produced a situation where any student in the group could initiate a response at any time. These observations and reasons explain why online chats can provide an environment for highly interactive group discussions.

The main disadvantages of online chats were identified from an analysis of simultaneous discussions, which in turn were found to be the result of the tendency to diverge from one conversation to another. Readings of the original text in the online chats showed that 1) simultaneous discussions were sometimes difficult to follow; 2) on some occasions, they resulted in miscommunication; 3) some students found the divergence in conversations frustrating; and 4) it

contributed to problems in maintaining focus in the group and movement toward achieving the main task. Another noted disadvantage was that the length of messages was limited to two or three sentences. This limit came from an inherent constraint within the computer system. However, the limitation was mostly because of the way messages flowed rapidly and spontaneously, which severely limited the amount of time a student could spend on composing a lengthy response and the ability to post responses while maintaining relevance to the current flow of discussion. For example, responses to another message were rarely posted more than ten messages past the initiating message. Even with these limitations, however, the examples also showed that some of these constraints and problems could be addressed through various methods of communication, such as addressing messages to recipients and the weak or strong presence of a group moderator.

In weighing the advantages with the disadvantages of online chats, it becomes clear that one major characteristic of the electronic medium tended both to contribute to and inhibit the quality of interaction among students. The observations suggest that response time was perhaps the most critical variable. The brief periods of time separating messages, caused by the slow pace of communicating through text, presented an advantage because they allowed every student to compose and initiate individual responses. Compared with the short response times in "live" communication, the result was high levels of participation and high interactivity. At the same time, however, the level of interactivity resulted in problems associated with diverging conversations and overlapping threads. Furthermore, the length of response time was limited by a need to maintain a coherent discussion and the necessity of posting responses that addressed only the most current thread or threads. This limitation tended to impose, to some degree, a linear structure onto the group discussions, while allowing for some minor diversions from the main thread. In considering these advantages and disadvantages, perhaps the dependency on response time is the key variable to be considered when determining how and when to implement online chats for conducting classroom activities and instructional tasks.

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