

Informal Communication in an Online Volunteer Community: Implications for Supporting Virtual Relationships

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Abstract. This paper considers the ways in which proximity benefits informal communication and relationship development and how technologies can create virtual proximity. We present an “encounters” framework for understanding how proximity shapes opportunities for interpersonal communication and relationship development and then examine how dimensions of encounters influence informal communication in an online chatroom-based volunteer community. The results suggest that many of the dimensions of encounters we propose influenced informal communication and relationship development among members of the community. The results further suggest that the ability to experience sounds and images simultaneously, through shared web pages, files, and other devices, was important for relationship-building. We conclude with a discussion of areas for future research, including enhancing the encounters framework, understanding how affordances of media shape interpersonal encounters, extending the work to other online communities, and the development of new research paradigms.

Introduction

Much research on collaborative work groups has demonstrated the benefit of physical proximity—how closely located individuals are to one another—on team collaboration and performance (e.g., Kiesler & Cummings, 2002; Kraut, Fussell, Brennan & Kiesler, 2002; Kraut, Fish, Root, & Chalfonte, 1990; Olson & Olson, 2000; Olson et al., 2002). Proximity is thought to have its effects through a variety of mechanisms, an important one of which is the facilitation of informal,

relatively unplanned communication, in contrast to scheduled project meetings and other planned interactions (Allen, 1977; Festinger, Schachter & Back, 1950; Kraut, Egidio, & Galegher, 1990; Kraut & Streeter, 1995). For example, one might stop by a colleague's office, or exchange social pleasantries with someone in the cafeteria line. Informal, unplanned communications have been shown to benefit collaborative work in a number of ways: by helping workers learn about one another's interests and abilities (Kraut, Fish, Root and Chalfonte; 1990), maintain awareness of each others' activities (e.g., Hutchins, 1994), facilitate task coordination, and develop interpersonal relationships (Nardi & Whittaker, 2002). An understanding of the mechanisms by which proximity affects informal communication should enable us to better design technologies for remote collaboration.

Many approaches to supporting informal communication focus on providing visual cues through video technologies, or awareness tools to create a passive understanding of others' activities (e.g., Fish, Kraut, & Chalfonte, 1990; Harrison, Bly, Anderson & Minneman, 1997; Heath & Luff, 1992; Isaacs, Whittaker, Frohlich, & O'Conaill, 1997; Root, 1988). These approaches tend to start by taking face-to-face communication as the exemplar of successful communication. In this paper we take a different approach, by focusing on the conversational contents and dynamics of an established internet chatroom that has already spawned numerous interpersonal relationships of a variety of levels of depth—from friends meeting online every day to couples who have crossed large distances to move in together and get married. By studying how informal conversation occurs in this forum, we believe we can gain insights into the types of social dynamics computer-mediated organizations should support if they desire to foster the development of personal relationships.

We focus on informal communication in an electronic volunteer organization, an online self-help community. A number of previous studies have examined task-related talk in self-help forums including face-to-face (e.g., Davison, Pennebaker, & Dickerson, 2000; Jacobs & Goodman, 1989), electronic bulletin boards and email distribution lists (e.g., Brennan & Ripich, 1994; Epstein, Rosenberg, Grant, & Hemenway, 2002; Galegher, Sproull, & Kiesler, 1998; Person, 2002). These studies focus on how exchange of information and emotional support affects the well-being of visitors. In contrast, our focus is quite different: we examine the *non*-task communication that arises over the course of the task-oriented sessions, with an eye to understanding how this informal, off-task communication helps build personal relationships among visitors. Our goal is to identify principles of interaction that support informal communication and relationship-building across a variety of work and other domains.

We conceptualize properties of interpersonal interaction in terms of encounters (Goffman, 1961). By *encounters* we mean occasions in which two or more people come into contact with each another. These encounters may be passive (e.g., when

two people simply look at one another) or they may involve active engagement in conversations or other activities with a joint focus of attention. Encounters may be face-to-face, but they may also occur via telephone, video conferencing, electronic chat, and other synchronous communications media. Proximity affects interpersonal encounters in a number of ways. For example, people who share a common physical environment are likely to encounter one another by chance (e.g., at a water fountain, in the printer room), as they go through their daily work routines. These chance encounters can provide awareness of others' activities and opportunities for interaction.

In the remainder of this paper, we first consider in more detail some of the characteristics of informal communication among co-located individuals. We then describe results from a long term study of a volunteer work-oriented chat community which suggest that the configuration of chat facilitates informal communication in much the same way as actual physical co-location. We propose a model of interpersonal encounters to capture the essential elements of system configurations that provide opportunities for informal communication. We conclude with suggestions for future research and design implications for systems to support informal communications among distributed workers.

Informal Communication in Collaborative Work

Kraut et al. (1990) suggest seven dimensions along which the informality-formality of communication may be characterized (see Table 1). One set of dimensions pertains to the spontaneity of the interaction in terms of timing, participants, roles, and agenda. As Kraut et al. establish, informal communication tends to be *opportunistic*—based on the social situations in which one finds oneself. Seeing another person in the hallway, for instance, can serve as a trigger, reminding one of a question for that person. Encountering a problem while working can likewise serve as an impetus to contact others (Belloti & Bly, 1996).

Formal Communication	Informal Communication
Scheduled in Advance	Unscheduled
Arranged participants	Random participants
Participants in role	Participants out of role
Preset agenda	Unarranged agenda
One-way	Interactive
Impoverished content	Rich content
Formal language and speech register	Informal language and speech register

Table 1. Characteristics of formal vs. informal communication (adapted from Kraut et al., 1990).

A second set of dimensions pertain to the discourse style of informal versus formal communication. Informal communications tend to have a conversational style, in which participants exchange speaking and listening roles frequently and provide one another with verbal and nonverbal backchannel responses (e.g., head nods or "mhm"s). As Clark and his colleagues have shown (e.g., Clark & Wilkes-Gibbs, 1986; Clark & Brennan, 1991) this style of conversation enables communicators to quickly and easily *ground* their utterances—that is, to establish to the satisfaction of all parties that a message has been understood as intended.

Informal communication has been posited to have at least three benefits for collaborative work: First, casual conversations can enable people to identify common interests and goals, leading to new collaborations (e.g., Allen, 1977; Festinger et al., 1950). Kraut et al. (1990) found that researchers working in the same building knew more about others with closely located offices, presumably because they had more frequent opportunities for informal communication with those colleagues. Second, informal communication can help current collaborators maintain awareness of project status and coordinate their activities (e.g., Kraut, Egido & Galegher, 1990). Research suggests that teams are more successful at coordinating if they can keep aware of the state of their team, its tasks and its environment (e.g., Cannon-Bowers, Salas, & Converse, 1993). Finally, informal communication can help develop and maintain social bonds between coworkers (Kiesler & Cummings, 2002; Kraut et al., 1990; Nardi & Whittaker, 2002). As Kraut et al. (1990) found, it is not uncommon for a single conversation, through shifts of topic, to have benefits on all three aspects of collaboration.

Kraut et al. (1990)'s analysis suggests two separate aspects of informal communication that might mediate its effects on work and social relationships. One aspect is its richness in terms of visual, audible, and other sensory cues; the other is its frequent, opportunistic nature. Of these, the former has received more attention through theories such as media richness (Daft & Lengel, 1984) and media affordances (Clark & Brennan, 1991). Alternatively, proximity might benefit informal communication by increasing the frequency and nature of interpersonal encounters. Some evidence that the benefits of proximity may stem from its impact on encounters comes from observational studies of work groups using synchronous text technologies (e.g., Churchill & Bly, 1999a, 1999b; Nardi, Whittaker, & Bradner, 2000). Users of such systems, which provide many of the same opportunities for encounters as co-location, develop deeper work and social relationships and are better able to coordinate their activities than would be predicted by media richness and similar theories.

An Encounters Framework for Understanding Informal Communication

The framework we propose conceptualizes the benefits of proximity in terms of the types of interpersonal encounters it facilitates. These encounters may be

passive (e.g., when two people meet gazes) or they may involve active engagement in conversations or other activities with a joint focus of attention (Goffman, 1961). As shown in Table 2, proximity both provides preconditions for encounters (e.g., by the presence of other individuals and activities) and influences the form of these encounters. We briefly describe our hypothesized benefits of proximity for encounters below.

Affordances	Definition
Multi-person	Multiple people are present at the same time
Multi-activity	Multiple activities take place in close proximity at the same time
Chance encounters	People encounter others during the course of their normal work activities
Extended encounters	People may remain in one another's presence for extended periods of time
Repeated encounters	People may encounter the same individuals multiple times
Open encounters	Individuals may come and go during ongoing interactions
Private encounters	People can position themselves to create private conversations

Table 2. Some affordances of proximity for interpersonal encounters.

Multi-person. One characteristic of the types of shared work spaces studied by Kraut and his colleagues (1990) is that multiple individuals are present at the same time. These individuals are, at any one moment, of three types: those working alone, those engaged in conversations with others, and those with whom one is directly engaged (if one is engaged in conversation). The presence of these other individuals with whom one is *not* currently interacting is one characteristic of proximity not realized in many popular communications technologies.

Multi-activity. Another feature of proximity is that multiple activities can take place simultaneously in more-or-less the same spot. For example, one person might go to a common area to pick up a computer printout while a colleague is there checking the mailbox and two more colleagues are chatting by the coffee pot. Overlapping of activities in the same spot increases the likelihood of encountering others. This feature is also not currently implemented in most communications technologies, nor included in most experimental studies of media effects.

Chance encounters refers to the ability of people to unintentionally come in contact with people they might interact with during the course of their normal work activities. Proximity facilitates chance encounters in the workplace through two related mechanisms: First, people can navigate through the environment, thereby coming across other individuals and activities (Bellotti & Bly, 1996; Whittaker et al., 1994). Second, other people can move through the environment and arrive at one's own location. Whittaker et al. found that a sizable proportion of informal conversations occurred when others arrived at a worker's office door.

Extended encounters. Although many informal encounters are fleeting (e.g., when one says "hi" to a colleague at a water fountain) proximity can also lead to longer periods of time during which people are in each other's presence. When people are co-present for periods of time, there appear to be what Goffman (1967) terms "involvement obligations" in that some degree of interpersonal communication is felt necessary, and its lack perceived as social discomfort. These longer interactions, such as lunchroom conversations, cover more topics. McDaniel et al. (1996) for example found that scientists using synchronous chat to observe data turned their topics of conversation to other things (including the chat technology, jokes, sports, etc.) when data collection was quiet.

Repeated encounters. The spaces in a physical environment such as an office building or laboratory are relatively permanent. Thus, a person encountered at the coffee station or printer table on one day is likely to be encountered again in the future through repetition of actions. Festinger, Schachter and Back (1950) demonstrated how repeated encounters relationships among unacquainted individuals can lead to passing acquaintance, informal conversation, and sometimes the development of deeper friendships. The common ground established in prior interactions may serve as the foundation for shorter informal conversations. Whittaker et al. (1994), for example, found that greater frequency of interaction was correlated with shorter duration of each particular conversation.

Open encounters refers to whether an ongoing interaction can be joined by new individuals. Informal conversations often take place in hallways, lunchrooms, and other at least partially public locations. Ongoing conversations can be joined by new parties, which can shape their time course and agenda. The presence of new individuals can provide an impetus for formal introductions. New individuals may also interrupt ongoing discussions to start their own conversations. For example, Whittaker et al. (1994) found that the majority of informal dyadic conversations they observed were terminated by a third party joining in.

Private encounters. Although many people may be present at the same time in a public place such as a hallway or lunchroom, private conversations are possible by moving closer together and lower one's voice. This may permit smooth switches from work-related to more personal topics.

Informal Communication in a Volunteer Chat Organization

The dynamics of encounters described above are in principle independent of specific media. Rather, they are aspects of the ways in which specific implementations of technologies incorporate principles of social interaction. In order to better understand how technologies might be designed to create virtual proximity and support informal communication, we conducted in-depth observations of a task-oriented chatroom on IRC. The chatroom goals were to provide support related to a chronic mental illness—to inform newly diagnosed individuals about treatment options and similar issues, provide information to

friends and family members, and supply peer support for visitors. Participants share their experiences with medications and side effects, ways of coping with symptoms, ways to deal with insurance issues, family issues, and the like. The chatroom is embedded within an extensive informational website that includes factual information on the disorder and its treatment, links to major mental health websites, and bulletin boards for asynchronous help. The website and chatroom are listed with major search engines, and this is the primary way that new visitors find the room.

The structure of this volunteer organization has a number of interesting characteristics that make it a good choice for studying online collaboration. First, the chatroom has a clear organizational hierarchy. All top decisions are made by the chatroom owner. In addition, there is a staff of approximately 25 volunteers, selected by the chatroom owner, who serve as “Channel Operators” (Ops). Ops are responsible for a combination of support and technical work, including welcoming new visitors, assisting visitors in crisis, and warning, kicking and sometimes banning disruptive visitors from the channel.

Second, the chatroom operates 24 hours a day, 7 days a week. The owner aims to staff the room with at least one Op at all times. During busier times of day (evening through late night), one to four Ops will typically be in the room at a given time. This need for continuous staffing differentiates online chat from outpatient support groups, which meet for a preset duration at a preset time of day or evening.

Third, the chatroom has a broad range of demographic properties. Visitors come from around the world. The majority are from the United States, Canada, and Australia, but other regular visitors are from New Zealand, England, the Netherlands, Thailand, Mexico, South and Central America. Furthermore, the range of symptomology of chat visitors is much wider than found in most face-to-face support groups, which are generally attended only by those experiencing a significant degree of distress. Although on any given day a subset of visitors, particularly those new to the chatroom, will be experiencing severe difficulties, there are also many others who are, at present, doing quite well.

A fourth characteristic of the chatroom concerns its dynamics for interpersonal communication. Visitors to this chatroom exchange text-only messages in real time. In this particular chatroom, there may be anywhere from two to twenty-five participants at any time, although they may not all be actively involved. There can be several conversational threads going on simultaneously (Cherny, 1999; Herring, 2001; Murphy & Collins, 1997; Suler, 1997). Conversational threads may morph into another thread or fall into the background without completely ending. (See Herring [2001] for a review of properties of text-based chat conversations.) When the room is busy, most participants are not involved in all possible conversational threads.

Method

The data we discuss here was drawn from a year of nearly daily 1-3 hour logs of chat conversations, drawn from a larger set of data encompassing over 4 years of conversations. The majority of the logs are from the busiest times in the room, generally corresponding to evening, night time, and weekend afternoons for the US and Canadian visitors. Each log is marked by date and with a time stamp (hr:min:sec) for each message. The log also includes system messages such as announcements of arrivals and departures of visitors.

Because the participants are anonymous and do not provide email addresses, we were not required to obtain informed consent to log the conversations. In fact, an option to log conversations is built into the most popular chat software used in this chatroom, and conversations are routinely logged by experienced chatters. Furthermore, the portal page to the chatroom instructs visitors that conversations are logged to ensure that they are aware of this possibility. In addition, we obtained the consent of the chatroom owner to analyze this data. To ensure privacy, all nicknames were anonymized and all identifying information (such as names, places of residence) was removed from the messages.

Qualitative Analysis

The qualitative analysis was performed in two phases. First, we examined each of the approximately 300 logs collected over the year's observation, looking closely at the nature of off-task informal communications and the ways these messages were embedded in the overall discussion. On the basis of this analysis, we identified eight categories of messages—task related, small talk, greeting/parting sequences, status information, demographic information, discussion of technology, and system messages—which we incorporated into our quantitative analysis (see Table 3). In the second phase of the qualitative work, we coded informal, non-task communication in a sample of 20 logs using QSR's NVIVO. The goal of this analysis was to understand the nature and dynamics of small talk within the task-oriented organization.

Quantitative Analysis

For the quantitative analysis, we analyzed a random subset of logs from the 2 years of records. The sample consisted of approximately 1800 messages, spanning ten logging sessions (mostly late night/weekend, the chatroom's busiest time). During this time, there were 29 visitors participating in the conversations. We coded all messages during this time period in terms of the categories identified during the qualitative work and shown in Table 3.

Category	Examples
Task Related	Diagnosis, treatments, effects on life (work, family)
Small Talk	Hobbies, life events (e.g., birthdays), health etc
Greeting and Parting	Hello's, Goodbye's and other forms of greeting and parting
Status Information	Current, former, future chatroom status of oneself and other chat members
Demographics	Age, gender, location
Technology	Computing, browsers, irc, alternative communications media (phone, f-f etc.)
System Messages	Joins and departures to channel, nickname changes, kicks, bans, topic changes
Uncoded	Messages not fitting in the other categories

Table 3. Initial Coding Categories

Results

We present the results in two parts: First, we show the results of the quantitative analysis of message frequencies across our sample. Then, we examine in greater detail the nature of these messages using examples from our qualitative work.

Quantitative Findings

The distribution of messages of each type across the sample is shown in Figure 1. Approximately 38% of messages were directly related to the task (i.e., providing support or information). The second most common category of messages, about

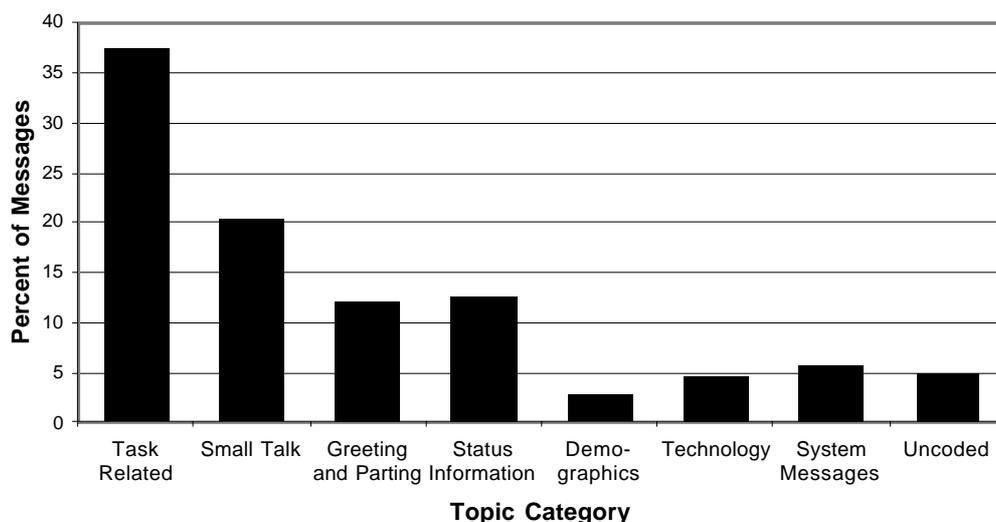


Figure 1. Percent of messages in each coding category.

20% of the total, was comprised of “small talk.” Greeting/parting sequences and system messages comprised about 12% of the total each. The other four categories (system messages, demographics, discussions of the technology, and “other”) comprised 6% or less of the total.

Elsewhere, we have looked more closely at the awareness and greeting/parting sequences (Fussell, 2002, November; Setlock, 2002). Here, we look more closely at the messages in the small talk category. We went back through all messages initially coded as small talk, and identified distinct topics using as a rule of thumb the criterion that these topics extended across at least 3-4 messages at a stretch. Based on our analysis, we identified ten subcategories of small talk, shown in Table 4. As can be seen, the most common topics were those pertaining to either life events like birthdays or Ebay activities (items, selling, purchasing). Joking, discussion of food and cooking, and music were the next most common. (The high frequency of Ebay-related talk reflects the fact that a number of participants sold items on Ebay and many others shopped there.)

Category	Examples	Percent Small Talk
Life Events	Birthdays, anniversaries, holidays, other events	22.70
Ebay	Specific items for sale, buying and selling on Ebay	21.62
Joking	Both one-line and multiple-line jokes and stories	15.14
Eating	Cooking, what one is eating, food preferences	11.08
Music	Specific tunes, mp3, bands	10.27
Health	Colds, flus and other physical health issues	9.19
Game Playing	Online trivia and similar games	3.51
Hobbies	Gardening, reading, movies, television, etc.	2.70
Websites	Websites on a variety of topics	2.43
Other	Topics not codable in the other categories	1.35

Table 4. Percent of messages in each of 10 categories of small talk

Qualitative Analysis

In order to understand better how informal, nontask conversations fit into the overall pattern of discussion in the chatroom, we looked closely at several excerpts from our two years of log files using QSR’s NVIVO to code topics and relationships among topics of conversation.

The NVIVO analyses showed a similar breakdown in topics as the quantitative analysis in Figure 1. Life events comprised 13% of the total conversational sequences. In this sample, weather was also a major topic (13% of the sequences), perhaps because the sampled logs often occurred during periods of bad weather in the United States and Canada, where many participants resided. Food and eating comprised 10.7 % of the sequences.

In the remainder of this section we first consider how the informal conversation was shaped by the properties of encounters we specified in Table 2 above; then, we describe three further findings that are not incorporated in the current encounters framework but appear relevant for relationship-building.

Virtual encounters and informal communication

Multi-person and multi-activity. During almost all of the logged periods, 5-25 different individuals were present in the chatroom, although not all of them were always engaged in conversation. Chatrooms are characterized by multiplicity of conversational threads (e.g., Cherny, 1999; Herring, 2001; Murphy & Collins, 1997; Suler, 1997). These multiplicity of threads reflect the fact that a single chatroom may be used for multiple purposes at the same time, leading to opportunities for familiarity and awareness of others and their activities. Individuals sometimes switched between the different conversational threads, as they heard something interesting arise. For example, upon overhearing a discussion of a particular band, someone would enter that conversation by mentioning they had recently seen a concert by that musician.

Chance encounters. Chat visitors also encountered others more or less by accident, during the course of their visits, and discovered things in common. Table 5 shows a typical conversation about people’s location, in which two people who had previously not met find they have mutual knowledge of a region. People also commonly talked about age, gender, marital status, children, and pets. When commonalities were discovered (e.g., both parties had teenage children), this would often lead to a lengthier discussion of the topic.

Participant	Message
Regular A	where are you NewPerson1?
Regular A	I'm in Cleveland, Ohio
NewPerson1	virginia
Regular A	OH!
Regular A	what part?
NewPerson1	ohio, ohio, ohio
Regular A	My uncle lives in Colonial Heights
NewPerson1	Fredericksburg, where is CH?
Regular A	I think it's near Lynchburgh
NewPerson1	We are near D.C.

Table 5. Example of finding commonalities

Extended encounters. Unlike with telephone and video conferencing systems, people tend to remain connected to chatrooms after they have finished a task-related conversation, and these idle times may give rise to informal communication. Throughout the corpus, it was rare to see small talk interspersed

with serious talk about the medical condition that was the focal topic of the chatroom. Instead, small talk filled the silence between visits from people with serious problems, arising mostly among the Ops and regular chatroom visitors (i.e., those who came on average at least 3 times a week). Once someone entered the chat with a question or need, generally all attention turned toward that person. Upon their leaving the room, conversation would revert to nonserious matters unless a new problem arose.

An example of a typical sequence of work and nonwork conversation is shown in Table 6. Here, conversation consists of small talk among six regular visitors until a new person enters and asks a serious question about medicines. After the question is asked, all talk focuses on issues of medicines until a second new person joins with his/her own question. As before, the conversation now turns to the second person's question. Once both visitors have left and only regulars remain in the room, the conversation reverts back to small talk (but on new topics). These examples suggest that it is the extended nature of the encounters among visitors that give rise to informal, off-task, communication. Just as one gets to know an office mate through chitchat interspersed with the work day, one gets to know online collaborators through the times when the task work is on hold.

Time (AM)	Participants	Topic of Conversation	No. of Messages
2:13-2:38	Regulars 1-6	Small talk (cars, television, cities, jokes)	168
2:38	New Person1 joins chatroom		
2:39	New Person1	Asks, " is anybody on [XXX]?"	1
2:39-2:49	Regulars 1-6, New Person 1	Discuss experiences with various medicines	77
2:49	New Person 2 joins chatroom		
2:51	New Person 2	Asks " anyone know anything about [Mental Disorder]?"	1
2:51	New Person 1 changes status to "away"		
2:51-3:00	Regulars 1-6, New Person 2	Discussion of New Person 2's diagnosis, symptoms, treatment	45
3: 00	New Person 1 leaves chatroom		
3:00-3:16	Regulars 1-6, New Person 2	Continued discussion of New Person 2's situation	95
3:16	New Person 2 leaves chatroom		
3:16-3:33	Regulars 1-6	Small talk (Christmas, parents)	93

Table 6. Example of conversational flow between non-task and task-related topics

Repeated encounters. Participants who met on one day and learned a little about one another would frequently, upon meeting again, follow up on the

previous discussion. For example, they might ask about children's health, if a child had been sick, about a job interview they knew a person had planned, or a recent trip. Because these participants often did not know one another well, they would be unlikely to initiate a planned message through conventional channels such as email to ask about updates on life events. But the repeated accidental crossing of paths in the chatroom allows them to build on their relationship in an opportunistic fashion.

Open encounters. As in most chatrooms, there are no rules about when people come and go in this community. Visitors arrive or leave in the middle of conversations, sometimes changing the shape of those conversations. As we showed above (Table 6), new people entering into a conversation sometimes shifted the conversation from small talk back to the focal task of helping others. The entrance of individuals into the conversation also shifted topics between different types of small talk, as when somebody who had recently been on vacation joined the conversation, and talk shifted to the details of his trip. On other occasions, a new participant may find common interests with one of the original participants, where none had existed between the original participants.

Private encounters. Private encounters refers to the ability of participants to converse without the other's overhearing. In chat, this function is served by private messaging (PMing), which sets up a separate box for two people to type in. Although we could not record the talk in these private message boxes, we observed several open requests for private messages in the channel (e.g., "Regular 1...PM", or visitor asking chatroom owner "may I ask you a question in pm?") However, most regular visitors initiate private messaging without an open request in the main channel.

Shared activities as a path to relationship development

In addition to the findings above, we found evidence of three further activities during small talk that we believe help build personal relationships among the participants: virtual sharing of food and drink, electronic sharing of images and music, and joint web excursions. We describe each of these briefly below.

Virtual "sharing" of food and drink. We found a number of instances in which visitors virtually shared food and drinks. Sharing was typically done using an action command in the chat software, which generates messages such as "John gives everyone a piece of his chocolate cake" or "Amy brings a tray of mocha lattes for everyone." These actions then elicited a discussion of the "food" (e.g., how good it "tastes", other similar foods). This sharing of food and drink appears to symbolically recreation of real-life sharing of meals and may be intended to help build relationships in the same way.

Trading files: images and music. Participants shared files, most commonly mp3 and jpg files, directly using the DCC [Direct Computer to Computer] command in their chat software (usually mIRC). A given file must be sent

separately to each individual with whom one wants to share it, and then all can view or listen to the file more or less simultaneously. Napster was in widespread use among chat participants during the time of this study, and sending each other files taken from Napster occurred on a regular basis. Participants also traded pictures of themselves, their families, and pets with their acquaintances (but almost never with people they didn't know.) As with the sharing of food, file sharing tended to elicit further discussion on the shared item (e.g., whether a song was good, how cute children in a picture were).

Joint "excursions." During the small talk phases of conversation, participants sometimes took joint web excursions to look at documents or pictures of interest. For example, in Table 7, one regular has posted a url for a website with an interesting world record on it, which other regulars visit and react to. In Table 8, one participant shares some images of Ebay items with another. This type of sharing of images and text is made easy with most chat software—one clicks on a pasted link and a browser will automatically open it in a separate window. As in the previous types of sharing, joint web excursions also frequently elicited lengthy conversations about what was seen.

Participant	Message
Regular A	http://www.guinssworldrecords.com/xxx
Regular B	oooooo brb gonna look
Regular C	i'm getting thereboy, i'd love to have a fast internet connection
Regular B	OH SICK!
Regular D enters the chatroom	
Regular B	show Regular D the xxx url
Regular B	you have to see this

Table 7. Example of shared web excursion

Participant	Message
Regular A	http://www.ebay.com/aw-cgi/[ebayitem1]
Regular B	ha ha thats great
Regular A	http://www.ebay.com/aw-cgi/[ebayitem2]
Regular B	that ones cute too

Table 8. Example of shared Ebay item viewing

Discussion

Our observations of a work-oriented chat community suggest that the ways in which chat is implemented facilitate informal communication in much the same way as actual physical proximity. The results suggest the importance of the

dynamics of encounters we suggested earlier. The multi-party, multi-activity settings provides the framework within which informal communication can arise. Chance encounters among visitors allow them to identify mutual interests, hobbies, and physical locations that are unrelated to their original reason for visiting the chatroom. The extended duration of the interaction, a property not found in most forms of computer-mediated communication, leaves gaps in the task-related talk that informal, off-task communication fills (McDaniel et al., 1996). Repeated encounters across days and months allowed people to get to know one another, building on their original common ground. The openness of the encounters allowed new people to join and leave, changing the shape of both task and nontask conversation. Finally, the private messaging function permitted people to move to a more “intimate” setting to discuss more personal topics, although we have no logs of the topics they discussed in PM. A number of these findings are consistent with those of others who have studied workgroups using synchronous text applications (e.g., Churchill & Bly, 1999a, 1999b; McDaniel et al., 1996; Nardi et al., 2000).

The results further suggest three important characteristics of proximity that we had not previously considered in our encounters framework. First, considerable importance was placed on sharing food and drink. Second, regular visitors to the chatroom frequently exchanged images and music, so that they could view or listen to these items simultaneously. Lastly, regular chat users shared “excursions” outside of the web site—to jointly view Ebay items, to read funny stories on other web sites, and the like. All three of these activities are focused on building interpersonal relationships through shared experiences. It is interesting that these activities recreate virtually the same types of social bonding found by Nardi and Whittaker to be important among co-located colleagues. For example, Nardi and Whittaker note the importance of sharing meals and activities for relationship-building.

Future Directions

We have argued that the benefits of proximity on distributed work might be understood within an encounters framework which considers the affordances of media for interpersonal interaction. This framework, however, needs further refinement and empirical test. We discuss four directions for future work below.

Refining the model of encounters

The first step is to create a better model of the affordances of physical encounters that give rise to informal communication. One direction for this refinement is the incorporation of our findings about sharing virtual objects and web trips. It is not merely the ability to encounter others that helps give rise to informal talk in our volunteer organization, but the ability to interact with these others and share

visual and auditory information. We believe that a more detailed examination of informal communication among co-located workers is required to identify critical elements of proximity, and to understand how affordances for encounters provided by proximity give rise to particular types of encounters. For example, although research has considered the causes and consequences of active encounters among co-located individuals, we have little data on how frequently people passively encounter others, or on the factors that influence whether passive encounters will turn into active conversations. With respect to informal communication, we have some information on the types of topics people discuss (e.g., work status, others' availability and whereabouts, social pleasantries) but no clear data on the consequences of each type of conversation.

Interactions between affordances of media and interpersonal encounters

We also need to clarify how affordances of media, such as visibility, audibility, and simultaneity (Clark & Brennan, 1991) interact with the dimensions of social encounters we have discussed. Although in principle any medium (e.g., telephony, video conferencing, electronic chat) may be configured to allow most types of encounters, we would anticipate that media properties will shape the initiation and outcome of these encounters. For example, visual cues provided by video conferencing systems might make it easier for participants to transform passive encounters into active conversations (Fish et al., 1990), participate peripherally (Monk & Watts, 2000) or ground their messages (Clark & Brennan, 1991). The qualities of typed versus spoken discourse may also be anticipated to influence encounters. Typed messages are different than spoken discourse in a variety of ways (Cherny, 1999; Herring, 2001; Suler, 1997), may omit hedges and other politeness markers (Brennan & Ohaeri, 1999; Kraut et al., 1992), and in at least some cases are ruder in tone (Kiesler et al., 1985). These characteristics might also be anticipated to influence the dynamics of social encounters. Variable transmission delays between message production and reception in many chat networks also might disrupt smooth conversational grounding (e.g., Krauss & Bricker, 1966) and could conceivably affect the form and content of informal communication and relationship development. Further work is needed to identify the ways in which media properties interact with properties of encounters to influence informal communication.

Expanding the domain of investigation

The findings presented here come from only one online volunteer organization. We believe this organization is interesting because of its enduring nature (over five years), professional organization and clear task focus. In addition, we have been able to collect an extensive sample—near daily samples of conversation for two years—which is often difficult in private corporations. Nonetheless, this chat organization has certain properties that are likely to influence how relationships

develop among its members. For example, norms of chat discourse make it permissible to ask questions about age, gender, marital status, children and location that might be considered rude or awkward in face-to-face or other computer-mediated settings. Members of this community also shared a certain level of prior common ground based on their mutual identity as sufferers from the mental disorder on which the room focused. Although this mutual identification alone did not lead to the development of relationships (in that only subsets of members developed friendships), it remains to be determined whether it provides more of an impetus for relationship-building than, say, mutual identification as a member of a particular field of work. It is thus important to investigate the properties of informal communication and relationship development across a range of online organizations to see how specific properties of those organizations, such as the temporal patterning of works and breaks, affect the form and content of informal communication. In addition, data needs to be collected in settings in which there is more direct access to participants, to follow up on observations of interest. The anonymity of our chat community made it impossible to collect additional data that might help flesh out our models.

Developing new research paradigms

Most observational and survey studies examining the effects of proximity on distributed work necessarily confound affordances of conventional media with the types of social encounters made possible by specific implementations of those media. To understand the relative contributions of these two aspects of physical proximity, we need to develop research paradigms that will allow us to disentangle their effects under controlled settings. Studying informal communication is problematic, however, in that it cannot be imposed upon experimental participants by the investigator. Whereas we can study task-related communication by instructing participants to perform a task, we cannot study informal communication by instructing participants to talk “informally” because the very instruction to engage in social interaction transforms the nature of the conversation from informal to formal. Consequently, virtually all laboratory studies of media effects have used research paradigms that fall on the formal side of the dimensions of communications formality suggested by Kraut et al. (1990; see Table 1 above)—participants come to the laboratory for one time only, to perform a specified task, often in a specified role. Possibilities of informal communication and relationship development over time are usually nonexistent (but see McGrath, 1990, and Walther, 2002 for other methods). We are currently developing new research paradigms that will enable us to systematically manipulate dimensions of social encounters to examine their effects on informal communication and relationship development under controlled laboratory settings.

Conclusion

We have presented a framework that considers how proximity shapes opportunities for interpersonal encounters and then examined how these dimensions of social encounters might influence informal communication in an online volunteer community. Our analyses suggest that these opportunities for encounters played a role in relationship development in this community. In addition, the ability to experience sounds and scenes simultaneously, through shared web pages, files, and other devices, appears to be important for relationship-building. Further research is required to understand how proximity influences encounters in face-to-face and other computer-mediated media, how properties of specific media interact with dimensions of encounters, and how properties of communities and organizations influence informal communication and relationship-building. We believe that the field would benefit from new research methodologies that allow us to examine these questions in depth.

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References

- Allen, T. (1977). *Managing the flow of technology*. Cambridge, MA: MIT Press.
- Bellotti, V. & Bly, S. (1996). Walking away from the desktop computer: Distributed collaboration and mobility in a product design team. *Proceedings of CSCW '96* (pp. 209-218). NY: ACM Press.
- Bly, S., Harrison, S., & Irwin, S. (1993). Media spaces: Bringing people together in a video, audio and computing environment. *Communications of the ACM*, 36, 28-45.
- Brennan, S. E. & Ohaeri, J. O. (1999). Why do electronic conversations seem less polite? The costs and benefits of hedging. *Proceedings of WACC '99* (pp. 227-235). NY: ACM Press.
- Brennan, P. F., & Ripich, S. (1994). Use of a home-care computer network by persons with AIDS. *International Journal of Technology Assessment in Health Care*, 10, 258-272.
- Cannon-Bowers, J. A., Salas, E., & Converse, S. A. (1993). Shared mental models in expert decision-making teams. In N. J. Castellan, Jr. (Ed.), *Current issues in individual and group decision making* (pp. 221-246). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cherny, L. (1999). *Conversation and community: Chat in a virtual world*. Stanford, CA: CSLI.
- Churchill, E. F. & Bly, S. (1999a). It's all in the words: Supporting work activities with lightweight tools. In *Proceedings of GROUP 99* (pp. 40-49). NY: ACM Press
- Churchill, E. F. & Bly, S. (1999b). Virtual environments at work: Ongoing use of MUDs in the workplace. *Proceedings of WACC'99* (pp. 99-08), NY: ACM Press.

- Clark, H. H. & Brennan, S. E. (1991). Grounding in communication. In L. B. Resnick, R. M. Levine, & S. D. Teasley (Eds.). *Perspectives on socially shared cognition*. (pp. 127-149). Washington, DC: American Psychological Association.
- Clark, H. H. & Wilkes-Gibbs, D. (1986). Referring as a collaborative process. *Cognition*, 22, 1-39.
- Daft, R. L. & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organizational design. *Research in Organizational Behavior*, 6, 191-233.
- Davison, K. P., Pennebaker, J. W., & Dickerson, S. S. (2000). Who talks? The social psychology of illness support groups. *American Psychologist*, 55, 205-217.
- Epstein, Y. M., Rosenberg, H. S., Grant, T. V., & Hemenway, N. (2002). Use of the internet as the only outlet for talking about infertility. *Fertility and Sterility*, 78, 507-514.
- Festinger, L., Schachter, S., & Back, K. (1950). *Social pressures in informal groups: A study of human factors in housing*. Palo Alto, CA: Stanford University Press.
- Fish, R. S., Kraut, R. E., & Chalfonte, B. L. (1990). The VideoWindow system in informal communications. *Proceedings of CSCW '90* (pp. 1-11). NY: ACM Press.
- Fussell, S. R., (2002, November). *An alternative conceptualization of the benefits of proximity*. Presented at the workshop Beyond Face-to-Face Communication, organized by E. Bradner and G. Mark at CSCW 2002, New Orleans, LA.
- Galegher, J., Sproull, L., & Kiesler, S. (1998). Legitimacy, authority, and community in electronic support groups. *Written Communication*, 15, 493-530.
- Goffman, E. (1961). *Encounters: Two studies in the sociology of interaction*. Indianapolis, IN: The Bobbs-Merrill Company.
- Harrison, S., Bly, S., Anderson, S., & Minneman, S. (1997). The Media Space. In K. E. Finn, A. J. Sellen, & S. B. Wilbur (Eds.) *Video-mediated communication* (pp. 273-300). Mahwah, NJ: Lawrence Erlbaum Associates.
- Health, C. & Luff, P. (1992). Collaboration and control: Crisis management and multimedia technology in London Underground line control rooms. *Computer Supported Cooperative Work*, 1, 69-94.
- Herring, S. C. (2001). Computer-mediated discourse. In D. Tannen, D. Schiffrin, & H. Hamilton, *Handbook of Discourse Analysis* (pp. 612-634). Oxford: Blackwell.
- Hutchins, E. (1994). *Cognition in the wild*. Cambridge, MA: MIT Press.
- Isaacs, E. A., Whittaker, S., Frohlich, D., O'Conaill, B. (1997). Informal communication reexamined: New functions for video in supporting opportunistic encounters. In K. E. Finn, A. J. Sellen, & S. B. Wilbur (Eds.) *Video-mediated communication* (pp. 459-485). Mahwah, NJ: Lawrence Erlbaum Associates.
- Jacobs, M. K., & Goodman, G. (1989). Psychology and self-help groups. *American Psychologist*, 44, 536-545.
- Kiesler, S. & Cummings, J. N. (2002). What do we know about proximity in work groups? A legacy of research on physical distance. In P. Hinds & S. Kiesler (Eds.) *Distributed Work* (pp. 57-80). Cambridge, MA: MIT Press.
- Kiesler, S., Zubrow, D., Moses, A., & Geller, V. (1985). Affect in computer-mediated communication: An experiment in synchronous terminal-to-terminal discussion. *Human-Computer Interaction*, 1, 77-104.
- Krauss, R. M. & Bricker, P. D. (1966). Effects of transmission delay and access delay on the efficiency of verbal communication. *Journal of the Acoustical Society*, 41, 286-292.
- Kraut, R. E. & Streeter, L. (1995). Coordination in software development. *Communications of the ACM*, 38, 69-81.

- Kraut, R. E., Egidio, C., & Galegher, J. (1990). Patterns of contact and communication in scientific research collaboration. In J. Galegher, R. Kraut, & C. Egidio (Eds.), *Intellectual teamwork: Social and technological bases of cooperative work* (pp. 149-171). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Kraut, R. E., Fish, R.S., Root, R.W., & Chalfonte, B.L. (1990). Informal communication in organizations: Form, function, and technology. In S. Oskamp & S. Spacapan (Eds.), *Human Reactions to Technology: The Claremont Symposium on Applied Social Psychology* (pp. 145-199). Beverly Hills, CA: Sage Publications.
- Kraut, R. E., Fussell, S. R., Brennan, S. E., & Siegel, J. (2002). A Framework for understanding effects of proximity on collaboration: Implications for technologies to support remote collaborative work. In P. Hinds & S. Kiesler (Eds.) *Distributed work* (pp. 137-162). Cambridge, MA: MIT Press.
- Kraut, R. E., Galegher, J., Fish, R. S., & Chalfonte, B. (1992). Task requirements and media choice in collaborative writing. *Human-Computer Interaction*, 7, 375-408.
- McDaniel, S. E., Olson, G. M., & Magee, J. C. (1996) Identifying and analyzing multiple threads in computer-mediated and face-to-face conversations. *Proceedings of CSCW '96* (pp. 39-47). NY: ACM Press.
- McGrath, J. E. (1990). Time matters in groups. In J. Galegher, R. E. Kraut, & C. Egidio (Eds.), *Intellectual teamwork: Social and technical foundations of cooperative work* (23-61). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Monk, A., & Watts, L. (2000). Peripheral participation in video-mediated communication. *International Journal of Human-Computer Studies*, 52, 775-960.
- Murphy, K. L. & Collins, M. P. (1997). Communication conventions in instructional electronic chats. *First Monday*, 2, 11, 1997. (http://www.firstmonday.dk/issues/issue2_11/murphy/).
- Nardi, B. A. & Whittaker, S. (2002). The place of face to face communication in distributed work. In P. Hinds & S. Kiesler (Eds.) *Distributed work*. Cambridge, MA: MIT Press.
- Nardi, B. A., Whittaker, S., & Bradner, E. (2000). Interaction and outeraction: Instant messaging in action. *Proceedings of CSCW 2000* (pp. 79-88). NY: ACM Press.
- Olson, G. M., & Olson, J. S. (2000). Distance matters. *Human-Computer Interaction*, 15, 138-178.
- Olson, J., Teasley, S., Covi, L., & Olson, G. (2002). The (currently) unique advantages of co-located work. In P. Hinds & S. Kiesler (Eds.) *Distributed Work* (pp. 113-135). Cambridge, MA: MIT Press.
- Person, B. (2002). Online support for caregivers of people with a mental illness. *Psychiatric Rehabilitation Journal*, 26, 70-77.
- Root, R.W. (1988). Design of a multimedia vehicle for social browsing. *Proceedings of the 1988 conference on computer-supported cooperative work (CSCW)*. New York: ACM Press.
- Setlock, L. D. (2002). *Needing to talk: Strategies for getting the floor in an online support community*. Unpublished manuscript, Carnegie Mellon University.
- Suler, J. (1997). Psychological dynamics of online synchronous conversations in text-driven chat environments. *The Psychology of Cyberspace*. (<http://www.rider.edu/~suler/psycyber/psycyber.html>)
- Walther, J. B. (2002). Time effects in computer-mediated groups: Past, present, and future. In P. Hinds & S. Kiesler (Eds.) *Distributed work* (pp. 235-257). Cambridge, MA: MIT Press.
- Whittaker, S., Frohlich, D., & Daly-Jones, O. (1994). Informal workplace communication: What is it like and how might we support it? *Proceedings of CHI '95* (pp. 131-137). NY: ACM Press.
- Zipf, G.K. (1949). *Human behavior and the principle of least effort*. Cambridge, MA: Addison-Wesley.