How and Why People Twitter: The Role that Micro-blogging Plays in Informal Communication at Work

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ABSTRACT

Micro-blogs, a relatively new phenomenon, provide a new communication channel for people to broadcast information that they likely would not share otherwise using existing channels (e.g., email, phone, IM, or weblogs). Micro-blogging has become popular quite quickly, raising its potential for serving as a new informal communication medium at work, providing a variety of impacts on collaborative work (e.g., enhancing information sharing, building common ground, and sustaining a feeling of connectedness among colleagues). This exploratory research project is aimed at gaining an in-depth understanding of how and why people use Twitter – a popular micro-blogging tool - and exploring micro-blog's potential impacts on informal communication at work.

Categories and Subject Descriptors

J.4 SOCIAL AND BEHAVIORAL SCIENCES

General Terms:

Human Factors

Keywords

Micro-blog, Twitter, Informal Communication

1. INTRODUCTION

Informal communication often consists of unplanned and brief "catching-up" conversations among employees in organizations (e.g., water-cooler conversations; [15]). Researchers have suggested that informal communication at work may play important roles for collaborative work and organizational innovation. It supports sharing of work-relevant information among employees; co-ordination of group activities; creating potential collaboration opportunities; and social functions such as transmission of office culture and maintenance of common ground and a feeling of connectedness between co-workers [14,15,19,29]. Through the emergence and use of computer-mediated communication technologies (CMC), communication patterns have shifted from primarily face-to-face to significant use of online computer-mediated communication. However, even though CMC has expanded the possibilities for staying in touch with collaborators and thereby increasing productivity, workers continue to suffer from time-famine and have little opportunity for informal exchange with each other, especially with those outside their daily work activities [21].

Researchers studying informal communication have been seeking ways to increase the chances of informal conversations at work. For instance, media richness theory and social presence theory suggest that social cues are beneficial in promoting spontaneous conversations and that we should be able to design systems that make better use of such cues [15,25]. Tool designs guided by theory were helpful for increasing social presences among co-workers [8,25], however, few empirical studies have yet shown significant impacts of increased social cues in CMC systems on leading to promote impromptu conversations and informal exchanges [24]. More recent efforts have shifted the emphasis to social software in organizations, including corporate blogs [7,11,12], social tagging [18,23], and social networking sites [5].

Micro-blogging, enabled by a variety of online social networking tools (e.g., Twitter, Jaiku, Pownce, and Facebook), refers to the activity that users broadcast brief text updates about small little things happening in their daily life and work activities, such as what they are reading, thinking, and experiencing [17]. Micro-blogging is used to achieve a wide variety of social purposes and has been quickly gaining popularity as an option for online social networking. In Twitter.com, people update their daily life activities with friends, families, and co-workers; share information, news, and opinions with interested observers; and seek knowledge and expertise in public tweets [13,17]. Emotionally, people seem to use micro-blogging to achieve a level of cyberspace presence, being "out there" and to feel another layer of connection with friends and the world [17]. The increasingly popular use of micro-blogging for lightweight communication in the world of social computing makes it a candidate media for informal communication at work.

However, micro-blogs are still a relatively new phenomenon in online social networking, and have received little scholarly attention as yet. In particular, there is no solid understanding of how and why people micro-blog, and there is no research studying the potential impacts of micro-blogging on informal communication at work. The exploratory study reported in this paper takes a step in this direction, seeking to build a rich understanding of why

people use micro-blogs and exploring how the characteristics of their micro-blogging behaviors enable informal communication.

2. BENEFITS OF INFORMAL COMMUNICATION

As mentioned in the prior section, scholars studying informal communication in work settings have emphasized that informal exchanges in opportunistic conversations (e.g., water-cooler conversations) among employees in organizations play an important role in organizations' success and provide a variety of potential benefits supporting for collaborative work [14,15,19,25]. We have organized the benefits discussed for informal communication into relational and personal beneficial consequences (Figure 1). The relational consequences capture the effects that informal communication may have on two persons' relationship and their future interpersonal activities (e.g., collaborative work). This consists of
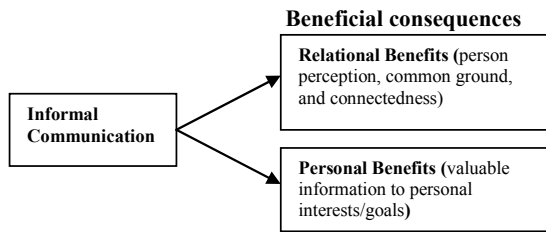
Beneficial consequences

Figure 1. Proposed benefits of informal communication

building person perceptions of each other, developing common ground, and sustaining a feeling of connectedness with one another. The personal consequences capture the benefits that informal communication's may have for one's personal interests and goals (e.g., information and knowledge gained for one's profession and other personal interests; serendipitous collaboration opportunities). In this section, we review relevant theories in interpersonal communication and social-psychology to expand the theoretical conceptions behind this simple framework.

2.1 Relational Benefits

2.1.1 Person perception

In brief, knowing what others have been doing and thinking and what new things may have happened or are now happening to them may help one to develop more accurate person perceptions of others (e.g., knowing people's competence, personality, behavioral characteristics). Person perception is an important factor for people making decisions in interactions with others, such as seeking collaborators for joint projects [15]. Social cognition scholars believe that reality is too complex to fully discern, and that we understand the world according to simplified schemas or images of reality [2]. Instead of weighing all the evidence when making a decision, people tend to build a background perception on others and rely on heuristics to save time and energy [6]. In these processes, vivid or highly memorable possibilities are more useful than those that are harder to picture or difficult to remember [2].

Through opportunistic conversations in informal communication, people often hear stories about each other's experiences and thoughts, which may produce a more memorable set of information to use in constructing schemas about others. Keeping aware of others' personal life updates may help update people's schemas and build a background perception about a person.

2.1.2 Common ground

Common ground refers to mutual understanding among communicators about a fact. Clark's definition of common ground [3] suggests that a proposition P is common ground only if all the people conversing know P; and they all know that they all know P. (e.g., I know that you know that I am not a native English speaker). Clark suggested that common ground can be built through a grounding process in conversations, and proposed that conversants seek to minimize communication effort, which in turn motivates them to develop common ground. The extent to which conversants have developed common ground in previous interactions may affect the efficiency of future communication. In this sense, informal catching-up conversations between colleagues may help to increase awareness of updates about each other, so as to better create and maintain common ground.

2.1.3 Connectedness

As previous literature has suggested, informal communication may lead to feelings of intimacy and connectedness between colleagues [19]. This positive emotional feeling that one has for another may be important for future interactions and collaboration (e.g., seeking information or help someone at work). Interpersonal attraction theory from social psychology may help to explain how informal communication may produce such emotional effects (e.g., intimacy and liking). Interpersonal attraction refers to all of the forces that lead people to like each other, establish relationships, and in some cases, fall in love. Several general principles [2] have been discovered by researchers in this area; these include physical proximity, familiarity (i.e., exposure to others' personal life happenings), and similarity (e.g., similar attitudes, experiences, and other traits).

Informal communication may promote feelings of liking another person based on these three principles. Though it may not increase the physical proximity with others who are not in our daily work or life activities, it may lead to virtual feelings of proximity (i.e., being there, still there [22]). Keeping in touch with colleagues may increase the chances of sharing personal life updates, and may raise the possibilities for discovering similar experiences and attitudes (e.g., places both have visited, similar reactions to current events).

2.2 Personal Benefits

Informal communication with people at work (both related and unrelated to active projects) can lead to acquisition of valuable information that is beneficial for one's personal work goals. For example, keeping in touch with co-workers from different business units may help employees acquire new information and knowledge about their professions, gain different perspectives for their own jobs, and even discover new collaboration opportunities [14,15,25].

Scholars studying social networks have suggested that a greater proportion of novel information flows to individuals through weak than through strong ties. This is not only because novel (and thus potentially more valuable) information is more likely to be gained from people outside our daily activities [9,10], but also that rapid feelings of mutual trust - called 'swift' trust - are more likely to form in weak tie interactions [16]. Weak ties are the most common social relationships that people have in their personal social networks. Thus an increased level of informal communication

throughout one's social network at work may increase the chances of sharing and gaining valuable information.

In addition to interpersonal trust, source credibility is a second criterion used in determining the trustworthiness and value of a piece of information. People must trust that the person they gain the information from has sufficient expertise or credibility [1]. In one's social network, there are often individuals who have common interests (e.g., profession, hobbies) but different specific experiences. Informal conversations might often be invoked around shared interests but distinct expertise, so as to increase possibilities of information exchanges that they perceived as valuable as well as from trusted sources.

From here, we will turn to reporting our exploratory study. We began with the general expectation that lightweight communications like broadcasting and sharing personal life updates in micro-blogging make it a strong candidate for informal communication at work. If so it may produce benefits such as we have described. However, micro-blogging is a relatively new phenomenon in modern online social networking, and we still know little about it. Thus we carried out a qualitative study of employees in a large corporation who have integrated micro-blogging into their own practices, using the Twitter micro-blog tool.

3. METHOD

Twitter is the most popular micro-blog tool among other existing equivalents and has been featured extensively in the public media; for example it has been used by political campaigns, news organizations, and for business communications. Yammer is a corporate version of Twitter that provides micro-blog support for a company's internal use. However, Yammer is at its early phases: corporate users seem to still have concerns of whether it is a safe place to post, and it has low participation thus far.

The investigation reported in this paper focuses on less public micro-blogs that are updated by ordinary people for much smaller audiences, rather than the heavily followed micro-blogs like those associated with political campaigns or major news organizations. To study the potential impact of micro-blogging on informal communication in work settings, we needed to focus on ordinary Twitter users who currently work in corporate settings.

We used semi-structured interview methods. Phone interviews (about 40 to 60 minutes each) were conducted during September and December 2008 with 11 participants (seven men and four women) from a large IT company; the work roles of participants included both workers and managers in engineering, product management, marketing, and corporate communication. Participants were recruited first through personal contacts in the company; we then used a "snowball" method, asking each informant to connect us to other Twitter users they know. Pseudonyms are used when discussing comments by specific informants.

The interviews were structured by two sets of questions, including (1) people's current micro-blogging practices (characteristics of content shared, what makes them share such information on Twitter); and (2) their experiences micro-blogging with co-workers (consequential effects that micro-blogging have or might have on collaborative work; issues encountered, opinions and anticipated feature needs). Questions were asked from both information sender and receiver perspectives. Participants were also asked more generally about their perceptions of micro-blogs, compared

with other communication media available. A complete set of questions used to guide the interviews can be found at our research website[1].

4. WHY PEOPLE USE TWITTER
4.1 Micro-blogging Practices and Motivations

The 11 participants had been using Twitter for six months to a year. They included six heavy users whose post frequency ranged from 626 to 1552 tweets ("tweet" is the word used to refer to a Twitter posts); they submitted tweets from 5 to 30 times per week. The remaining five participants were more casual users who posted from 48 to 167 tweets. Seven of the 11 interviews had more than 60 followers (people who subscribe to their Twitter updates), with a range from 67 to 193 (except for Alice, a marketing director who had 665 followers). Their followers represented a variety of social relationships, including friends; colleagues and business partners from both inside and outside of company; and other interested observers. All used multiple Twitter clients on multiple devices (e.g., PC, Mac, mobile phones), including Twitterfox for the Firefox browser and Twitterific on mobile phones.

Like what Java et al. [13] reported in their study, we found that even in our small sample, there was tremendous diversity in Twitter content: personal whereabouts information, links to articles and news, and opinions to headline news. Our interviewees reported using Twitter for a variety of social purposes, including (1) keeping in touch with friends and colleagues; (2) raising visibility of interesting things to one's social networks; (3) gathering useful information for one's profession or other personal interests; (4) seeking for helps and opinions; and (5) releasing emotional stress. These motivations seem to be quite similar to purposes reported in studies of other social media for (e.g., IM, Blogs, and RSS), and as such offer little insight about why people use Twitter. Thus we turn now to a discussion of message characteristics and technology features that seem important to how these users' have appropriated micro-blogging into their social lives.

4.2 Content Features

Our interest in micro-blogging as informal communication alternative led us to emphasize how Twitter is used *differently* from other communication media and how they perceive the unique characteristics of messages shared on Twitter compared with those on other media. Although we have not yet conducted a systematic analysis of the interview transcripts, we have reviewed them to identify ways in which Twitter may be playing a special role in serving informal communication needs. In the following we illustrate three interesting ways in which our interviewees think about tweets, from both micro-blogger and follower perspectives: frequent life updates, real-time information, and what we have metaphorically called people-based RSS feeds.

4.2.1 *Frequent brief updates about personal life activities*

Many of our informants use Twitter to update others (e.g., friends, colleagues) about interesting things happening in their personal lives (e.g., whereabouts, interesting articles read, and thoughts). By staying aware of others' ongoing updates, people are able to

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[1] http://cscl.ist.psu.edu/public/users/dzhao/Twitter+interview+questions

keep in touch with friends and maintain social relationships; this is especially important for contacts that are not part of their daily life or work activities. Pete, a business development manager, described Twitter as "a great tool to allow keeping a pulse on them, whom I don't see all the time". He said,

> [Pete-1] Basically, just to keep a pulse of what the other people were doing, so we knew it makes sense to reach out and to call them because we have some useful information or something like that. It became compelling to keep track of people that way, because I find it bridges the gap with people I didn't see all the time. If I see some people all the time, then Twitter doesn't have a lot meaning for those people. But if I didn't see them all the time, it wasn't the equivalent, but it is a partial replacement for the day-to-day bumping into them, where you find what sort of mood they were in, what things they are interested in, or what music they are listening to. Those little things that goes along way allow me to maintain some form of relationships.

Tom is a business development manager at the company. Because of job needs, he moved from Seattle to San Francisco two years ago. But he was able to keep up with some friends through Twitter physically 1000 miles away, so that he knows what's been happening in their daily lives. He said,

> [Tom-1] When I visited Seattle this summer and met up with them, our discussion was able to accelerate to sort of current topics, because I didn't have to catch up on all of the things that have been happening in our daily lives, because we have seen each others' Twitter updates in the last nine months or whatever. So we were able to create a much more discrete and intimate context for our conversations, because the level of information that we have been able to get from each other simply by using Twitter. So it truly changed the interpersonal engagement because of the way we have been able to stay in contact.

As Nardi [20] found, people blog to provide a record of events in their lives. Some of our informants use Twitter as an alternative to blogging, for keeping track of what they have been doing. Brad, an IT analyst, posts 20-30 times a week, and as he described, many his posts are:

> [Brad-1] Random stuff, for instance when I am travelling to Missouri on this Tuesday, I have been updating about my flight status. Or some other random things, like where I am at for dinner or coffee, or at gym something like that.

Note though that in contrast to blogging, some of our informants reported that they found micro-blogging easier and that they do it more frequently than blogging. Brad said [Brad-2] "it's just a way for me to blog [frequently]. I think I am more able to blog 140 characters than, you know, sit down and compose blogs everyday." The easy access to Twitter services encourages people to twitter about interesting things as they happen, rather than waiting and writing a perhaps longer and more reflective message later on. Bob, a product solution manager, often uses the camera on his mobile phones to "take pictures of things [he saw] interesting going on in my daily life and post it". He often posted tweets to convey "fun things different from a normal day". Bob said,

> [Bob-1], I am often on the phone in a meeting all the day. If I am not on the phone in a meeting, say if I am going out to a school to talk with some people at that school, or volunteering to do something, or I took a day off and I went sliding with my kids, I will usually put something in that. Especially, when I am doing something really fun, I will tweet about that, because I think it will make my friends feel happy about it too.

Similarly, Aaron and Delilah, both IT engineers, often twittered about interesting articles in the IT industry that they came across when sitting on their desks at work. Tasha and Ray, corporate communication managers, often attend external conferences and events, where they twitter about interesting talks and ideas they encounter. Ray told us that he maintains a private account to share whereabouts information with several close friends, for staying in frequent touch with them on Twitter [Ray-1].

In sum, micro-blogging was viewed as a quick and easy way to share interesting and fun things happening in daily life activities; it lets users keep in touch with friends and colleagues, especially who are outside our life cycles. Because the length of tweets are restricted and there is very little overhead to sending or receiving tweets, users see it as a low-cost way to share updates that might otherwise not be seen as worth the effort.

4.2.2 Real-time information

People often create Twitter posts as things happen in real time, for example as they are doing some activity, thinking about something, or reading or viewing material. Our informants reported in common that real-time information of this sort is more useful than more outdated comments for both relational and personal interests. With respect to relational interests, real-time updates are useful for monitoring changes in context and mental states, and initiating impromptu conversations. Delilah said,

> [Delilah-1] By reading someone's updates, you get more present understanding of what's on that person's mind, what he or she has been interested, so that it's more easily to get a conversation started and flow.

Pete reported that monitoring someone's live updates is useful for prompting catching-up conversations and organizing joint events with friends whom he does not see very often. He said:

> [Pete-2] Basically, just to keep a pulse of what the other people were doing, so we knew it makes sense to reach out and to call them because we have some useful information or something like that … [continues] I will twitter about it if it is useful for friends of mine that are following me, and when they don't see me in normal places, they know what's on my mind right now, or great sledding locations in the northeast, because I really like to go sledding with my friends.

As to personal interests and goals, real-time information is considered much more valuable than older information. Alice, a marketing director, reports that she often tweets about ideas and thoughts as they fly across her mind in her daily professional observations. She described her twitter habits as

> [Alice-1] When I am out, say in a conference meeting, I will tweet about my thoughts of what people are sharing in the conference. If I am at home, for personal use, you know, I will just tweet about what I am thinking and feeling, thoughts or idea. If it's at work, tends to be more about work ideas, or questions about a concept, or an observation of my industry or my profession.

Another interesting example was given by Aaron, an IT engineer who works on the company's internal Web 2.0 social software. Aaron needs to frequently gather information about available products and services for his work tasks. He said that "prior to Twitter days", he usually went to review sites to find this information; unfortunately those reviews are often months old.

> [Aaron-1] So I have no idea what people are thinking about the product today. But if you take that same term in Twitter, you will literally get what people are thinking about that product now … after doing research on twitter, I get a sense, by reading some of the tweets, that the product may lack some maturity. I am able to trust that information just because

that information is far more recent than those from Amazon or any other review sites.

Bob reported that he found real-time information more useful when it is about specific things that people are doing or reading, rather than general comments like "I went shopping today". He continues with examples,

[Bob-2] Things like, an interesting talk posted when she is in a conference; an interesting article that a person just read; or a deal information that a person posts when he is out shopping.

Real-time information posted through micro-blogging is considered a quick and interesting source of news. It can also provide valuable context information that may prompt catching-up conversations with distant friends and colleagues.

4.2.3 People-based RSS feed

Many our informants used Twitter also as a RSS feed for gathering information interesting and useful for their work and other personal interests. Bob described this as "people-based RSS feeds". He considered information gathered in his personal Twitter account as more relevant to his individual interests and as having higher credibility. When asked to compare Twitter with other available tools, like social tagging and bookmarking, Bob said,

[Bob-3] I am not a big fun of those media. And the reason why, it is not trustable opinion so to speak. So if I go to digg.com, someone says something is good and you should go to look at it, I am not sure I can trust that. I do trust my personal network, so to speak. If someone that I know highlighted something in Twitter, I more likely go and check it out.

Many of our informants reported that they are able to get useful information in Twitter because they follow (subscribe to) people with whom they share similar interests, either about social hobbies or their professions. Donna, a marketing manager, said "I follow tea, politics, social media, or people I just like". She described Twitter as "a fabulous way to keep current on information coming to me without me having to search for it". According to her, reason that Twitter helps is that she can find and follow people who are active in the fields of her interests.

[Donna-1] I follow a few people who are movers and shakers in the social media field, so that I know what's on their minds, you know, what they are attending, listening to, or reading. These people often twitter about articles with URLs about industry status. So, by subscribing to their updates, I can keep current on industry status without having to go out and look for information.

Tasha, a corporate communication manager, was able to use Twitter to get useful work-related information from researchers and practitioners she met at conferences. She once went to a social media conference last year in San Francisco. As she described,

[Tasha-1] Twitter was the predominant way to keep people at the conference to network with … these people are sort of leaders in social media, they share a lot of interesting articles and links on Twitter … Normally I would not have the opportunities to be exposed to those ideas, or articles, or resources, except through the Twitter friends.

Similarly, Delilah, an IT manager, often needs to keep an eye on new web services that are available and might be useful for her work purposes. She found that Twitter was useful for keeping track of current threads among many emerging new services by following others who are active in the field.

[Delilah-2] There are so many new web services coming out, it's very hard to keep track of them all, and some of them you may not want to bother with, because they may be out of business six months after launch … So I am able to find and follow those people who are very active in the industry, part of their jobs is to look at new services. If they are looking at it, then I will probably check it also.

From an information sender's perspective, the fact that Twitter content is perceived as containing valuable content is tied to the fact that people tend to tweet when they consider their content to be interesting or useful to others. Many of our informants reported that they often tweet when they are reading or seeing something really interesting. Aaron said, "Typically when I am reading or seeing something that I think is absolutely wonderful, I just retweet". Pete is quite interested in politics and sometimes tweets about it. He gave this as an example,

[Pete-3] A while back, there was some legislation about to happen in Congress, and nobody knew what's going on except for a few news organizations. So, you know, I will tweet stuff like that, to raise the visibility of that sort of thing to people in my circle.

Similarly Donna said she tends to tweet more about interesting things from her personal observation than about daily routines.

[Donna-2] for example, so it might be that I am at a concert, there might be something special and I will tweet that, it might be a new recording that I found, if I find something in social media is very interesting, I will tweet about that, if I find a piece of research very compelling, I will tweet about that.

Micro-blogging is useful for gathering valuable information for people's personal work and other interests. From an information provider's perspective, this is because users often share a piece of information when they find it very interesting and useful. From a reader's perspective, information posted by a person the reader has deliberately selected to follow is perceived as useful and trustworthy. In the following section, we will discuss the technology characteristics of micro-blog that makes our informants use and perceive Twitter differently from other CMC tools.

4.3 Technology Features

In the previous section, we described several interesting communication behaviors found across people who use Twitter. Frequent updates of interesting things in personal life activities allow users to keep a pulse on what is going on in others' minds and maintain social relationships with friends and colleagues who are outside their life cycles. People use Twitter for gathering useful information for their personal interests (both work and life interests) because content shared is real-time, from people who share similar interests, and is trustable information from one's personal networks. We turn now to a discussion drawn from informants' reports about how micro-blog technologies powered by Twitter help to afford these communication behaviors. We found the following technology characteristics that might help to further explain why people use Twitter for informal communication.

4.3.1 Brevity

From a micro-blogger's perspective, a 140-character limitation on text messages is a good thing. This feature helps reduce the cost of sharing, as summarized by Aaron: "If I am doing something, my effort to share it with someone should be minimum." Similarly as what we have reported in [Brad-2] previously, in comparison with

blogging, Aaron described his preference to use micro-blogging to share interesting things and opinions with friends.

> [Aaron-2] If I have something to say or share, if it takes me 15 minutes to do it, which typically happens if you want to blog, then, you know, I would say I don't have 15 minutes. If it only takes me 2 seconds, like in Twitter, selecting the content and copying and pasting it in a window and hitting 'send', then I will do it.

In addition to ease of use, some informants suggested that the brevity feature also helps make information more concise, a possible benefit from the reader's perspective. For example, Tom said "the fact that is limited to 140 characters also requires you to provide a little more thought to what you say and economy of words to be used". Similarly, Donna said

> [Donna-3] Because you have 140 characters, I like to try to communicate something very specific, so I'll work the sentence to convey my message, the idea is you are trying to get a very succinct message out in exact 140 characters or less.

As a reader, the brevity of Twitter posts makes it efficient to browse large amount of updates. For example, Tom said,

> [Tom-2] Because of the format in Twitter, it is so easy to read, and I filter through it very quickly and determine what's going to provide me value immediately and can simply scroll pass the rest of it.

Similarly, Donna said that "One thing I like is that, it is short, you are not forced to read a lot and you can get a lot of information in a short amount of time." In addition, she believed that "Because it is short, you are forced to get into the point". Similarly, some informants reported that, compared with the limited view provided by RSS reader tools, posts by a real person tend to be not only brief, but well-crafted and right to the point.

4.3.2   Mobility and pervasive access

Easy access to Twitter services is another important technology feature that allows users to post updates frequently and in real time. Tasha reported that "I probably use 5 or 6 tools, depending on which platform I am on, whether it's Mac or PC, or iPhone, or sometimes just on the website, if I am not on one of my devices". Similarly, most of our informants used a variety of Twitter services on multiple devices and reported that the pervasive access to Twitter makes it easy to update as things happen, so that they are more likely to do it frequently (as we have already illustrated in [Bob-1]). Aaron said,

> [Aaron-3] If I am out on the street, and I want to share something, if I have to make a mental note that when I go back to my desk, I need to find something and send it, then I would not do it. If I can share it right away from cell phone, then I will do it… There are so many channels to allow me to access that thing, from my iPhone, my web-browser, my IM client … For example, in my Firefox RSS feed reader, when you read some content, if you want to tweet it, you can just tweet it.

The flexible access to Twitter also makes it easy and convenient for readers to monitor others' updates. Zack, a marketing manager, often is in meetings all day. He has found it very convenient to have Twitter on his Blackberry, so that he can check new information, as he described, "whenever I got a moment in-between meetings" [Zack-1]. Tasha is a corporate communication manager, as we mentioned before. Part of her job is to post questions and ask opinions to her group through various media. She found it often to be quicker to gather feedback from Twitter. She said,

> [Tasha-2] Unlike other media like forum or blogs, Twitter is more real-time. People seem monitoring it on the background all the time, so you may get responses more frequently than other media.

4.3.3   Broadcast nature

The broadcasting nature that micro-blogging inherits from the blog paradigm makes it easy for people to share and check posts. As information producers, micro-bloggers broadcast interesting things on their own channel to their "subscribed" audience. These are often small little things happening in their daily lives, such as where they will hang out tonight, interesting news or articles they have found, or work status like "been writing a CHI paper". This information is modest enough that they probably would not bother to select recipients for sending via IM or email. As Bob described, Twitter is good at broadcasting things that he found interesting, but with unknown beneficiaries. When asked to compare his micro-blogging with phone, IM, and email, he said,

> [Bob-4] The best way to describe would be that it is my stream of thinking. If I have a thought and it is not directly to anyone particular, but it's something that I am thinking and I would like to say aloud in my head, but I don't have specific person to give it to make it actionable. That's what I use it for. I use it for interesting information with unknown recipients that I would like to share.

Similarly, Tom implied that the voluntary readership made him broadcast and share things with less concern than when he uses other media. He said,

> [Tom-3] Because people can choose to read it or not, I am able to use it much more informally, and simply use it as a form of expression, where it is not expected and anticipated that someone would reply to that message. While with email, there is implicit understanding that there is a sort of request for reciprocation. IM and telephone obviously much more imply reciprocation.

Some informants also found the broadcasting and voluntary listening nature in Twitter useful for releasing emotional stress. For example, Pete said,

> [Pete-4] When I am frustrated, I find Twitter is very good for that, because it gives you this ability to yell out loud, and without strangling the person you are talking to and that's very helpful.

In addition to helping reduce the cognitive threshold for people to share, broadcasting simply makes it easier to reach a lot of people relative to some other communication media, as many of our informants reported. For example, Donna said that "If you use email, you may have to broadcast to a huge list, and I think it is very very impersonal. If you use phone, you can never get to everybody at one time."

From a reader's perspective, just as people choose radio channels to listen to, Twitter users choose to subscribe to people's tweets based on similar interests, as we have illustrated in [Donna-1, Tasha-1, and Delilah-2]. Tasha described the subscribing feature in Twitter as, "it provides me a filter for the best types of information in the topics that I am most interested in. Because, more often, the people that I monitor in Twitter are people who have similar interests with me, so I find them very valuable". The subscribing feature also increases the perceived credibility of a subscribed information source (as illustrated in [Bob-3]). Tom described this as, "If I choose to follow somebody, and I know that person has established himself in that area, then I don't have to worry about the types of content I am gonna get from him".

The open subscription feature in Twitter not only allows users to find interesting people to follow for exchange of information and thoughts, but may also help to establish valuable personal relationships for future collaborations. Tom told us an amazing story about such an experience. A while ago, he tweeted about a book that he was reading and liked a lot. Natasha, a social constructer, was reading the book at the similar period of time. She found Tom's tweets about the book very interesting and they started following each other on Twitter. Natasha worked on a project with the Kenyan government working to pull Kenya people out of poverty through ICT. Several months later, Natasha sent Tom a message on Twitter asking whether she could talk with him to learn more about Tom's company before her meeting with executives of the company about the Kenya project. After the meeting with Tom, Natasha invited him to the executive briefing and also invited him as a representative from the company working on the Kenya project. In Tom's words

> [Tom-4] So, that's the type of relationship that can be built simply through Twitter. I never knew Natasha, and haven't been knowing anything about Kenya. She finds me because our common interests and developed a positive relationship that I am very proud of and very interested in continuing.

Voluntary readership also helps reduce cognitive cost for users to browse and keep up with the large amount of updates on Twitter, compared with cognitive overload often perceived by email users [4]. As Nardi [20] found about blogging in general, voluntary readership allows users to check others' updates at their own convenience, is not intrusive (no one is forced to pay attention), and no one needs to respond unless they wish to. As Pete put it [Pete-1], Twitter is a great tool for monitoring and keeping a pulse on friends, and reaching out to them only if you find any of their posts interesting. When asked to compare with keeping up with messages in email inbox, Donna said [Donna-4] "because it is only 140 characters, you just do the quickest look, interested or not interested, I mean it is just so easy". Donna's comment also implies that browsing Twitter updates is easier than reading messages in email inbox, not only because the messages are short and easy to scan, but also because they entail no action implications; reading and responding is voluntary and action takes place only when there is a specific interest.

5. POTENTIAL IMPACTS ON INFORMAL COMMUNICATION AT WORK

As discussed in prior sections, micro-blogging was useful for keeping in touch with friends and colleagues, and in gathering useful information for work and personal interest. In this section, we turn to a discussion of the potential impacts that micro-blogging might have on informal communication at work. We do this by returning to the conceptual framework offered in section 2, using our findings of Twitter use and experiences to illustrate the framework. When asked specifically how he thought micro-blogging might influence him at work, Pete suggested that it would help him to keep in touch with colleagues whom he didn't see all the time at work. He said, [Pete-5] "It may not replace the water-cooler conversations, but it definitely helps. There are some people that I actively follow and communicate with through Twitter, who are probably within 100 feet of me geographically that I never see."

5.1 Relational Impacts

5.1.1 Person perception

As we have found previously, Twitter is useful for keeping a pulse on what is on others' minds and knowing their personal life updates. Therefore, micro-blogging may contribute vivid content useful in constructing person schemas as well as building background perceptions of others to reduce social cognitive cost in interaction. This suggests that micro-blogging may complement other social software (e.g., blogs, SNSs) in organizations, as a way of getting to know a colleague as a person and learn about his or her interests as well as work responsibilities, e.g.,

> [Aaron-4] If you have access to such information, you will be in a better position to understand, appreciate, or feel more connected with the person, than you do if you just get a picture and basic work information in their profile page in corporate directory.

Bob had some experiences of Twitter's impact on learning about team members in his virtual team. Bob works in a virtual team with members from different sites around the world. They once had a persistent chat room open all day for them to exchange information about what they have been working on. However he found Twitter to be better for starting a water-cooler conversation,

> [Bob-4] When we started using Twitter, what we found is that we learned a lot about each other, a glimpse of their lives, the glimpse that they would like to share with you, just like if they chat at the water-cooler with you. And things like, someone was doing a lot of things with his children, you know about their family lives… it just allows you to learn about the people that you are working with.

Similarly, Donna follows a large number of people at her company, and she said that she learned a lot more about who a person is by what they tweet. As she described it, "I think it makes the person more human, than just professional carbon unit". Pat, Donna's previous boss at the company, was one of the colleagues she followed in the organization.

> [Donna-5] What I found about him over time is that he tweets about his business, he tweets about what's on his mind, or what happens with his kids, and he tweets about personal things he does. And so he lets all sorts of aspects of his personality come through these 140-character snippets. And [James] does the same thing, and [Erin] does the same thing. So you really get this interesting personal plus professional view when the only way I would know them was professionally.

In the story that we have described previously in [Tom-4] about Natasha inviting Tom into her Kenya project, Tom told us that this collaboration opportunity not only came through a personal relationship built between him and Natasha, but also because she was able to get to know him from his Twitter updates.

> [Tom-5] One of the things that I said to [Natasha] is that I am not an executive and I don't have any related to executive pool. She said, yeah, I know, I have been watching you for 4 or 5 months now, I understand who you are and I understand your position, but I still want you to be part of this conversation because I know you understand [the technology]. She didn't care whether or not I had any executive poll, she knew from following me on Twitter, what I was interested in and she knew how I could help her.

5.1.2 Common ground

We found that micro-blogging was useful for increasing awareness of what is on each others' mind; this in turn implies that it may help to generate more common ground that can be used to support future conversations.

Pete thought that in accomplishing any job with multiple people, it has a lot to do with the relationships and common ground developed between the people. He gave a personal experience of this in Twitter use,

> [Pete-6] The thing that is probably more effective in a team is knowing that, you know, this other guy whom I am working with, his wife is pregnant, and as he tweets the other day 'very pregnant' about to give birth. It helps me to understand what perspective is on his mind. This little thing that people post on Twitter is actually extremely valuable in business, because sometimes the people that I work with are from all over the world, and sometimes I don't even know where they are. And there is someplace that he could put that sort of information, and otherwise I wouldn't even know about it.

Zack worked in a marketing group, and several members in the group that he follows on Twitter often post industry news and articles. He said that he replies to a co-worker's update or opinion sometimes just as an alert that he read it, or sometimes to convey that he agrees with it to a greater or lesser extent [Zack-2].

5.1.3 Connectedness

As we discussed in section 2, feelings of connectedness might be facilitated by proximity, similarity, and exposure to personal events. The real-time personal updates found in Twitter may help sustain a virtual feeling of proximity (i.e., being there, still there), enable more chances of exposure to what is on others' minds and what they have been doing, and provide possibilities to explore similar experiences and attitudes with each other.

Delilah, one of our informants, reported that, through monitoring others' personal updates, "You kind of know them, before you start the conversation for the first time, so that the conversation is easier to get started and flow" [Delilah-3]. Another example was given by Tom. Most of Tom's team members use Twitter. During Nov 2008, Tom was part of a fund-raising project for a child cancer association. He used Twitter to ask people to donate money, and to share the status of the project. He said,

> [Tom-6] When I going to a meeting, one of things people would ask about, is 'how is the [project] going'. It would break the ice and get the conversation started, and it would create more team-based environment.

An experience from Brad told us that micro-blogging may increase the chances to exchange social supports and build intimacy among co-workers. He reported that [Brad-3] "For instance, I updated about that I am staying late at work, and my manager commented that I appreciate your hard work, you know something like that, my manager is great!"

In a word, micro-blogging may help colleagues to know each other better as a person in addition to professional relationships, through being aware more of their personal life updates, their interests, and current mood. Keeping aware of what each other have been thinking, reading, and doing helps create more opportunities of exchanging acknowledgements, social supports and building common ground. Through such informal social exchanges, it may help build intimacy between colleagues and sustain a feeling of connectedness that is beneficial for work collaboration in future.

5.2 Personal Impacts

5.2.1 Work-relevant information sharing and expertise seeking

Information and knowledge sharing has been a critical issue in organizations. Practitioners and researchers have long sought incentives that would lead employees to share knowledge and valuable information; incentives are needed because information sharing often involves extra effort by a worker. The technology characteristics of micro-blogging (e.g., brevity, mobility, broadcast nature) may offer ways to reduce users' cost of sharing, and thus make it easier for other employees to obtaining useful and trustworthy information.

Donna followed several people in Twitter who work in marketing departments from different business units. They all share an interest in social media and post quite a bit about what they read and think in the field, such that they exchange information and share perspectives from a variety of work contexts. She said, "I am very fortunate to have some people who are at very different experience sites than I am, but are really fascinating people." She continues by giving an example of reading tweets from a marketing contractor who works for another business unit.

> [Donna-6] I kind of get a pulse about what he thinks about the companies that he is working for, what he thinks the future is going to look like in social media, and how he thinks social media is going to fit into the economic future of the country. So I think those dialog and discussion with people outside your workplace are totally fascinating. Because you will get a broader perspective than you do if you only talk with people who you work with.

When asked about the potential impact of micro-blogging on information sharing at work, Delilah thought it might increase the role of serendipity. She said,

> [Delilah-4] It may make it easy to know what a lot of other groups are working on, you know, we are often so busy on our own projects, and there probably another team somewhere else is doing something similar. So it might make it easier to find other people you can collaborate on or learn from the similar projects they are working on.

Similarly, Tom said that, in a very large company, it is very hard to navigate through the organization structure to create alignments. He thought that micro-blogging might help get a stream of what people are working on so as to foster and inspire the ability to find collaborative opportunities that we might not find without it. Though Yammer, a corporate version of Twitter, aims to provide such support by asking users to update "what they are working on", Tom said that the issue with Yammer is lack of critical mass and participation in the organization. Tom's virtual team tried Yammer for exchanging work related information. He said,

> [Tom-7] It can be useful in small groups. However you don't have participation, [so] its value is limited. As I said before, I would like see a stream of what's happening inside the company so that I can tag certain information and get feeds based on certain information that is salient to my daily work. Without critical mass and participation, I am not able to get enough information to make it valuable for me to continue to participate. The value exchange has to be high enough to encourage participation. I think there is a tipping point somewhere; and I don't think that tipping point has been reached [for Yammer].

Pete thought that Twitter-like communication technology may help expertise seeking. He said,

[Pete-7] Had a project want to know, with Twitter, I would be able to send out the request to a broad audience of people out there in my social network that may know the answer, and without worrying about the fact asking someone to do something otherwise with other media like email, IM or phone.

Alice thought that micro-blogs might help senior managers to send down strategic information (e.g., what they think are priorities for the company to work on) to their group members.

In sum, people use Twitter at work to keep up with what's new and what's happening with one another, and to share and exchange information needed. It provides a new informal communication channel complementary to other media (e.g., IM, email, phone, F-to-F, and other social tools).

6. ISSUES AND DESIGN IMPLICATIONS

Although Twitter is being used to serve a variety of informal communication goals, the technology supporting micro-blogging still has issues associated with its use, especially for work purposes. We turn now to a discussion of some of these issues.

6.1 Security

Some informants reported that they might share even more work-related updates and would like to be aware of similar things from co-workers, if Twitter could be a safe place to post inside the company's firewall. For example, Zack gave a scenario [Zack-3] that a salesman could provide an update of "working on a Pepsi project", and others who know about Pepsi or have worked with Pepsi in different ways may reply to him, and further conversations may be invoked. However, people hesitate to mention project- or client-specific information on a public feed.

Though Yammer (lack of participation currently), a corporate version of Twitter, provides micro-blog support for a company's internal use, some informants still worried whether it would be a safe place to explicitly discuss business-sensitive information. For instance Delilah said, [Delilah-5] "However, you still need to be careful what you say, we are not sure whether someone outside the company will come to look at our conversations, unless it is inside our firewall".

6.2 Integration

As Bob described [Bob-4], Twitter was helpful for getting to know his virtual team members as real persons (e.g., knowing about their personal social life); however he also emphasized that one reason members post about personal lives on Twitter is because the audience is a blend of work colleagues and friends. This implies that integration of micro-blogging inside and outside a company will be another challenge. A sales manager may want to use micro-blogging to maintain awareness with his co-workers inside the company, but also keep in touch with sales partners and other friends outside the company.

As we mentioned in [Ray-1] previously, Ray maintains two Twitter accounts, one for tweeting about work and another one for tweeting about social life. However, he has also found it to be very hard to separate work and social updates,

[Ray-2] It was just annoying, you know, trying to keep those two lines in things like Twitter is very difficult. When you have something to post, you have think about where you have to post it to. Eventually I

gave up, and I made some decisions eliminating some types of content that I would post.

6.3 Filtering and Grouping

Another challenge for micro-blogs at work is that users might end up following a large number of people and groups, to gather as much work-related information and expertise seeking as possible. One consequence from a readers' perspective is that there may be cognitive overload for monitoring a large number of people and keeping up with great amount of daily updates, not unlike what people now experience with email. Brad reported that sometimes he feels annoyed by people who twitter too much and he would like to have a filtering function that allows him to create a page of updates based on his current contexts and interests. For example, he said, "When I am in LA, I want to group my friends down there, because it's more relevant".

Privacy would be another consequential concern for corporate use of micro-blogs. In Twitter, subscribing to one's updates is open without permission approval, and the system sends a user's updates to all his/her subscribers. An employee may have concerns about what to update if his boss is in this subscription list. A manager may hesitate to update because he may not want all his team members to know what he has been doing. As Donna, a marketing manager, said, "If you use Twitter to communicate within your own team, I think I have a problem with that. I see what happens is that everybody is following you is going to see all those tweets". And she would like to have a way to create different circles, so that in each circle she might decide who may follow her updates. This feature need might be achieved by providing users easy ways of grouping recipients for broadcasting different types of information.

7. CONCLUSION

In this paper, we reported an exploratory study, which we hope to be helpful for providing a better understanding of why ordinary people use Twitter, and for shedding some light on the possible role that micro-blogging might play on informal communication at work. Our analysis points to several characteristics of the messages shared in micro-blogging, as well as other features that seem to be more technology-related, that take us part of the way toward understanding why and how people decide to post or browse micro-blog updates. For example, frequent small updates of personal life events, one of the unique characteristics of content shared on Twitter, enabled our informants to "keep a pulse" on people they do not encounter in their daily life activities. Because micro-blogging tends to happen in real time, Twitter posts were considered more valuable than other media for connecting information to personal goals, for knowing what is on others' minds at this moment, and for prompting opportunistic conversations. The concept of a "people-based RSS feed" was another characteristic described by our participants; they were able to get trustworthy and useful information from people who they know personally and elected to "follow". Often these individuals are selected because they share similar interests with the subscriber. Other important characteristics were attributed the nature of micro-blogging, for example the enforced message brevity, access mobility, and its broadcast nature. These technology characteristics were found useful for reducing our informants' cost of sharing and promoting more frequent updates in real-time, as well as making it easier for users to browse and monitor large amount of information updates.

A conceptual framework was offered in the paper for studying possible beneficial consequences of informal communication; we used this framework to consider how our interviewees' comments might illustrate the impacts that micro-blogging may have on informal communication at work. Our results suggest that micro-blogging may help colleagues to know each other better as persons, that is in addition to professional relationships; this benefit is achieved by staying aware of small details about others' personal lives, interests, and current moods, which in turn creates more opportunities for exchanging acknowledgements and social support, generating new common ground, and creating and sustaining a feeling of connectedness. All of these can enhance colleagues' efforts toward future collaboration at work.

Even though we have identified characteristics of Twitter behavior that may enhance informal communication, we also have seen that there are challenges in realizing these benefits as broadly as possible. Twitter makes it easy to share and gathering useful and valuable information for personal interests, but employees are leery about sharing everything without knowing that the content is managed securely within organization's firewall. As micro-blogging grows in popularity, new needs for update management, filtering, and inter-connection may be required to help in managing the costs of staying up to date, even given the brevity and pointedness of most micro-blog messages. There is also a lingering question about the boundary between work and personal content – one irony is that micro-blog characteristics that help build person perceptions and promote feelings of connectedness in a work setting may also blur the distinction between work and leisure, and it is not clear what the implications of this will be in the longer term.

To sum up, our informants' comments suggested that micro-blogs might indeed be one mechanism for generating virtual watercooler conversations, and that the low cost of micro-blogging may promote it as a new informal communication channel that complements other forms of interaction (e.g., IM, email, phone, face-to-face, other social computing tools). However the technology is still new and its ultimate impact is subject to participation and critical mass (e.g., Yammer has not yet built a user population). In addition to providing a rich description of a group of work-based Twitter users, we have raised a number of issues and design implications that may contribute to improved support for micro-blogging in organizational use contexts. In our own future work we will be continuing to expand our understanding of micro-blog practices, but at the same time begin to work from our current understanding toward the development of micro-blogging support that supports informal communication at work.

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