INFORMAL WORKPLACE COMMUNICATION – WHAT ROLES CAN MICROBLOGGING PLAY IN IT?

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by

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Informal communication, e.g., unplanned “water-cooler” conversations, has been suggested to play important roles in collaborative work and organizational innovation. It provides opportunities among employees for exchanging work-relevant information, initiating potential collaboration, maintaining awareness of workplace context; and supports social functions such as transmission of office culture and maintenance of common ground and a feeling of connectedness between co-workers. (Johnson, Donohue, Atkin, & Johnson, 1994; Kraut, Fish, Root, & Chalfonte, 1993; Nardi, 2005; Whittaker, Frohlich, & Daly-Jones, 1994).

Even as Computer-Mediated Communication (e.g., through phone, IM, emails) has extended our capability of communicating with colleagues and co-workers across distance and time, people continue to suffer from a lack of informal communication in today’s computer-mediated distributed work, especially with colleagues outside their daily work circles (Perlow, 1999). Researchers and practitioners have been seeking ways to simulate catching-up interactions within the space of computer-mediated communication. However, the best ways to support informal communication among co-workers across walls and geo-locations, still remains as an open and challenging research problem.

Microblogs, a relatively new phenomenon, provide a communication channel for people to broadcast information that they likely would not share otherwise using existing channels such as email, phone, IM, or blogs. Microblogging 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).

The exploratory research reported in this dissertation aims at first obtaining a baseline understanding of why people choose to microblog and as part of that, to characterize the
technology affordances of microblogging. It continues an exploratory research path by exploring the perceived impacts of microblogging as a means for informal communication in the workplace, summarizing these observations as opportunities and challenges that are presented by microblogging as an aid to informal communication. Scenario-based design (Carroll, 2000; Rosson & Carroll, 2002) is adopted in the final phase of the dissertation, where in I synthesize scenarios, tradeoffs and themes from the field studies and use these to guide the design, prototyping and evaluation of a novel microblogging system GroupBuzz.
# TABLE OF CONTENTS

List of Figures ......................................................................................................................... v

List of Tables .......................................................................................................................... vi

Acknowledgements .................................................................................................................. vii

Chapter 1 Introduction – Informal Communication in the Workplace .......................................... 9

IWC in Computer-Mediated Collaborative Work ........................................................................ 9

Microblogging as a Channel for Computer-Mediated IWC ...................................................... 10

Chapter 2 Related Work .......................................................................................................... 13

A Working Definition of IWC .................................................................................................. 13

A Conceptual Framework ........................................................................................................ 14

  Informational benefits ........................................................................................................... 15

  Social benefits ......................................................................................................................... 16

Limitations of Existing Options for CMC ................................................................................ 19

Summary .................................................................................................................................. 22

Chapter 3 Research Questions and Approach .......................................................................... 24

Research Questions ................................................................................................................ 24

Scenario-Based Design Approach ........................................................................................... 25

Chapter 4 Twitter Study – Exploring the Affordances of Microblogging .................................... 28

Study Design and Method ........................................................................................................ 29

Unique Microblogging Characteristics ..................................................................................... 30

  Microblog content characteristics ......................................................................................... 31

  Microblog technology characteristics .................................................................................... 37

Preliminary Findings of Impacts on Informal Communication .................................................. 43

  Social impacts ......................................................................................................................... 43

  Informational impacts ............................................................................................................ 47

  Limitations and implications ................................................................................................... 49

Summary .................................................................................................................................. 51

Chapter 5 Yammer Study - A Field Study of Microblogging in a Workplace ............................ 54

Study Design and Methods ..................................................................................................... 54

What Did Participants Microblog About? ............................................................................... 56

Revisiting the Affordances of Microblogging .......................................................................... 59

  Voluntary readership and brevity nature enabled sharing less critical whereabouts .................. 60

  Focused audience enabled microblogging about daily work activities .................................. 62

  Informational Impacts ............................................................................................................ 65

  Project updates have relatively fine granularity ..................................................................... 66
Chapter 6 GroupBuzz: Scenario-Based Design of a Novel Microblogging Tool......82

GroupBuzz Prototype..................................................................................84
Problem 1: Lack of audience feedback ..........................................................85
    Problem description..................................................................................85
    Design analysis.........................................................................................87
    New feature design..................................................................................89
Problem 2: Annoying Microblog Alerts .........................................................93
    Problem description..................................................................................93
    Design analysis.........................................................................................95
    New feature design..................................................................................97

Chapter 7 Scenario-Based Evaluation.............................................................101

Method – Scenario-Based Evaluation..............................................................102
    Scenario simulation..................................................................................103
    Study procedures....................................................................................106
Study Results................................................................................................108
    General experience of the simulated work scenario.................................108
    User reaction to new features.................................................................111
Discussion....................................................................................................115

Chapter 8 Contributions and Future Work.....................................................117

Main Contributions .......................................................................................117
    A conceptual framework of informal workplace communication...............117
    Microblogging characteristics in general ..................................................119
    Primary findings of microblogging impacts on informal workplace
        communication......................................................................................120
    A novel microblogging tool - GroupBuzz..................................................122
    A novel scenario simulation based evaluation method ...............................122
Future Research Directions............................................................................124

References....................................................................................................127
Appendix A: Twitter Study – Interview Question Guide ..................................................133
Appendix B: Yammer Study Materials ........................................................................135
Appendix C: Yammer Study – Complete Interview Coding Themes ............................138
Appendix D: GroupBuzz Lab Study Materials ...............................................................143

LIST OF FIGURES

Figure 2-1. A conceptual framework of informal workplace communication ..............15
Figure 3-1. Research approach guided by SBD .............................................................26
Figure 5-1. # of Microblogs posted in project groups (black) V.S. department network (gray) .................................................................58
Figure 6-1. GroupBuzz – main feed page of the microblogging network .....................85
Figure 6-2. Problem scenario and claim related to audience (un)awareness ..................87
Figure 6-3. Audience size and visiting frequency indication in GroupBuzz .................91
Figure 6-4. Claim analysis - Audience indication new feature ....................................92
Figure 6-5. Problem 2 - Scenario and claim .................................................................94
Figure 6-6. new alerting features and claim analysis ..................................................98
Figure 6-7. Alert frequency control over individual person and the entire system ........100
Figure 7-1. GroupBuzz set up for the simulated workplace microblogging study ..........106
Figure 7-2. Participants’ desktop layout (a) in GroupBuzz study ................................110
Figure 7-3. Participants’ desktop layout (b) in GroupBuzz study ................................110
LIST OF TABLES

Table 5-1. Types of microblog posts from the study. .................................................................57

Table 5-2. Primary themes in interview transcripts from Yammer study ...............................60

Table 7-1. Simulated organizational setting for GroupBuzz study ......................................105

Table 7-2. GroupBuzz study - survey results .......................................................................113
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Chapter 1

Introduction – Informal Communication in the Workplace

Informal communication often consists of unplanned and brief “catching-up” conversations among employees in organizations, the type of spontaneous interaction that has often been termed “water-cooler” conversations (Kraut, Fish, Root, & Chalfonte, 1993). Informal communication is generally mediated by physical proximity and often occurs spontaneously; typical examples are the chats that take place when people bump into each other in the hall, or at a shared coffee machine. In the workplace, informal communication has been observed to play important roles for collaborative work and organizational innovation. It supports sharing of work-relevant information among employees; coordination 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 (Johnson, Donohue, Atkin, & Johnson, 1994; Kraut, Fish, Root, & Chalfonte, 1993; Nardi, 2005; Whittaker, Frohlich, & Daly-Jones, 1994).

IWC in Computer-Mediated Collaborative Work

Computer-mediated communication (CMC) technologies have extended our capability of collaborating with co-workers over distance and time boundaries. As communication patterns have shifted from primarily face-to-face interactions to a significant reliance on phone, email, and instant messaging (IM) in the workplace, the need for supporting informal workplace communication (IWC) has become more crucial than ever. However, due to the spontaneous
nature of IWC, finding ways to evoke and support it has been a challenge. Businesses have access to well-established computer technologies for scheduling meetings and sharing reports, but virtually nothing that supports bumping into a colleague in the hall.

Researchers and practitioners have been exploring a variety of approaches to encourage spontaneous catching up conversations through CMC. For instance, media richness theory and social presence theory suggested that because social cues are beneficial in promoting spontaneous conversations, we should design systems that make better use of such cues (Erickson & Kellogg, 2000; Kraut, Fish, Root, & Chalfonte, 1993). However, tool designs guided by theory and empirical studies have not yet shown that increased social cues in CMC systems will lead to more impromptu conversations and informal social exchanges (Whittaker, 2003). More recent research looked at social software use in organizations and impacts on collaborative work, including corporate blogs (Efimova & Grudin, 2007; Huh, Jones, Erickson, Kellogg, Bellamy, & Thomas, 2007; Jackson, Yates, & Orlikowski, 2007), social tagging (Millen, Feinberg, & Kerr, 2006; Thom-Santelli, Muller, & Millen, 2008), and social networking sites (DiMicco, Millen, Geyer, Dugan, Brownholtz, & Muller, 2008). However, none of these technologies have been reported as successful in enacting spontaneous conversations or sharing catching-up information.

**Microblogging as a Channel for Computer-Mediated IWC**

In recent years, microblogging has emerged as a popular new phenomenon in social online world, and raises interesting possibilities for IWC. Microblogging refers to the activity in which users to broadcast brief text updates about small and relatively unimportant things happening in their daily life and work activities, such as what they are reading, thinking, and experiencing (McFedries, 2007). Currently microblogging is enabled by a variety of online social networking tools, including, Twitter, Jaiku, Pownce, and Facebook. Microblogging is used to
achieve a wide variety of social purposes and has gained popularity as an option for online social networking. Using 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 (Java, Song, Finin, & Tseng, 2007; McFedries, 2007). Emotionally, people seem to use microblogging to achieve a level of cyberspace presence, a sort of being “out there” that allows them to feel another layer of connection with friends and the world (McFedries, 2007). The increasingly popular use of microblogging for lightweight communication in the world of social computing makes it a candidate CMC channel for IWC.

However, at the time this dissertation project was conducted (2008), microblogs were a relatively new phenomenon in online social networking, and had received little scholarly attention. In particular, there was no solid understanding of how and why people microblog, and there was no research studying the potential impacts of microblogging on informal communication at work. As a result, the exploratory research project described in this dissertation was designed to take a step in this direction, seeking to build a rich understanding of why people use microblogs and exploring how the characteristics of their microblogging behaviors might enable IWC.

The work reported in this dissertation follows an exploratory research agenda that investigates the opportunities and challenges presented by microblogging technologies, as an aid to informal communication within a workplace context. The primary focus is on developing a rich description of microblogging practices and associated issues, in both a general and workplace setting. Furthermore, by focusing on both the strengths and weaknesses of microblogging as a support for IWC, it begins to explore the design space for improved technologies. In particular, it adopts the methodological guidance provided by scenario-based design (Carroll, 2000; Rosson & Carroll, 2002), extracting scenarios, tradeoffs and themes from field studies and using these to guide the design, prototyping and evaluation of a novel microblogging system.
The dissertation is organized as follows. After first developing a conceptual framework for the research program (Chapter 2), I summarize the research approach and the questions that guide the work (Chapter 3). Chapters 4 and 5 present findings from two field studies of existing microblogging tools, and Chapter 6 presents the design arguments that led to the novel tool (GroupBuzz). Chapter 7 summarizes a small scenario-based evaluation of the prototype tool and is followed by a final chapter that draws general lessons and conclusions.
Chapter 2

Related Work

As mentioned in Chapter 1, scholars studying informal communication in work settings have emphasized that opportunistic informal catching up conversations among employees in organizations (e.g., water-cooler conversations) play an important role in these organizations’ success, and provide a variety of potential benefits that can support collaborative work.

A Working Definition of IWC

The research presented in this dissertation begins with a working definition of informal workplace communication. At its core, informal communication is simply one form of communication. Thus conceptualizing IWC within the context of communication research may help us understand what it is and prepare us to study its relationship with CMC. As a human activity, communication is about transmitting information from one person to another. As a research discipline, communication has unified many research themes including speech communication, interpersonal communication, mass communication, communication technology, and policies for telecommunication. Among many definitions of communication, Lasswell’s definition is often used as a conceptual foundation for other communication theories (O’Sullivan, 1983). Lasswell (Lasswell, 1948) defined communication as “who says what to whom in what channel with what effect”.

From this theoretical perspective, informal workplace communication can be seen as consisting of four basic elements: subject: people who are colleagues, either inside or outside each other’s daily work circles; content: catching up with each other about work/life activity updates, whereabouts information, news, and other everyday topics that might be invoked during
the conversation; media: through opportunistic catching up conversations, e.g., bumping into one another in face-to-face settings, one person calling another on the phone, and online communication through IM, emails, and other social tools; and effect: with both informational and social effects. Socially, communication partners may get to know each other better, feel socially supported with respect to what they are doing or thinking, and feel connected with each other. From an informational perspective, communication partners may discover pieces of information to be very valuable for their own work interests or goals. There might be also negative effects to subjects (e.g., information overload or unwanted intimacy), but we are more interested in the positive side in this research.

A Conceptual Framework

In the remainder of this chapter, I will consider the potential beneficial effects of IWC, as well as whether and to what extent existing CMC technologies may have facilitated such benefits. I have organized the potential beneficial effects of informal communication into social and informational beneficial consequences (Figure 2-1). The social 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 building person perceptions of each other, developing common ground, and sustaining a feeling of connectedness with one another. The informational consequences capture the benefits that informal communication 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 the following sections, I review relevant theories in interpersonal communication and social psychology to expand the theoretical conceptions behind this simple framework.
Figure 2-1. A conceptual framework of informal workplace communication

**Informational benefits**

People often share recent work activity updates and news with each other during catching up conversations. Such informal information exchange can lead to the acquisition of valuable information that is beneficial for one another’s personal work interests and 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 (Johnson, Donohue, Atkin, & Johnson, 1994; Kraut, Fish, Root, & Chalfonte, 1993; Whittaker, Frohlich, & Daly-Jones, 1994). 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 new/novel (and thus potentially more valuable) information is more likely to be gained from people outside our daily activities (Granovetter, 1973; Granovetter, 2004), but also that rapid feelings of mutual trust – also called ‘swift’ trust (Abrams, Cross, & Levin, 2003) – are more likely to form in weak tie interactions to facilitate information sharing (Levin, Cross, & Abrams, 2002). 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 gaining valuable information.

Not only facilitating valuable information sharing among colleagues outside of each other’s daily working activities, but exchanging personal work activity updates and whereabouts information sharing is critical for efficient collaboration among directly working relationships, e.g., team members. For example, what is the status of other team members’ work-in-progress? What problems or roadblocks are they trying to solve? What do they plan to do next? How does their plan affect my work and our shared goal? Do I agree with their plan? Such awareness information is very useful for prompting expertise/ideas sharing and directing one’s own work tasks. However such personal task whereabouts information often remains implicit until the work reaches critical points (Schmidt, 2002). How to support awareness of collaborative processes has been a key challenge in collaborative work (Schmidt, 2002).

Social benefits

While informal communication can lead to sharing valuable information among colleagues and maintain awareness crucial for collaborative work, socially colleagues may get to know each other better, feel socially supported with respects to what they are doing or thinking, and feel more connected with their working teams and the larger group and organization.

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, or behavioral
characteristics). Person perception is an important factor in helping people to make decisions during their interactions with others, such as sharing valued information or seeking collaborators for joint projects (Kraut, Fish, Root, & Chalfonte, 1993). 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 (Brown, 2006). Instead of weighing all the evidence when making a decision, people tend to build a background perception of others and rely on heuristics to save time and energy (Dunbar, 1998). In these processes, vivid or highly memorable possibilities are more useful than those that are harder to picture or difficult to remember (Brown, 2006).

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. For example, hearing a story from a colleague about how he found out about and reacted to his son’s misbehavior after a sporting event might create a vivid record of that episode (i.e., as told by the father); this memory might contribute to future work-related decisions that rely on knowing the colleague’s value system. In general, staying aware of others’ personal and work activity updates may help update people’s schemas and build a background perception about a person.

**Common ground**

Common ground refers to mutual understanding among communicators about a fact. Clark’s definition of common ground (Clark & Brennan, 1991) 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 is built through a dynamic 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 help develop common ground and context for efficient work communication later on.

**Connectedness**

As previous literature has suggested, informal communication may lead to feelings of intimacy and connectedness between colleagues (Nardi, 2005). This positive emotional feeling that one has for another may be important for future interactions and collaboration (e.g., seeking information or helping someone at work). Continuing the previous example of a colleague sharing a story about his son’s misbehavior, the sharing episode may reinforce friendship bonds (e.g., increasing feelings of intimacy based on richer personal knowledge of the colleague), which may increase the receiver’s willingness to seek the sender’s opinion or make requests of him in the future.

Interpersonal attraction theory (Byrne, 1961) from social psychology helps to explain how informal communication may produce emotional effects such as 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 (Brown, 2006) have been discovered by researchers in this area; these include physical proximity, familiarity (i.e., exposure to others’ personal activities), 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 communication 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 (Rawlins, 1992). Keeping in touch with colleagues may increase the chances of
sharing personal work life updates, and may raise the possibilities for discovering similar experiences and attitudes (e.g., places both have visited, similar reactions to current events).

**Limitations of Existing Options for CMC**

Despite a range of benefits for informal communication as described above, the informal exchange of personal work/life activity updates and whereabouts information does not happen quite often among colleagues at work, but instead is seen as occasionally relying on opportunistic catching up conversations. The words “unplanned” and “opportunistic” often appear in existing literature, because such informal exchange seems not to be happening often in today’s primarily computer-mediated communication (e.g., phone, emails, IMs) at workplace. In the following, I will consider current practices and challenges of informal communication with traditional communication media as well as previous design research efforts.

The invention of telephone technologies enabled possibilities for people to connect with distant others. People use phones often for specific work task conversations (e.g., conference call meetings), or other urgent needs. Initiating a phone conversation at work requires a bit of effort, due to the general absence of clues about receivers’ availability prior to a phone call. Providing availability information through an online contact list, may to some extent help to reduce the cost of initiating calls or following up with missed calls (Milewski & Smith, 2000). In addition, prior research on phone use in social networking suggests that phone communication may be sufficient to maintain strong ties between persons who know each other well; however people tend not to use it for keeping in touch with others who are connected by weak ties (Wellman & Tindall, 1993).

Email has become a major communication channel more recently at work. Due to the asynchronous communication nature of email messages, people are able to send emails to others
with less concern about their current circumstances, and receivers can read and respond at a convenient time. Perhaps partly for this reason, email use has become overloaded (Whittaker & Sidner, 1996; Fisher, Brush, Gleave, & Smith, 2006). People receive a large amount of email daily for all work related communication tasks, e.g., organizing meetings, coordinate collaboration, and describing work tasks/problems in details (Dabbish, Kraut, Fussell, & Kiesler, 2005). Though it plays important roles for people’s daily work communication tasks, people do not tend to use emails for informal catching up or sharing personal activity updates at work, apart from occasional personal announcements (Haythornthwaite C. A., 2005). This is probably due to the culture of email use at work. Emails are often perceived a form of communication that requires or implies action and receivers may not have the time or processing capacity to act at the moment; furthermore people in general experience cognitive overload in processing enormous amount of emails to support their daily work tasks (Dabbish, Kraut, Fussell, & Kiesler, 2005).

Instance Messaging (IM) is another popular communication technology in the social world of today, including significant adoption in work settings. As a synchronous communication tool that provides user-specific indicators to convey status, IM communication still suffers from issues related to intrusiveness and interruption in the workplace (Nardi, Whittaker, & Schwarz, 2002; Isaacs, Walendowski, Whittaker, Schiano, & Kamm, 2002). Some users deliberately set their presence status as ‘away’, ‘busy’ or even ‘offline’ (Cameron & Webster, 2005) to hide their availability and protect themselves from being interrupted while busy at work. There have been a number of research and design efforts aimed at reducing the interruptions caused by IM use at work (Bailey & Konstan, 2006; Gluck, Bunt, & McGrenere, 2007). Due to the channel’s synchronous and interruptive nature, IM has been used primarily for communicating critical matters or quick questions and answers, but not often for initiating the catching-up conversations associated with water-cooler interactions. Nardi, Whittaker, and Schwarz (2002) found that workplace IM users frequently interacted only with four or five of their IM buddies at work.
Similarly, in everyday social settings, researchers have found that teenagers communicate regularly with fewer than five IM buddies (Schiano, Chen, Ginsberg, Gretarsdottir, Huddleston, & Isaacs, 2002). The personal status message does provide a short line for users to broadcast personal life updates to their buddy list (e.g., ‘working on a paper’, ‘movie is great’) or any other thought they wish to share broadly. By monitoring others’ presence icons in the buddy list and sending greeting messages outside specific conversations, IM users may perceive and maintain interconnected feelings and communicative readiness with each other (Nardi, 2005). However, the usefulness of these status updates may be limited by the few words that can be displayed in a receiver’s buddy list (Smale & Greenberg, 2005).

Some research efforts have tried to simulate the “water-cooler” type of catching up conversations in computer-supported media, for example by replicating the social cues that are naturally present in a face-to-face setting. Media richness theory and social presence theory suggested that in-person social cues would be beneficial to prompt spontaneous conversations and that we should be able to design systems that make better use of such cues (Erickson & Kellogg, 2000; Kraut, Fish, Root, & Chalfonte, 1993). For example, media space systems were created by leveraging the rich cues provided in shared video and/or audio channels (Dourish & Bly, 1992). However, such systems have not proven significantly helpful for prompting exchange of personal work activity updates (Whittaker, 2003). Prior research in collaboration awareness also explores possibilities for extracting users’ work activity updates automatically, e.g., what actions team members have already carried out; such systems aim to provide team members with awareness of each other’s actions on shared working content (e.g., documents, software code). However, a record of actions on a content object does not help team members understand the goal or objective underlying the actions (Nardi, 2005). Another approach to team awareness is radical collocation (e.g., war-rooms), which has been successful at supporting intense teamwork, for
example participatory software development (Teasley, Covi, Krishnan, & Olson, 2000).
However, it is not always possible to co-locate teams.

**Summary**

In a summary, researchers and practitioners have suggested that informal communication plays important roles in the workplace that contribute to information exchange, awareness information crucial for collaborative work and organizational success. However, how to facilitate such informal catching up communication among colleagues separated by walls and distance remains to be an open research problem and challenge. Prior research efforts had primarily focused on ways to prompt spontaneous catching up conversation by replicating in-person social cues in CMC guided by media richness theory. However this line of research efforts seemed not to be very successful. Drawing from prior research, I have put up a working definition of informal workplace communication and a conceptual framework. Instead of focusing on how to prompt informal communication, the new lens helped me take one step back and look at information get exchanged during informal communication and how it leads to the consequential benefits as anticipated in prior research works.

Under this guidance, I reviewed why the existing primary CMC tools (i.e., phone, email, and IM) might not be good candidates for users to frequently exchange personal work/life whereabouts information at work. According to literature, phone, email, and IMs are primarily used for task-directed communication in workplaces, and rarely used for informal catching up. Due to the interrupting nature of phone calls and instant messages, phone and IM are primarily used for urgent needs or quick question/answer sort of communication at work, as well as for supporting synchronous communication needs (e.g., meetings and discussions). Emails are often preferred over phone and IMs so as to avoid being intrusive to others’ current work, and hence
email usage at work been overloaded. People do choose to use it for greeting and catching up with colleagues once in a while or for special events, but it seems to be too costly to do this frequently, or with a large number of contacts.

This analysis lens has promote my interest to Microblogging, a relative new communication phenomenon that becomes popular rapidly in social world with support of SNSs tools, through which people frequently broadcast their personal life updates, news, and opinions. There have been some studies of SNSs usage in organizations, but findings were very preliminary about early stage adoption of the tools, few looked at the problem from the microblogging perspective, none studied its potential impacts on informal communication. This leads to my research interests and goals in the next chapter.
Chapter 3

Research Questions and Approach

Previously, I argued that informal communication plays critical roles in supporting collaborative work. Personal work and life activity updates and whereabouts information that is exchanged among colleagues can lead to both informational and social beneficial impacts. However, people seem not to share such information using traditional communication media (e.g., meetings, phone, emails, and IMs); the sharing only happens occasionally when there are spontaneous or opportunistic catching-up conversations. How to better support informal communication and work/life activity status updates among colleagues both inside and outside of each other’s daily working circles still remains an open research problem.

Meanwhile, the new microblogging phenomenon of broadcasting personal whereabouts life event updates in social world seems to raise opportunities for this line of research. Microblogging has become popular quite quickly, thereby increasing its potential for serving as a new informal communication medium at work. However, we still know little about this new online social behavior; we do not yet know how people might use microblogs at work or whether the use of microblogging leads to the beneficial consequences described in the conceptual framework.

Research Questions

The fundamental goal of my dissertation project is first to gain a better understanding of what how the affordances of microblog technology may help to enable frequent sharing or exchanging of personal whereabouts information; following this I wished to further explore whether I would observe similar behavior (both positives and negatives) in a workplace setting,
and in particular how this technology might impact IWC. With these general research goals in mind, I formulated the following research questions.

1. **Whether and how might microblogging help to enable the sharing of personal and informal information such as one’s whereabouts?**
   a. What do people use microblogs for?
   b. What microblog features help enable sharing such information?

2. **What roles does microblogging play in informal workplace communication?**
   a. What do people microblog about in the workplace?
   b. What, if any, are the beneficial consequences of informal communication in the workplace through microblogging?
   c. What are other consequences of microblogging in the workplace?

3. **How might microblogging systems be improved to better support informal communication in the workplace?**
   a. What are the problems and opportunities for improvement?
   b. How might these issues be addressed by new technology design features?
   c. To what extent do the resulting new designs address the problems and opportunities that were analyzed?

**Scenario-Based Design Approach**

Scenario-Based Design (SBD) serves as a methodological framework for the research in this dissertation. Developed as a method for supporting the Task-Artifact Framework (Carroll & Rosson, 1992), SBD consists of a mix of research methods for analyzing current practices and envisioning and evaluating new design features (Rosson & Carroll, 2002). A set of empirical research methods (e.g., survey, interviews, or field observations) can be used for gaining
knowledge of current practices. A tradeoff analysis (in SBD this is called claims analysis) can be used to highlight the strengths and weaknesses of the current situation and guide the design of scenarios and prototypes. As summarized in Figure 3-1, this dissertation adopts the methodological guidance provided by scenario-based design, extracting scenarios, tradeoffs and themes from field studies and using these to guide the design, prototyping and evaluation of a novel microblogging system. Note that although SBD is primarily a framework for developing more effective interactive systems, the analytic work conducted throughout the process (e.g., gathering and synthesizing field study results; documenting the consequences of specific technology features in use or as envisioned) can result in theoretical contributions as well (Carroll & Rosson, 2003).

Figure 3-1. Research approach guided by SBD

More specifically, two field studies that used a combination of interview and survey methods were conducted to gain an in-depth understanding of people’s current practices and reviews of microblogging in the workplace. To address on the first research question, an
An interview study was conducted to gather a preliminary understanding of how and why people microblog from both an information poster and viewer’s point of views in the social world using Twitter. A second and more controlled field study at a workplace context was used to investigate the second set of research questions, with the goal of gaining an in-depth understanding of how people use microblog at work. Through these two field studies, I sought to gain a good knowledge of why and how people microblog in general, what people share through microblogging in a work setting, as well as opportunities and challenges presented by microblogging technologies as an aid to informal workplace communication.

Guided by SBD, the third set of research questions was addressed by a phase of research that included scenario generation, claims analysis, feature envisionment, and scenario envisionment. Drawing from the fieldwork findings, problem scenarios and claims were developed. The problem scenarios were written exemplify a particular use of the current microblog tools, while also describing the experiences and costs from the users’ perspectives. Claims were analyzed from each problem scenario, where a claim can be viewed as a hypothetical causal relationship between a feature and consequences of that feature (e.g., pros and cons). During claims analysis, claims are organized to present important features of use, along with both positive and negative consequences.

Following analysis of the problem scenarios, envisioned features were proposed or refined by enhancing the positive consequences and mitigating the negative consequences of the original features. The problem scenarios can then be modified or refined by incorporating the new envisioned features. Finally new design ideas/features were evaluated using a scenario-based evaluation approach in a simulated work environment.
Chapter 4

Twitter Study – Exploring the Affordances of Microblogging

Microblogs have been popularly used for sharing personal whereabouts, e.g., what people are doing, reading, thinking, and experiencing in social world. This suggests that microblogs might be a medium for sharing similar personal activity updates in the workplace, not unlike what is done in face-to-face casual conversation. However, at the time this research was initiated, microblogs were still a relatively new phenomenon in online social networking, and we were not sure what microblogging characteristics or features might help enable sharing personal whereabouts, and whether these could be replicable in a workplace. In particular, there was no solid understanding of how and why people microblog, and no research studying the potential impacts of microblogging on IWC. Thus my first study sought to gather a preliminary understanding of what people use Twitter for and what features of Twitter help support such microblogging behavior from both information poster and viewer points of views. This interview study was guided by the following research questions:

1) What kinds of content do people often post and view in microblogs? What’s unique about microblog content from both sender and viewer perspectives?

2) Why do people choose to share or view such content in microblogs, rather than using other communication media like email, IM, or telephone?

3) What roles does microblogging might potentially play in informal communication at work?
Study Design and Method

Twitter is the most popular microblog 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 microblog support for a company’s internal use. However, at the time of this study (Fall 2008), Yammer was in its early phases: corporate users seemed to have concerns about whether it is a safe place to post, and it had not attracted much participation.

The investigation reported in this study focuses on relatively personal microblogs that are updated by ordinary people for a small audience of “followers”, rather than the heavily followed microblogs like those associated with celebrities, political campaigns or major news organizations. Because I was most interested in the potential impact of microblogging on informal communication in work settings, I chose to focus on ordinary Twitter users who currently work in corporate settings.

I used semi-structured interview methods. Phone interviews (about 40 to 60 minutes each) were conducted during September and December 2008 with 11 employees (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; I then used a “snowball” method, asking each informant to connect us to other Twitter users they know. In the analysis reported later, I use pseudonyms when reporting comments by specific informants.

The interviews were structured by two sets of questions, including (1) people’s current microblogging practices (characteristics of content shared, what makes them share such information on Twitter); and (2) their experiences microblogging with co-workers (consequential effects that microblogging 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 microblogs, compared with other communication media available. A complete set of the questions used to guide the interviews can be found in Appendix A: Twitter Study – Interview Question Guide.

Unique Microblogging Characteristics

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.

Consistent with what Java et al. (2007) reported in their study, I 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 also 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 I turn now to a discussion of message characteristics and technology features that seemed to be important to how these users’ have appropriated microblogging into their social lives.

**Microblog content characteristics**

Our interest in microblogging as an option for informal communication 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 I did not conduct a systematic analysis of the interview transcripts, I did review them comprehensively to identify ways in which Twitter may be playing a special role in serving informal communication needs. In the following I illustrate three interesting ways in which our interviewees seemed to think about tweets, from both microblogger (poster) and follower (reader) perspectives: frequent life updates, real-time information, and what I have metaphorically called people-based RSS feeds.

**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 they had read, and more general thoughts). By staying aware of others’ ongoing updates, people are able to keep in touch with friends and maintain social relationships; this is especially important for contacts who 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 those who 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 other’s’ 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 found, people blog to provide a record of events in their lives (Nardi, Schiano, & Gumbrecht, 2004). Some of our informants told us that they use Twitter as an alternative to blogging, for keeping track of what they have been doing. Brad is an IT analyst who posts 20-30 times a week; and as he described, many of 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 microblogging easier to do, and that as a result they do microblogging 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 at their desks in their offices. Tasha and Ray, corporate communication managers, often attend external conferences and events, where they tweet about interesting presentations or 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, microblogging 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.
**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 ideas. 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 microblogging 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.

People-based RSS feed

Many of our informants used Twitter as a type of RSS feed for gathering information interesting and useful for their work and other personal interests. A RSS (Rich Site Summary, also referred as Really Simple Syndication) is a web feed format used to publish and subscribe to frequently updated web contents, e.g., blog entries and news headlines. Bob described Twitter content 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 fan 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, the 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 posts are 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 re-tweet”. 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.

Microblogging 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, I will discuss the technology characteristics of microblog that makes our informants use and perceive Twitter differently from other CMC tools.

**Microblog technology characteristics**

In the previous section, I 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 the content is shared in real time, from people who share similar interests, and is trustworthy information because it is tied to one’s personal networks. I turn now to a discussion drawn from informants’ reports about how microblog 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.

**Brevity**

From a microblogger’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 minimal.” Similar to what I have reported in [Brad-2] previously, in comparison with blogging, Aaron described his preference to use microblogging 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 it 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”. Interestingly, this should work against the perceived ease of use – tweeting something implies a brief communication act, but at the same time it may imply more care in crafting that short message. Indeed, some microbloggers
may even find the crafting process to be a creative or challenging aspect of microblogging. For instance, 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 also well-crafted and right to the point.

**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 I 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 get a moment in-between meetings” [Zack-1]. Tasha is a corporate communication manager, as I 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 faster 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.

**Broadcast nature**

The broadcasting nature that microblogging inherits from the blog paradigm makes it easy for people to share and check posts. As information producers, microbloggers 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 microblogging 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 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 I 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 (Dabbish, Kraut, Fussell, & Kiesler, 2005). As researchers (Nardi, Schiano, & Gumbrecht, 2004) 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.

**Preliminary Findings of Impacts on Informal Communication**

As discussed in prior sections, microblogging was useful for keeping in touch with friends and colleagues, and in gathering useful information for work and personal interest. In this section, I consider more generally the potential impacts that microblogging might have on informal communication at work. I do this by returning to the conceptual framework offered in Chapter 2, using our findings of Twitter use and experiences to illustrate the framework. When asked specifically how he thought microblogging 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.”

**Social impacts**

**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, microblogging 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 microblogging 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 a 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 I 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 relation to executive pull. 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 pull, she knew from following me on Twitter, what I was interested in and she knew how I could help her.

**Common ground**

I found that microblogging 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].
**Connectedness**

As I 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 microblogging 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, microblogging 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.

**Informational impacts**

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 microblogging (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 microblogging 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 told us that in a very large company, it is hard to navigate through the organizational structure to create alignments. He thought that microblogging might help get a sense 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 in 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 microblogs 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).
Limitations and implications

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

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 (which at the time of this study had low levels of participation), a corporate version of Twitter, provides microblog 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”.

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 microblogging inside and outside a company will be another challenge. A sales manager may want to use microblogging 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 I 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.

**Filtering and Grouping**

Another challenge for microblogs 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 L.A, I want to group my friends down there, because it’s more relevant”.

Privacy would be another consequential concern for corporate use of microblogs. 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.

Summary

In this chapter, I reported an exploratory study aimed at providing a better understanding of why ordinary people use Twitter, and for shedding some light on the possible role that microblogging might play on informal communication at work. Our analysis points to some important affordances of microblogging as a communication medium, both in terms of the kinds of messages people tend to share, as well as other features that are more technology-related. These findings take us part of the way toward understanding why and how people decide to post or browse microblog 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 microblogging 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” seems to be another interesting affordance of microblogging; our respondents 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 to the nature of microblogging, 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.

I used the conceptual framework presented earlier to consider how our interviewees’ comments might illustrate the impacts that microblogging may have on informal communication at work. Our results suggest that microblogging 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 I have identified some affordances of microblogging 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 microblogging 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 microblog messages. There is also a lingering question about the boundary between work and personal content – one irony is that microblog 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.
Finally, even though I was able to uncover a number of ways that microblogging might promote IWC and its potential benefits, the public nature of Twitter platform tends to limit employees’ sharing to content that is relatively low in work sensitivity. We were not able to dig more deeply to understand how such informal sharing in microblogs might impact co-workers’ day-to-day work collaboration activities. Will microblogging’s role be primarily in sharing whereabouts information, or can it have a more substantive role in the informal sharing of work-relevant content? It is the latter type of sharing that has been noted as so valuable to the success of businesses. Thus in my second field study, I carried out a more direct investigation of microblogging behaviors that were confined to an internal organizational setting.
Chapter 5

Yammer Study - A Field Study of Microblogging in a Workplace

In the prior Twitter study, we discovered that some of the technology affordances of microblogs (brevity, broadcasting and voluntary readership, and mobility) enable frequent sharing of personal updates (for example, interesting news or articles that are work-related, individual social/work activities, opinions/ideas). This informal sharing can lead to beneficial consequences such as enhanced person perception and common ground, and in this sense played a similar role to what has been seen for informal communication in the workplace. However, because Twitter is an inherently public microblogging service, we still lack knowledge about whether and how co-workers might use microblogging differently if it was being used from within company boundaries, and in particular how this might influence the sharing of ongoing work/project updates, and through this how it might impact people’s day-to-day professional collaboration.

Study Design and Methods

To investigate microblogging within a workplace setting, I conducted a five-week semi-controlled field study of microblogging, as it was used in a department of a large IT company. Similar to the first study, this project was carried out as part of a research internship that I held in the summer of 2009. Our participants included 40 employees comprising 13 project teams. Most of the employees were located in a single building, but 11 were remotely located. Project teams were independent of each other, but needed to maintain a relatively up-to-date, high-level awareness of each other’s goals and accomplishments, because projects were working in the same field and feeding work into the same product groups. In this company, projects typically last
one year, sometimes multiple. The participants included 7 managers, 16 researchers, 11 software
engineers, and 6 interns.

This field study studied the use of Yammer set up to provide a private microblogging
network. Instead of using the company-wide Yammer network (us.company.com), we created a
private Yammer network for the functional department. “Groups” was a key feature of Yammer
that allowed us to study microblogging within and across project teams. A scoped audience of
this sort is different from those offered in large company-wide networks, in which users may feel
uncomfortable posting very specific, detailed, or sensitive information. We created one Yammer
group per project team in advance, and invited participants to join their project groups in
Yammer. In this private microblogging network, participants were able to follow other
individuals as well as project groups, and they were able to post to the entire network (functional
department), or to their group (project team). To help them get started, I asked participants to
read and post to Yammer at least once a day. I also gave examples of what they could post,
including task status updates, questions, ideas, and social information. Despite these instructions,
I should emphasize that we had no power to require Yammer use.

Both surveys and interviews were used in the study for collecting background and
feedback information from participants. Participants completed surveys both before and after the
study (32 participants completed the pre-survey and 28 completed the post-survey). The pre-
survey helped us understand the current mechanisms and tools used to garner awareness. The
post-survey asked about how and when users read and posted to Yammer, the types of
information they found interesting, how it differed from other communication tools if at all, and
general likes and dislikes.

After the study period, I conducted one-hour, semi-structured interviews with 12 users
with varying usage levels, project teams, job roles, and work locations. In the interviews I probed
how microblogging affected project team and functional group awareness, what types of posts
were considered most interesting, what types of actions or interactions resulted from microblogging use and general impressions. Please see Appendix B: Yammer Study Materials for a complete interview question guide.

What Did Participants Microblog About?

Before turning to analysis of microblogging impacts on informal communication, I first describe the content posted in the microblogs. This will help us get a general sense of what types of information people shared through microblogs in this organizational network setting (i.e., the functional group) and how it might be relevant to communication content that people often exchange in informal catching up conversations. This starts with a quantitative overview of Yammer usage and content based on a descriptive analysis of Yammer posts in this section; and then follows with microblog characteristics and media comparison by drawing from interview findings in the next section.

In four weeks of use, a total of 886 posts (with 69% as original posts, and 31%) were generated by 38 of our 40 participants (8 users posted more than twice a day, 10 users posted daily, 9 users posted several times a week, and the remaining 11 users rarely posted). Overall, about half (419) of the total posts were made to the 13 project groups. Seven project teams posted to their groups more than once a day, ranging from 1.6 to 5.1 posts per day. The other 6 project teams reported not using the system much, either for lack of critical mass, or because they met daily or sat in the same cubicle which provided enough awareness.

I coded all microblogs posted from weeks 2-5 of the study for the type of content being shared, while another researcher helped coded a sample of posts. Posts from the first week were excluded, because users were mostly experimenting with the tool. Open coding was employed in our first coding pass. We combined codes into the seven categories (as shown in Table 5-1), after
developing rules for how to apply these codes. In a second pass using these rules, one person coded all posts and a second coded 20% of the same posts. The inter-rater reliability for the two coders was Kappa=.80 (p<.001). When more than one category applied, which happened infrequently, we chose the category describing the majority of the post’s content.

Table 5-1. Types of microblog posts from the study.

| Project task status                      | “Implementing delete for sqlite logs”  |
|                                        | “uploaded new UI sketches to design wiki… https://…” |
| Other work status                      | “in a four-hour management meeting with [the lab director]”; |
|                                        | “reviewing papers for CHIMIT” |
| Info / idea sharing                    | “Just talked with [a colleague] at [another lab]: They're currently working on UI widget design for the [project] integration in [a product]…” |
| Question                               | “Why do we need to have components in Every Object? There ought to be a better way.” |
|                                        | “Where can I print a poster? I need to print one for [the conference].” |
| Social / personal                      | “headed to Napa for a day of wine tasting and sight-seeing” |
| Availability                           | “Home sick, feel like my head is going to explode” |
|                                        | “I'm on vacation tomorrow (Jul 31); heading to a friend's wedding…” |
| Other                                  | “[Project name] is bringing sexy back.” |

Counting only posts that were original (i.e., not replies to other posts), 91% were work-relevant. These included project task status (44% of all original posts), information and idea sharing (19%), other work status (18%), questions (6%), and work availability (4%). Personal and social information were relatively uncommon (6%) as were posts falling into the “other” category (3%). Figure 5-1 shows the relative frequencies of these different types of work-relevant posts.
As can be seen in Figure 5-1, posts related to project status were not only the most common but were almost exclusively directed at the project team. In contrast, the other six categories were posted more broadly to the entire functional department. Interestingly, posts in the category of “other work status” were always shared more generally; these posts contained content such as “in a four-hour management meeting with [the lab director]”; or “reviewing papers for CHIMIT”. These status updates are not specific to a project and in fact might be particularly interesting to other colleagues who are engaged in similar or related non-project activities. Posts of this sort are also the kind that might be shared on Twitter, as they are more expressive of the person’s status and less about the details of projects or shared work activities. It is also interesting that the social and personal posts (e.g., “Getting excited about seeing HP6 today with the summer interns!”) were relatively infrequent, and were less than we had expected.
Revisiting the Affordances of Microblogging

In the prior section, I reported that participants frequently shared project task status, other work status and other information and ideas. But we did not know whether the shared information is content that people also receive and communicate on other existing media (e.g., email, IM, other SNSs), or whether microblogging provided a complementary channel for information sharing. In this section I focus on the content characteristics of microblog posts in the study and consider whether and how they are similar or different from information communicated through other media (e.g., email, IM, SNSs).

In addition to the seven-way classification of posts summarized in Table 5-1, I carried out an analysis of the interviews, searching for themes related to posting content from both reader’s and poster’s point of views. All 12 interviews were transcribed and coded. The initial coding schema was borrowed from the conceptual framework described in Chapter 2, with new categories also emerging during coding. The primary themes are summarized in Table 5-2. A complete coding schema is attached in Appendix C: Yammer Study – Complete Interview Coding Themes. First, let’s revisit microblog’s characteristics and see how it is similar or different from findings in the prior Twitter study.
Table 5-2. Primary themes in interview transcripts from Yammer study

| (1) Microblog characteristics | (1.1) Content is less critical than that found in email and IM  
|                              | (1.2) Posts are audience-specific broadcasting |
| (2) Informational impacts     | (2.1) Project updates have relatively fine granularity  
|                              | (2.2) Information is beyond one’s daily communication circles  
|                              | (2.3) Enabled timely communications and feedbacks  
|                              | (2.4) Public posting enabled information/expertise sharing from both within and across teams  
|                              | (2.5) Knowing what collaborators have been up to provides rich contextual presence information |
| (3) Social Impacts            | (3.1) Posts enable knowing co-workers better as a person  
|                              | (3.2) Project status posts provided more context for later communication in meetings  
|                              | (3.3) Helpful for strengthening feelings of connection with the group |
| (4) Issues and design implications | (4.1) Audience-targeted microblogging  
|                                  | (4.2) Lack of audience feedback  
|                                  | (4.3) Posts that focused on project group were very contextual  
|                                  | (4.4) Problems with filtering mechanisms |

**Voluntary readership and brevity nature enabled sharing less critical whereabouts**

From an information sender’s point of view, all participants (12 interviewees) reported that they were more willing to share content in microblogging that is less critical that the content they typically communicate in email, IM, or face-to-face meetings. Examples include small steps that one just completed towards a project task goal; issues that one is working on, but that are not so serious to require others’ attention; ideas that emerge from an interesting conversation with someone, but that have not yet been developed enough to formulate as a proposal. People often do not share such information unless they bump into each other, as one participant said:
“I think I post mostly about very project specific stuff. And it’s posting about project updates either I am working on this now, or something I just completed … The thing I wouldn’t necessarily send an email about, but I would still like to share it … When I run into somebody, I would say, oh I just completed this, or something like that.”

This reflection about content replicates a finding from the preliminary study of Twitter practices and attitudes. In this study, I found that microblogging’s broadcasting nature and voluntary readership encourages workers to share less critical work-specific status updates. One reason that participants said they were more willing to share such less critical things, is that it seems OK to share this more “trivial” information using the less intrusive and directive channel of microblogging. IM is perceived as too interruptive for conveying non-urgent stuff; as Julia put it, “only when they have a reason, either it’s urgent or they need an answer right away”.

Similarly email was mainly used for communicating more significant matters, due to the perception of cognitive overload in email use. Our participants reported that Yammer helped reduce the threshold for mentioning things like small tasks they are working on and small issues they are resolving, because posts were not directed to individuals. They thought that undirected posts are not very intrusive to readers, because readers are not obligated to read or reply.

For example, Aaron is a programmer who works remotely at home three days a week. His manager often asked him to stay close with the rest of the team. But he had trouble finding an easy way to keep his team inside the loop of what he has been working on, when using traditional communication media (e.g., IM, email). When asked to compare microblogging with other media, he said, “Then, Yammer was a place in between [emails and IMs], because it is acceptable to say that here is the things I’ve been working on, you don’t have to answer me. I probably will have it figured out in the next two hours on my own.” He continues,

“If I post at [the IM client] to [a team member], asking him a question, it means I need an answer. You know, he can’t just ignore it. He basically has to deal with it. It would be very rude if I did that … Since with Yammer I was just posting it to the [project group], I am not requiring anybody to answer. So it makes me more willing to mention the problem I am having. Just in case
somebody has an answer. Normally I just wouldn’t say anything, because I wouldn’t want to bother [the team member]. So I would just work it out by myself. So this maybe has a lower threshold.”

This less directive and less interruptive channel of microblogging has also let participants be less hesitant to share random news, articles and other interesting information that they thought might be useful for others. As Edison reported, he felt more comfortable about broadcasting news/articles in this channel that he did not want to spam others’ email inbox about previously. He said:

[Edison-1]“It’s an alternative channel for me where it’s a little less imposing. Because before if maybe I find a nice paper I think other people should read, I send them an email about it. The threshold for me to send an email is pretty high because I know, then they have to manage that, and I don’t expect them to read or write, since this is just kind of like ‘oh, this is a nice paper’. But if I put that in Yammer, it’s a little less committing because if they want to read it, if they don’t they can ignore it. And then I feel better because I am not leaving spams in their emails anymore, which I think is nice. So it’s kind of just having that alternative way to broadcast to my team, my co-workers is really nice.”

When asked to compare microblog use with other communication media, some participants also emphasized that they would not rely on microblogging for sending or communicating important and critical content (e.g., material that they want to be sure that people receive). This further illustrated the distinction between usage preferences for microblogs versus those for email and IM – microblogging is seen as more appropriate for sharing random less critical things but would be still interesting and useful for others to know, while Email and IM are more “official” channels for communicating critical and urgent matters.

**Focused audience enabled microblogging about daily work activities**

A key finding of the study is audience-targeted microblogging. While the broadcasting nature of the posts (i.e., they are non-directive and non-interruptive) helps to reduce the threshold for sharing less critical things, I found that perceptions of the audience does seem to affect what
people share in microblogs. As our analysis of posts showed previously, 91% of all posts were work-related, and 44% were project status in this study. This is significantly different from what people post in other types of social networks, for examples, primarily social personal content and article/news link dropping on Twitter (Zhao & Rosson, 2009), and few project specific status updates in company-wide social networking sites (DiMicco, Millen, Geyer, Dugan, Brownholtz, & Muller, 2008; Wu, DiMicco, & Millen, 2010), and microblogging networks (Zhang, Qu, Cody, & Wu, 2010). Compared to company-wide social networking, the microblogging network created for this study was relatively small. As a result, many of our participants (10 out of 12 interviewees) reported that the microblogging network within the functional department and the project groups allowed them to easily formulate posts about their daily work activities that they expected to be relevant to the more restrictive audience.

Not surprisingly, many participants mentioned that project groups provided a context that prompted the sharing of rather detailed task-relevant information to teams; such updates would be less likely shared in the larger functional group, because the updates would not be relevant and interesting to people outside the teams. As Edison described,

[Edison-2]“Within the group or team, you know I might say fixing bug no.12, but you know, to the outside world would be annoying if they don’t know every bug I was fixing.”

Another example of audience-based microblogging comes from Jack, a junior researcher involved in two projects with different teams. He was often posting about technical issues in the project group where others also work on technical problems, but not doing so in the other group, as he noted:

[Jack-1] “Actually for [the other group], I was not posting technical things, because, I cannot really share or get help from someone since everyone else is doing something different [not technical], so I cannot get technical help from others in that group, so it doesn’t make sense to post some technical issues there.”
While the project groups helped provide context for posting project relevant content, the functional department network set up in the study provided another predictable audience, where everyone knows everyone and they work on related projects to achieve related goals. With this clear audience in mind, our participants reported that they were able to easily find relevant content to share, in contrast to how they would feel if they did not know their audience. As Simon said when comparing this with Twitter,

[Simon-1] “I am scared to post on Twitter, because I don’t know who is following me, you know, what’s the audience. Is this personal people, since a lot of them are from my personal email address. Is this professional people, because some of them I may know in networks, or some of these probably just know my name somehow. And so, you know, it’s hard for me to see what these people are interested in. Whereas this [functional department network], having this as an isolated eco system has made it very easy for me to tell my audience what I am going to accomplish.”

Similarly, when comparing the Yammer use in this study with a company-wide social networking site, Edison noted:

[Edison-3] “So here the Yammer is much more, I know my audience and I guess the content is very fine-grained for them. You know if I am gonna say something project specific, that only they will understand. And on [an company-wide social networking site], I think its way more general … so yah it’s a much more broad audience.”

In contrast to Twitter and Facebook uses, many participants reported that they tended to keep social content to a minimum in the Yammer network, not only because it is not work-related, but also because they expected that their co-workers would not value such posts as highly as other more work-relevant posts. While it is possible that our initial setup and instructions, which involved creating project-focused groups, may have biased participants toward work-related information, we did explicitly suggest social information as a possible topic to post about (along with task status updates, questions, and ideas). However, an unspoken expectation that Yammer was meant for high-value work information emerged among participants, as Jane, a local software engineer and avid Twitter user, put it:
[Jane-1]“I feel like with Twitter I have very low expectations. I go in, there might be nothing of value and that’s fine. But with Yammer, because certain people… have posted very valuable information… I have much higher expectations. So I wonder if initially, because I was getting so much valuable information out of it, when suddenly I was seeing a little bit more noise, I was like ‘Gaarrr! What is this?’… In Yammer… I know everybody who’s following me… so I try to target the information so that they would find it valuable.”

Similarly, some participants mentioned that they do not tend to share work-relevant content on Facebook or Twitter, as it might annoy their social friends, as Joe said,

[Joe-1] “I use it [Facebook] much more for personal stuff. I also have a big audience there, yea I would say a relatively big audience but it’s outside of work, so I feel, first of all, I don’t put anything at all about work at [company], because, it would be boring, and second maybe because it’s a bit more confidential.”

**Informational Impacts**

As discussed in the previous section, microblogging filled a communication niche for sharing less critical, specific updates that are relevant to people’s daily work activities. Unlike the use of IM and email, posts do not have to be directed to individuals, thus users were able to share non-critical information, without worrying about being “rude”. Focused groups (e.g., project groups and the small network within the functional department) formed an easy-to-understand audience; this in turn helped users to know better what was useful to post. In contrast to writing emails, a short post requires relatively little effort and the relative ease of posting enabled frequent sharing as relevant work was happening. From an information consumer’s point of view, many participants reported that they were able to learn more about what co-workers were up to through microblog postings, gaining knowledge of them that they would not be likely to know otherwise (i.e., more detailed work steps and timely status updates; more information beyond one’s direct working teams).

While microblog enabled broadcasting of such personal work activity/event updates and thoughts, it enacted similar content exchange as in spontaneous conversations around water-
coolers, but broader and more frequent among all colleagues. I found that such frequent microblog posting and monitoring behavior can lead to various beneficial consequences similarly as anticipated in informal communication. Under the guidance of the conceptual framework described in Chapter 2, I now turn to a discussion of how microblogging in this study had impacted day-to-day collaboration activities among colleagues both inside and across project teams in the functional department.

**Project updates have relatively fine granularity**

From an information consumer’s point of view, the Yammer users felt that they were able to gain information that they would not otherwise have available. This includes project task updates from co-workers within the teams that are at a finer level of granularity; information beyond one’s immediate working pairs and teams; and in general, timely information of what is happening now. I will discuss these three content characteristics respectively in the following subsections.

Firstly, microblog status updates were more detailed (e.g., lower level steps) relative to other status sharing options (e.g., weekly reports). Especially from a manager’s point of view, as Jeremy, a team lead, described “more frequent and detailed updates than I would get in the meeting.” All four managers who were interviewed reported that they discovered many low-level steps and issues that team members have gone through to achieve their tasks that otherwise they would not have known. As Jim said:

[Jim-1] “So I learned something about somebody that I work with closely, [Mark, a team member]. He didn’t tell me directly, and it’s probably that he didn’t think that I would probably be interested. He sort of said it to the [project group] on Yammer. And it’s more about what he has been doing at the time, right, like he is doing X. I know he is doing something related to X, but I didn’t know he is exactly doing X. So I find it out from reading the Yammer.”
From a team member’s point of view, Aaron compared his weekly status reports from his posts on Yammer. His team does weekly meeting, where team members do self-report and talk about what they did for the last week, and what they were planning to do next. He said,

[Aaron-2] “The things that I post on Yammer for what I am about to do now, are lower level, smaller things that I wouldn’t, you know, I would tell them in our weekly meeting what I did last week. But then, it’s too late right, and if I tell them what I am gonna to work on next week, it’s more general than things I post on Yammer. So on Yammer, I can say more specifically here’s what I am gonna work on for the next 2-3 hours. That’s stuff, if there weren’t Yammer, I wouldn’t have told them. I didn’t have a channel for doing it before. There wasn’t a good way to do for it, even if I knew I needed to, but I wasn’t really doing that and Yammer made it possible for me to do that.”

**Overhearing information beyond one’s communication circles**

Many participants (8 out of 12) reported that Yammer provides them with information that otherwise would not be addressed in emails or other more directive communication channels. People hear more of others’ individual work updates and conversations in the teams as well as from people who are beyond their direct working teams. Aaron gave an example of overhearing two team-members’ current work that is not directly relevant, but useful to his work.

[Aaron-3] “Here some stuff, you know, some interaction between [member A] and [member B] talking about [a software program], which they are currently working on. And you know, I don’t use that program, I don’t do anything with that, so I don’t really care. But since it is close enough to what I do, I’d like to know what they are up to, so it’s nice for me to find out that they have an issue here, and that’s useful to me, because I am doing a similar thing with [another project]. So that’s a good example of something in here, it’s information that I would normally not know what they were working on with the [software program]. But, it’s in the [project group on Yammer], I know about it and it is useful for me.”

Due to the public broadcasting nature of microblogging, participants had more chances of learning things from colleagues that they do not typically talk with. As Jim said, “I got to know something about some people that otherwise I wouldn’t have known, because I wouldn’t have an external conversation with them. So [a person] posted something on there, so I’ve never talked to
her, so I wouldn’t know those things. [Another colleague] posted about [a project he’s working on]. I talked to him when he is around, so I could have learnt that from him directly, but I didn’t.”

Simon provided some other examples of how Yammer let him more aware of projects that he is only loosely involved with.

[Simon-2] “there is a lot of stuff I found in Yammer, probably could have been in email, but I probably wouldn’t have been copied. So Joe [team lead of another project] might email others that he’s working on spam, but I wouldn’t have known that. And especially stuff from Tisha [another team manager], I never had email from Tisha. Yammer is the way to keep tracking some stuff she is working on, and stuff is relevant about, you know, is relevant to me. So she’s been talking about [a potential project for a product team], so I learned about that from Yammer. Well, [a project] is another good example, Polo emails his team about what he’s updating [the software], but I can’t see it, because I am not actively involved in it every week, you know. So I found it there is a lot of stuff that goes in Yammer, that I wouldn’t have an email about, even if it went to someone else’s emails.”

Timely updates enabled early communication and feedbacks

Another content characteristic is that Yammer-shared information tends to be more timely with respect to what is happening now, compared with those received in other channels.

As an interviewee described, “a lot of them are project updates. Like somebody did something and they say, oh I just added this function, or I just fixed this bug. You know, it’s really telling people what’s going on, and what’s happening right now.” Especially for distributed teams who have no communication mechanisms apart from weekly reports and meetings, these teams reported that Yammer was very helpful for keeping members updated about each other’s work.

Sharon, in a distributed team, works more closely with pairs on the main office site. Apart from weekly team meetings, she only hears once a while from remote members in emails. She said,

[Sharon-1] “For [my team], almost half of our team is down in Argentina. If I get any updates from [a team member], it’s going to be my email once a week or two weeks, you know, [things like] I am having this problem I have been working on for a while and I can’t fix it, or something like that. While with Yammer, it’s like quick post, like [the team member] might say “I have updated the Synchronous
Editing function. And I can go to check it right away. I can follow through more on it if I wanted to. You know, if I see any problem, I can reply to him on Yammer.”

Similarly as Jane described, she often hears about things first on Yammer and later in emails or meetings. For example, people posted about issues they are working on, and a couple of days later sent a more comprehensive email describing how they were solved; people posted ideas that emerged from a passing conversation, and mentioned the same ideas later at a team meeting; and even sometimes, people discover that colleagues are sick at home or that they will be late for work first on Yammer, and then later receive a more official email announcing this.

When asked to compare microblogging with other media for team communication, Jeremy mentioned that, apart from the less intrusive feature, the short simple microblog format also helped reduce effort of sharing and allow him to update as work being carried out.

[Jeremy-1] “it’s really easy to say this is what I am working on, things that I am seeing, and if somebody happens to get that, it’s great, otherwise, you don’t lose too much time on it. So I thought it’s sort of in between too interruptive like IM and too much time to construct like email. Some people just shoot me short emails, but typically users from my experience spend more time on writing emails than Yammer posts.”

As Edison described, most of his posts just provide quick pointers for people about things he is doing or find interesting, such as, “[A collaborator] and I just talked about [a study] and it’s doing well”. And if someone finds something interesting about this, further conversations might be initiated through other channels to discuss the activity in detail.

Microblogging as work being carried out prompted timely communication and exchange of feedback among team members. As discussed in the previous section, microblogging provided a communication niche for posting less critical small steps/issues, and asking lightweight questions that they likely would not have mentioned otherwise. These in-context updates enabled others to tap into the process of their colleagues’ work and initiate timely conversations. Information and feedback were thus exchanged as work in progress. As one participant described,
It indeed increased awareness, right. Not just that I knew that people had a problem and fixed it, but I also knew the intermediate steps they took to fix the problem, which in general case it allows me to help them in that process. I think it allows me to see a little bit more about their process, instead of the done results.”

In another example, Yammer posts supplemented weekly code reviews in Aaron’s team and helped to uncover potential issues early on, as described by the team manager:

“We have once a week code reviews. In those code reviews we go over all the check-ins in the code base for that week. We’ll go over things we don’t understand… but on a week where there are a lot of check-ins we won’t go through everything that happened that week… So this back and forth [on Yammer] has been more frequently than once a week and it’s actually before you check it in, which I would hope saves you time, because once you check it in it’s a pain to go back and change it, you’ve already decided on strategy…”

Aaron also had his chance of providing timely information and knowledge to other team members’ work:

“Here is another example, here was [a post] about using HTML unit as a [server] that [a team member] was working on, and I knew someone’s done that a couple of years ago and she didn’t know it, so I let her know … I said ‘a summer intern with this other group two years ago tried using HTML unit as a [server]’. So that was something I think she wouldn’t have brought that up if there wasn’t Yammer.”

**Public posts enabled information/expertise sharing across teams/groups**

An effect of openly sharing project information among a broader but focused network of colleagues was that people outside teams could read project-related posts (all 12 participants reported doing this regularly). These outside followers read another team’s posts because they may have played a peripheral role (e.g., consulted for advice), worked on related projects (e.g., dealing with similar technical problems), or were simply interested.

The public microblogging environment made it possible for people outside the core team to be aware of a project’s progress; this at times prompted them to initiate conversations with core team members, provide helpful ideas or information, or respond to questions. As participants told
us previously, these interactions with peripheral project followers would not have otherwise occurred, because email and IM messages would not be sent to them, and they did not attend group meetings. For instance,

[Simon-3] “I get a lot from [a core team member] on [a project], which is a project I’m somewhat aware of… but from him I get, ‘OK, I made the background white today. There’s a new update, here’s the link.’ And I follow it… I can see it right away… I was able to have a conversation with [the project lead] about that later that day, which otherwise, I would have missed that conversation. I wouldn’t have been a part of it.”

Some participants also reported that they were able to learn from related projects by reading their project group posts. For example, Jeremy followed another project team that works on similar technical problems.

Jeremy-2] “It is interesting to hear their day-to-day conversations about how they are dealing with bugs in different versions of browsers and how they make their code to work with them. That gives me a sense of how tightly coupled they are with browser technology and what’s problem in browser that I would hit if I write an extension, which I do from time to time.”

Provided greater contextual presence information

An interesting finding is that the microblogging provided greater presence information than the presence icon in IM’s buddy list (i.e., busy, offline, online status). One participant reported that he were able to get more contextual and timely awareness information about his co-workers and that this has been extremely useful for managing collaboration activities among them, for example, to find whether it is a good time to ask a colleague for help.

[Edison-4]“I have all these small little projects which I could use the help from a developer. And I thought, oh, maybe, he would like to take a rest, you know, something different. Because it would take him you know like a few hours to do this and maybe he is exciting about it. So I can kind of see he said, I finally did something, you know, it’s working, and I was like, oh okay maybe he has a few moments to help me out now. Otherwise if I don’t hear or see from him at all, like I don’t see what he is doing, is he really available, is he not? Does he busy? Or maybe he wants or doesn’t want to do something. I guess I get a better impression.”
Such greater social awareness over co-workers was also helpful for managing collaboration expectations. For example, as Edison described, he was expecting someone to solve some bugs. But from Yammer, he knew that his team member was doing training and meetings, and so cannot focus on the bugs right now. This helped him manage expectations.

**Social Impacts**

**Enable knowing co-workers better as a person**

Cognitively, reading others’ individual work updates helps co-workers get to know more of each other and their work. Many participants (7 interviewees) commented on that Yammer let them discover aspects of colleagues’ work and interests they likely would not have otherwise learned. In team projects, this let members understand better and appreciate each other’s work, especially among people in different job roles (e.g., programmer and UI designer) with different education backgrounds. As a result, it enhanced collaboration, as a participant described,

[Edwards-1] “I didn't understand and care about [Sharon]’s work much before. Reading her Yammer posts let me understand her work better and find it interesting. I also replied to her my feedback. It get me more involved with people who I don’t often interact with”

As some participants commented, sometimes it was not much about the work activities that were valuable to them to know, but more about people. For example, Simon as a manager sometimes did not need to know every detail that his team members posted on Yammer. But it is nice to know that his team members have been working hard on the project, as he described “Although it was kind of nice to see [Hans, a remote worker in Argentina] was checking [the server’s performance] late at the night in Argentina time. I know he was really working hard on this project.” Another example as reported early in [Aaron-3] overhearing other members’
conversation of their work, Aaron was less interested in the conversational content, but as he said it was nice for him to know what his co-workers and manager care about.

As discussed in the last section, microblogs allow users to hear from people beyond their working teams, and immediate collaboration/social circles at work. As a result, one gets more chances to know people in other groups, including people they do not often talk with, by reading about their posts and recent updates on Yammer. For example, when asked what he found from reading posts by people outside his groups, Jim said,

[Jim-2] “It gets you to know other people you otherwise wouldn’t know. Like I read more about [Sharon] on Yammer, you know otherwise, the most contexts I had with her was Tea Time [a weekly social event in the department]. And I now know a little more about [Edwards] as well, that’s quite different than what I’ve got in the other way.”

Knowing a person’s recent work activities provides a context for getting a conversation started at encounters, and prompting informal communication and further establishing collaboration opportunities. For example, Jeremy learned from Yammer that Edison (a UI designer from another team) has recently become more interested in programming by discovering that he has been attending a training session on programming. Knowing this recent change of Edison prompted a catching up conversation between them at a department meeting. For another example, Paul mentioned that he got to know many interesting people working on very interesting projects that he previously did not know about because he works in a remote office. He was able to consult those people later on about their expertise.

**Project status posts provided more context for later communication in meetings**

While all teams met regularly to share project status, microblog posts provided lower-level details about what each member is working on. Some participants (5 out of 12 interviewees)
mentioned that reading Yammer through the week helped them to gain more awareness information of what others have been working on, establishing a context that led to more efficient communication at the meetings. As Jeremy described,

[Jeremy-3] “I get more frequent and detailed updates from Yammer than I would from a meeting. It also helps when I’m going into the meeting, if I have that context, I don’t have to sit there and try to level-set with everybody to try and understand where they are with the things they agreed to work on in the last meeting… I think it makes the meetings much more effective… You can get past ‘here’s what I did’ and get straight to, ‘here’s the problem I had’ and start brainstorming what to do next to try and work around them.”

This better awareness of others’ work not only allowed team members to better understand each other’s work status, but also made them more willing to listen to each other and pay more attention in the meetings. As Sandra said,

[Sharon-2] “If I just follow along during the week, I have a better sense of what to expect and what’s going on during the Monday meetings. In that respect, I am not confused during the meeting, and more like to pay attention during the meeting, and I am more likely to understand during the meeting.”

Yammer posts also served as a reminder for items to be discussed in more detail during meetings. As I discussed previously, participants often get updates earlier on Yammer. For example, random ideas from a conversation; issues one is working on in an early stage; an article one found useful for the project. Awareness of such early updates provided a context for what to expect to hear more at meetings, and sometimes helped to remind things for discussion.

[Aaron-5] “Once [Our manager] wrote a Yammer post suggesting we talk about [an issue raised on Yammer] during the next meeting, but she forgot… If it weren’t for Yammer, we would have forgotten that we needed to talk about [the issue] in the meeting… It made me aware that we should talk about this during the meeting, so I could remind her.”

Helpful for strengthen a feeling of being connected with the group

Emotionally, frequent microblogs create a greater online presence of colleagues and help to maintain one’s feeling of being connected to each other. Although people may not see each
other often even they work in the same office building, reading microblogs kept them updated of what each other is up to and helped build stronger social ties, As Simon described in his words,

[Simon-4] “I feel like this is really good for my productivity. I’m more aware of what people are doing a lot more and I feel a social connection with people a lot more. It’s both that I can make business decisions and that I can feel closer to people and more comfortable with people.”

The feeling of being connected makes one feel more comfortable to get a conversation started and allow communication to be more productive. As Jeremy described,

[Jeremy-4] “So you know, seeing what they were working on certainly provides me with context if I got to talk to them in some meeting. That awareness helps me quickly connect with them socially to a comfort level for that discussion to be more productive.”

Especially for teams remotely located in distributed offices, microblogging through the week helped fill the gap of awareness in between team meetings and build a virtual proximity. As Sharon described, that email was the official communication channel for team work communication, but she does not hear from the rest of team very often, except in cases where someone one hits a serious roadblock or figures out how to solve a serious problem. Team members were little aware of others’ work in progress status in between team meetings. Staying aware of each other’s “right now” work updates in microblogs let them feel like sitting in the same office, as Paul (another team member) described,

[Paul-1] “In a sense, it’s like being in the same office besides that person, having the chance to know what he is working on … And In a certain sense, it puts you closer to your remote office and gives you the chance to know what they are doing in a regular basis.”

As mentioned previously, Yammer allowed participants to see what other projects and people are up to and thinking about, beyond just the people with whom they work closely. This was seen as extremely helpful for remote workers to form a stronger feeling of connectedness with the larger department, as described by Jeremy:

[Jeremy-5] “I feel tremendously more connected to especially folks in [the department], where I get a sense of what they are working on in more regular
basis than I would normally. If I were local, I would get it from hallway talk or occasionally lunches or things like that. Those things just don’t happen when you are remote … You know being able to widen the scope beyond just my immediate team and to see about our second and third lines of organization, that’s for me just very helpful without being overwhelming.”

**Issues and Design Implications**

I have shown that microblogging helped facilitate awareness within a project team, as well as in a larger functional group of related project teams in this five-week controlled field study. Although we have not addressed the adoption issue, we can say that some features of a microblogging system seem to be necessary for an adopted system to be effective for team awareness. This include: (1) posts are short, thus it is easy to make frequent updates as work is being carried out; (2) posts do not have to be directed to individuals, so that undirected posts are not intrusive to readers, readers are not obligated to reply, and they can be used to share non-critical information; (3) focused groups (e.g., project groups and the small network within the functional department) help form an easy-to-understand audience, so that more specific, relevant content can be posted.

I also acknowledge that perceived values in this study would rely on sustained microblogging use, which might be affected by many other factors, such as organizational culture and privacy issue. Though the adoption issue is beyond the scope of the paper, our findings also suggest areas for future research on facilitating project team and larger group awareness using microblogging. We now turn to a discussion of some these issues.

**Audience-targeted microblogging**

First, a mechanism for creating focused, easy-to-understand audience sets is important for enabling users to know what to post (which could help adoption) and improves the value of
posted content to readers. These might be project groups, a larger functional group, or communities of shared interest within a company-wide system. However, accomplishing this within a very large microblogging network could be a major challenge.

The concept of a group that can be followed and posted to is not new to Yammer and various third-party solutions have emerged to provide groups for Twitter users (e.g., Tweetworks, www.tweetworks.com). However, how to help users create and maintain a system of groups that reflects project teams, functional departments, and other focused communities remains an open question. This problem is evident in a Yammer network for all U.S. employees of the same company, which was created over a year ago by an unknown employee. While 37 groups have been created, all but 2 have fewer than 10 messages; and the entire network of 1093 members only has 2.4 messages per user on average. While I were able to accomplish a focused environment in our second field study by limiting our network to participants and carefully creating the project groups, the relative lack of focus in the company’s U.S. Yammer network indicates that further research is needed to foster groups that would facilitate project and functional group awareness within large networks. I described our automatic creation of project teams as an artifact of this study, but it may be that a “service” like that is useful in promoting project-specific posts.

Lack of audience feedback

Another audience related issue was audience feedback. The project groups and small Yammer network within the functional group helped form easy-to-understand audience, which was close enough for users to freely share their daily work activities. At the same time, our findings also suggested that a lack of audience feedback in microblogging practice might eventually affect sustained use. As one of the participants Jim reported that, at the beginning he
found that Yammer was an easy way for him to share with others about his exciting work process. However, lately without much feedback from his audience, he was not sure whether anyone actually read his posts or what they think them. As he put it:

[Jim-3]“The question I have for my investment of doing that. Does it matter? Does anybody care any of it? I don’t know. And if someone said it’s good, I will do it again, otherwise, I might just stop.”

Some participants also reported that they tend to think about the audience based on who they see often posting. This perceived audience was actually much smaller than the reality, as many people viewed posts without leaving any activity trace. Clearly the existing feedback mechanism, such as the thumb-up like button and the reply feature, has not been used frequently enough to provide users an accurate mental model of who their readers are. Like in television and radio broadcasting, it might be useful to have a mechanism of easily gathering feedback information from audience, such as who read my posts.

**Group-focused posts were very contextual**

Though project groups helped to evoke project-specific posts and work task status updates, team-targeted microblogs were too contextual to understand for people outside the teams in general. This would be a potential barrier for facilitating cross-project awareness and informal communication among different project teams and functional groups. Although public project groups enabled information flow and expertise sharing cross project teams, many participants (6 interviewees) reported that project-specific posts from other teams were too low-level and technical to understand if without a background knowledge of the project status. For example, posts about fixing bugs could confuse people outside the team, so they would not know whether the team is making good progress, or they are in serious troubles, as Edison described,
“It’s confusing though in some ways ... so for example, they are running these tests on cloud computing, and they are complaining that they are hitting bad numbers. And so I don’t know if they are just fixing a bug or like in general, they would tell the outside world that the project is going well and we are getting good results. But all I can see is the trouble, right?”

This raises a challenge of fostering perceptions of a focused audience and at same time facilitating cross-project awareness and information sharing. Some our participants suggested that the tool might provide a high-level summary kind of project status information, as in Jack’s words “If there were more high level interaction in the group, then I am who is outside the group can easily understand and capture what is their plan, their thinking, things like that right, that might benefit me.” However this remains as an open question, that is what would be meaningful ways of providing such information.

Problems with filtering mechanisms

The “follow” mechanism was perceived as confusing for the small network inside the functional department. The “follow” mechanism might work well for information filtering in large social networks, like on Twitter where people from all over the world, so that users have to select ones they are interested in hearing updates from. However I found that in small networks where everyone knows everyone, it makes little sense to ask users to choose people to “follow” at the beginning. Some participants suggested that they would prefer a blocking mechanism more than a following model, as a participant described,

“I wish I could say, by default if new people join, I want to follow them, and if I found somebody is really annoying, then I would be able to remove them, instead of adding people individually. You know, if there is a new person in the department, then he Yammers a little bit, then it’s probably interesting. So by default, I would like to have that stuff show up. And then, if I determine that there is some people their talk is not very interesting to me, then at that point I would just like get rid of them. Yammer, right now, is the other way around”
Another related issue is the filtering problem in the real-time notification system. Because posts were timely about what’s happening now, many participants reported that they would like to stay on top of interesting updates (e.g., issues team member is solving; thoughts and ideas co-workers are thinking about; a talk is currently going on). However, they were often bothered and felt annoyed by constant alerts of less urgent and non-interesting posts. For example, Jack is a person who would like to have the real-time alert on to keep in touch with other members in his team. But he often felt overwhelmed by someone’s series of updates of how he is making progress on a task or overheated conversations on Yammer. He wishes there would be a way to filter out such posts from alerting.

However this raises a question of what kinds of information should be filtered from the alerting process and when they should be filtered out. It might also depend on individual users’ preference and the circumstances. For example, sometimes participants found such series of instant updates from a person were very useful for gaining contextual presence information of a co-worker, as I discussed before in [Edison-4].

**Summary**

In this chapter, I have presented a study of microblogging use by a set of project teams that comprised a functional group within a large company. I found that project team members were able to use microblogging as a communication channel for sharing project information, and reported its effects on awareness within a project team and between related project teams. Our main findings indicate that (1) microblogging supplemented other forms of team communication, helping some teams initiate timely conversations as work in progress, acquire more context enabling more effective communication in meetings, and obtain more contextual presence of each other that is useful for managing work collaboration and coordination; (2) microblogging was
valued for facilitating cross-project team awareness within a functional group, garnering participation on projects from non-core team members, and building stronger social connection with colleagues beyond one’s immediate working teams; (3) a scoped, easy-to-understand audience size was important to the adoption of microblogging and the perceived value of posted content. Our observations also provided directions and issues to be addressed for future research on supporting collaboration awareness with microblogging, including (1) how to foster focused groups and easy-to-understand audience in larger microblogging networks; (2) how to provide more feedback information from audience; and (3) how to facilitate outsiders making sense of contextual information posted to specific groups.
Chapter 6

GroupBuzz: Scenario-Based Design of a Novel Microblogging Tool

In Chapters 4 and 5, I reported the findings of two field studies of microblogging in organizations. I drew a number of lessons from these studies, and while I cannot address each issue through a single design effort, my third research question concerned the ways in which microblogging tools might be redesigned to better meet workers’ needs. This redesign goal is the focus of this chapter.

In general, the field studies have revealed that microblogging can contribute to informal communication and collaboration awareness among team members and across project teams and groups. My participants felt that microblogging filled in a particular niche for exchanging information that is often not being communicated through emails or text chat. The unique characteristics of microblogging (e.g., its brevity, voluntary readership and broadcast nature) lead users to feel more comfortable in sharing what we might call “whereabouts” information – these are small milestones they have just met, tasks or issues they are working on, and other noteworthy comments regarding their daily work activities. Such information seems to be less critical, but at the same time contributes to workplace awareness, facilitating effective work collaboration.

My participants described microblogs as playing a similar role as a conversation around the water cooler or during a tea break. The microblog posts bring more opportunities for co-workers to learn more aspects of each other as an individual, understand more about team members’ daily work activities; this in turn made meetings, work communication and collaboration more productive. Not only did microblogging cause participants to feel more connected with team members and projects in the long run, but also the timely nature of these posts allowed them to exchange insights and expertise in the midst of work that is being carried out, including bringing up problems and interesting ideas at an early stage in a team project.
Although in general I concluded that microblogging is a positive activity for workers, my participants also shared a number of problems in current microblogging practice. Two of these problems seem to be critical for microblog adoption at workplace and potentially detract any informal communication benefits, which I hope to address with innovative designs. One problem related to users as senders of messages, while the other focused on the receiver side of the communication activity. In brief, the two problems can be summarized as follows:

1) From a posting point of view, most participants reported that they didn’t know how well their posts have been read and whether people think them useful or interesting. Lack of audience feedback in current microblogging system design may cause a user to wonder whether it is worthwhile to continue posting.

2) From a reader’s perspective, real-time alerts (e.g., a brief auditory tone) are useful for staying on top of new posts. However these alerts become annoying when less relevant or interesting posts become frequent; there is a clear tradeoff between staying aware and having ones work interrupted for little benefit.

In this chapter, I adopt the reasoning approach provided by scenario-based design to analyze usage scenarios, claims and corresponding design requirements for changes to the microblogging activity. Working from data collected in the two field studies, in combination with other relevant published research, I motivate and describe in detail a prototype microblogging tool called GroupBuzz. The analysis of the design includes envisioned scenarios and associated claims that serve as informal hypotheses about the user experiences I hope the tool will provide in the context of workplace microblogging.
GroupBuzz Prototype

Before detailing the problem analysis and scenario reasoning that led to the new tool, I first provide an overview of GroupBuzz, so that it can be understood as a specific case of a general microblogging tool. For example, GroupBuzz provides typical microblogging functionalities as found in the popular tools Twitter and Yammer (e.g., create a user, edit user profile, log in/out, post a microblog, view microblogs). However because this is assumed to be a workplace tool, instead of assuming a “follow” mechanism (as in Twitter when users subscribe to other users’ feeds), users are able see everyone’s posts by default. I chose to assume general access because my intention was to support a small network (teams and perhaps a department or larger group), where everyone knows everyone. GroupBuzz provided microblog communication support for a small network, including both teams and larger groupings. GroupBuzz users can view and post microblogs at the level of individual users, a team, and a department network.

Figure 6-1 shows the default main page of GroupBuzz. It displays all microblog posts in the overall network (at the level of a department that includes subgroups corresponding to teams). In the right side bar, it lists all the teams and team members in this larger group; users can click to view different teams’ microblog postings. In addition, it provides two new features, audience readership indication and alert frequency control, developed in response to the two general problems introduced earlier. With this general description in mind, I will now describe in more detail the rationale for GroupBuzz design.
Problem 1: Lack of audience feedback

Problem description

From a posting point of view, most participants reported that they did not know to what extent their posts have been read and if so, whether people found the posts to be useful or interesting. In one participant’s words, “The question I have for my investment of doing that. Does it matter? Does anybody care any of it? I don’t know. And if someone said it’s good, I will do it again, otherwise, I might just stop.” [Jim-3]
A lack of audience feedback might eventually affect sustained posting behavior, and in turn impact the consequential benefits of microblogging. From our studies, we know that the brevity and indirect broadcasting character of microblogging helps to reduce the perceived cost of sharing, with the result that people may share more frequently and create posts about less critical information relating one’s own activities. However, in contrast to the more direct communication of email and IM, microblogging users have relatively little idea of who is actually receiving or reading their microblogs. The question thus becomes how can we maintain the broadcasting character of microblogging but also provide more information about audience readership? This tension between simplicity of posting versus awareness of “who’s out there” is captured in the problem scenario and claims analysis summarized in Figure 6-2.
Problem Scenario (a) Alice is one of the top bloggers in her department, frequently posting project-specific work updates as well as other general work activities, ideas, and noteworthy news, articles and talks. She feels that microblogs fill in a niche for sharing such informal information, things that she thinks might be interesting to others, but previously was hesitant to bother others using IM or email messages. However, as she sits down to write a new post, she wonders whether it is really worthwhile to do this any more, because she has little idea about who has been reading or benefiting from her posts. She seldom receives comments on her posts, beyond occasional feedback from team members about her project task updates. She has noticed other employees who like her are frequent microbloggers, and assumes these are the people who will see this new post, even though she wants to share it with everyone.

Claim: Broadcasting a brief microblog post to an entire work organization

+ encourages users to submit posts relevant to anyone within their organization
+ makes it easy to share simple pieces of information with a relatively large audience
  - but not knowing who else is online and able to see the post may reduce feelings of impact at the moment of posting
  - but the absence of viewing/reading history for posts may raise concerns that ideas are being produced but not consumed

Figure 6-2. Problem scenario and claim related to audience (un)awareness

Design analysis

Online networks that rely on broadcasting (e.g., SNSs, Microblogging, forums) often include some support for directed feedback in the form of comments to one’s original post. However, online lurking is a phenomenon known to be common in online communication (Nonnecke & Preece, 2001; Muller, Shami, Millen, & Feinberg, 2010). People tend to browse more than share. In my second field study, participants reported that a large number of their posts were replies or comments (about one third of total posts). However, still fewer than 10 percent of original microblog posts had replies. For an average user, it means that only 1 out 10 of his/her
posts got comments. The feature of thumb-up or like was introduced and expected to be useful for stimulating replying behavior. However, this feature was not used more than the commenting feature.

Popular social networking sites like Twitter are used to support a rather large population; in these settings a small percentage of users providing comments would still be a lot, and might stimulate other people to comment. But for the case of social networking at work, the fact that the tool is supporting a small and coherent work-related network is a crucial factor in fostering the sharing of work-related information. But because these are smaller networks, it becomes much more difficult to get “enough” people to reply or comment. As a result, my question becomes, how can I improve users’ perception of audience readership in small broadcast-based microblogging networks?

Besides direct feedback in the form of comments or other replies, participants must rely on indirect feedback (e.g., that they might gather through system use) to estimate who and how many people might be reading their posts. In my second field study, I found that participants’ perceptions of audience and audience size was inaccurate and based primarily on the other users participants often see making their own posts. But if lurking is common in these systems as it is in general for online behavior, this estimation process is not very useful. For example, most participants in the field study reported that they visited their company’s microblogging site at least three times a day, but on average they posted just one microblog daily. With respect to readership specificity, many participants reported that they do not care who actually reads their posts, as long as they believe that a variety of people in the company are reading and potentially benefiting from it.

These thoughts caused me to explore whether and how I could provide system that offers a more accurate indication of audience size and readership pattern, so that users’ perceptions would not be based on their observations of who has been posting.
New feature design

My design response was quite straightforward. To better indicate audience size, GroupBuzz displays the number of users who have visited the microblog posts thus far on any given day. Over time users might thus develop an understanding of audience size on an average day. My original intention was also to provide audience information for individual microblog posts, that is to say, the number of people who have read a single post. However, from a technical point of view, I could not envision a way to capture such information, because there is no guarantee that a person opening a page of blog posts would read each one. If I decided instead to display one post at a time (thereby allowing me to capture how often an individual microblog was viewed), I would have lost one of the main benefits of the microblog paradigm, namely being able to glance through a list of recent posts all at once without additional clicks.

In addition to conveying a general sense of audience size, I wanted to provide a better indication of audience readership patterns, for example how often people visit the site, when they visit, and which colleagues visit more or less. My thought is that this could enrich users’ understanding of their potential audience. For instance, knowing that my manager only checks in once in the morning might cause me to make the most important posts at the end of the day or early in the morning and I might be less careful about posts made in the middle of the day. In general, even just knowing that people are most likely to check the weblog at the beginning and end of the day might influence my behavior, and being able to predict when most people are online might cause me to be more careful or deliberate with my microblogs at that time. But at this point these possible side effects are just speculation; I would need to collect data to investigate such impacts. In the meantime, I follow the SBD framework, documenting these issues using scenarios and claims analysis.
Figure 6-3 is taken from a hypothetical scenario of GroupBuzz in use. It is a typical day for Alice, and when she opens her department’s microblogging network, she sees that only a few colleagues have posted so far. However, the display in the top sidebar lets her know that 16 colleagues have been online at least once today; she figures that many of them have just browsed the microblogs rather than contributing their own. When she drags her mouse over the number 16, an information details box slides down from the number string, listing the names of those who have visited today, how many times, and who’s online. When she drags her mouse over the second (total visits) number, Alice is able to see another information box that shows a histogram display of how visits to the microblog site have played out over different periods of the day. As usual, she sees that the peak in visits occurs in the first half of the morning, between 8 and 10am.

In addition to sketching this redesigned microblogging scenario (i.e., conveying information about visitors and their usage patterns), the SBD framework guides me to analyze the new tradeoffs that present themselves in light of the new features. As with the problem scenario, this is done using claims analysis, as summarized in Figure 6-4. The claims document the particular features of the new microblog tool that were motivated by the problem scenario and analysis, and that are emphasized in the design scenario. The result is a balanced analysis of possible benefits or upsides of the new features (these are the reasons for building the new design) but also acknowledging the uncertainties that are always present for new design ideas.
Figure 6-3. Audience size and visiting frequency indication in GroupBuzz.
Claim 1: Showing the number of people who have visited a local microblog site on the side bar of the page
+ may give users an idea of the audience size, so that they can know how many people might be reading their posts (e.g., versus the number who are posting)
+ removes the display of such information out of the main viewing area, simplifying the design
− but if the display indicates few people are visiting or viewing, users may feel reduced engagement and purpose for this tool
− but the display consumes screen real estate and may irritate users who do not use it

Claim 2: Updating the display of number of people and visits in real time
+ emphasizes the current activity level of the site, for example that additional people are logging on or viewing individual pages
+ may make the tool seem more energetic and interesting when numbers change quickly
− but the real time updates may distract users by attracting visual attention to the periphery

Claim 3: Showing a dropdown list of users and each person’s visiting frequency when the mouse is dragged over the summary number
+ provides more detailed awareness about who has visited and their reading frequency
+ is a flexible technique for adding details only on request
+ may suggest goals for timing particular kinds of posts for times of day when particular co-workers are likely to see the posts
− but creates a new task with new overhead, namely staying aware of individual users’ site visiting patterns
− may lead to users over-analyzing or over-worrying about when and what to post

Claim 4: A histogram of site visiting frequency over time period
− provides insight into more general patterns of audience readership
− but users may find this summary information confusing, as it combines across people

Figure 6-4. Claim analysis - Audience indication new feature
Problem 2: Annoying Microblog Alerts

Problem description

One pervasive lesson from my field studies was the value of timeliness in microblogging, e.g., the ability of this medium to suggest what’s happening now. Many of my participants reported that they like to stay on top of interesting updates (e.g., issues that a team member is addressing; thoughts and ideas co-workers are working through; a talk that is currently going on). Timely microblogs play a crucial role at workplace, helping workers to build and sustain their awareness of what is happening within their surrounding working environment. Timeliness also supports efficient collaboration and expertise exchange, and it stimulates discussion of potential issues/problems in an early stage.

However, at the same time, participants shared that they were often annoyed by a constant flow of auditory alerts that signal the arrival of posts, but where the new posts are not particularly urgent or interesting to them. For example, one participant reported that he appreciates the real-time alerts, to keep in touch with what other members are doing in his team. But he often felt overwhelmed by posts, for example a series of updates that someone is making progress on a task, where the task is not something he wants to know about in detail, or when posts and replies become online conversation between other users. He wishes that the system could just keep quiet for new posts like this that are uninteresting to him. Some other users also mentioned that they eventually turned off the real-time alert, especially at times when the frequency of updates became too high. This leads to a design question of how a microblogging system can keep its timeliness characteristic, but at the same time make notification process less annoying.
Problem Scenario (b) Eric is a UI designer. In an average day, Eric keeps his microblog auditory alert on so that he can receive new posts in a timely way from his team as well as other people in his functional group. In one of his project, he is looking forward to a new prototype update based on his new UI design, so that he can start running user test. From Yammer, he learns that the two core technical members have been away, contributing to other technical meetings for a week-long technical training. This raises his awareness of their availability, and he understands that he probably will not get answers from them as soon as he expected. At the same time, Eric is working on a set of small UI programming projects with his technical partner. Again through the real-time updates on Yammer, Eric receives a set of posts from Herman in the last two hours, documenting how he’s been making progress on solving a technical issue. Though he does not quite understand all the technical details, he knows finally it might be a good time to congratulate him and ask for his further help the next time he sees Herman.

However, later on in the day Eric gets tired of these updates. He has only a little programming background, and the constant and detailed technical updates about code problems and successes from other team members are a little bit annoying and interrupting to his current work. Sometimes, he wants to turn off the real-time notification, but at the same time he also does not want to miss out on interesting or timely updates.

Claim: Auditory alerts that signal the arrival of new microblog posts
+ Attracts users’ attention, suggesting that new and useful information may be available.
+ Encourages coworkers to share information immediately, and to expect that others will know that it has been shared.
+ Provides specific activity information about individual users (i.e. the post author).
− But users might be annoyed by the continuous interruption of the alerts, especially when they are concentrating on tasks and/or the incoming information is not relevant.
Design analysis

Notification and interruption in workplace activities is a popular research topic in CMC (Nardi, Whittaker, & Schwarz, 2002; Isaacs, Walendowski, Whittaker, Schiano, & Kamm, 2002). However, in the context of the current design analysis, it is important to discuss some of the similarities and differences between microblogging behavior and instant messaging or email. In fact, the consumption habits associated with microblogs is fundamentally different from the consumption of emails and IM at work. Emails often imply action, for example people may be expected to read and react in a certain period of time after receipt (Dabbish, Kraut, Fussell, & Kiesler, 2005). IM tends to be used for urgent inquiries for that need quick response (Isaacs, Walendowski, Whittaker, Schiano, & Kamm, 2002; Cameron & Webster, 2005). As a result, when notified of new emails and IMs, users know that many will have the expectation of reading and action, either immediately (IM) or in the longer run (email). Therefore, a good deal of prior research has focused on how to filter email messages based on urgency and importance to the users, or how to help users to prioritize email tasks (Dabbish, Kraut, Fussell, & Kiesler, 2005; Gupta, Sharda, Ducheneaut, Zhao, & Weber, 2006). In contrast, the broadcasting and voluntary readership character of microblogging should be less likely to produce feelings of stressfulness; users are not expected to read or resolve all incoming microblog posts. Because microblogs are usually very short, people often just read them quickly, and react only if a message triggers a response. People may feel frustrated when they find posts that are not very interesting, and they may feel they are wasting time to keep tabs on the feed, but they are less bothered by the interruption of the notification itself.

People want to be told when interesting new material has arrived. Unfortunately, interestingness or relevance is almost a question of serendipity in microblogging, with different people reacting to different content at different times in different ways. This makes it very hard to
predict what could be interesting to a given user. From our second field study, I found many
criteria for relevance; these criteria would change from time to time based on the user’s context at
the moment. As described in the problem scenario, Eric wants to keep the alert open to keep
awareness of what’s happening in his team, but at the same time he does not want to be bothered
by posts that are extremely technical. However, once a while, he finds technical posts from
Herman that are very useful to provide contextual presence information about Herman, for
example giving him the idea to congratulate him and perhaps ask for a bit of help. This makes it
even harder for systems to be smart enough to detect content relevance accurately, if it is possible
at all. Therefore, I am exploring design options that would let users manage their own alert
frequency as a function of which coworkers are posting. This could allow the users to keep the
real-time channel open, but perhaps feel less annoyed.

In the field studies, I found that users often develop a mental model of interestingness
based on who has authored which posts. However, people post all types of things all the time, and
posting patterns change at different time too. For example, a user may find that person A’s posts
are often interesting to him; however once in a while, person A has a habit of microblogging
about his personal life, and these the user find a little annoying because they are not relevant to
his current task. In contrast, the user may find that person B’s posts are often not interesting to
him, but he still wants to keep a minimal awareness of his work activities and news rather than
completely remove him from the list. On occasion, this user might be very busy, and therefore not
want to be overly bothered by any alerts, but s/he would still like to keep the alert on to maintain
a minimal awareness of what’s happening and going on. In the field studies, I found those three
types of scenarios were frequently mentioned and put users in a dilemma of whether, when, and
for how long to turn off the alert.
New feature design

My novel design feature is to provide alert frequency controls at the level of individual persons or groups. This feature is designed to allow users to easily change alert frequency over individual microbloggers or the entire microblog network at any time, based on their current context and needs. Furthermore, rather than implementing these controls through a complex preference setting page, the user interface provides a direct manipulation frequency control to adjust alert frequency by simply clicking a “volume” button over a person’s profile icon, selecting among 3 pre-set levels (normal, reduced, and mute).

To further reduce the potential annoyance of notifications, I considered additional mechanisms for making GroupBuzz notifications more lightweight. Like many other notification systems, GroupBuzz uses a combination of sound and a visual update to alert users about new posts. So as to be more consistent with the microblog characteristic of voluntary readership, I decided to implement a visual effect that should be minimally distractive. Instead of using the popular alert popup window, GroupBuzz implements a blinking title bar that communicates the number of new posts. I hope this mechanism will introduce less visual distraction, but still be useful enough to remind users about the new posts. Continuing with the same design goal of lowered interruption, a gentle alerting sound has been chosen. Finally, GroupBuzz also highlights new microblogs when users reactivate a GroupBuzz window. This feature aims at providing users a quick and easy preview of what and how much is new, so that they do not have to scan through to find where they left last time. The goal of all these new designs is to provide users a lightweight alerting mechanism that allows them to stay on top of new posts but still feel little annoyance.
**Figure 6-6. new alerting features and claim analysis**

- **Claim 1: An alert frequency control that pertains to individual users or overall network**
  - Allow users to stay on top of new posts, at the same time adjust alert frequency at any time easily based on individual authors.
  - Provides the flexibility to reduce overall microblog alert frequency when needed, while still maintaining a minimal awareness of news.
  - But users must now manage the control, and for example might forget to turn it back to default after reduce the frequency level.

- **Claim 2: Gentle alert sound and flashing informational title bar**
  - Conveys that new posts are of interest but not enough to take over another task.
  - Allows users to learn about new microblogs without switching the window focus.
  - But the alert sound could be too soft that users might not be bothered to check it out.

- **Claim 3: Highlighted new posts when users switch back to the GroupBuzz page**
  - Allow users to recognize and focus in on new content quickly.
  - But the highlighting might draw attention to posts that are particularly uninteresting.

Figure 6-7 shows an activity scenario that illustrates the new notification features I have designed for use in GroupBuzz. On an average day, Eric opens the GroupBuzz webpage and browses the new content being posted by others in his department. After this quick review, he leaves the GroupBuzz page open in his browser, and shifts to work on his assigned tasks. When he hears a soft beep sound, he recognizes that a new microblog has been posted. By quickly looking at the GroupBuzz title bar, he sees it was posted by Sam. But he does not bother to check it out, because there is nothing critical to react on right away in microblogs. He continues with his work, because he doesn’t want to switch context right now. After a while, he hears several
more soft beeps, so he knows there are even more microblogs being posted. “4 new posts”
flashing on the page tab bar reminds him of the number of new posts accumulated so far. When
he has a chance to take a break he switches back to the GroupBuzz page; he immediately sees all
4 new microblogs highlighted, so that he is able to easily identify what he missed. After reading,
he goes back to his work.

As alerts become more frequent, Eric leaves his task to check the GroupBuzz page even
more frequently. But apart from a couple of interesting posts, he finds nothing that is very
valuable. For example, Sam has been updating a software release he is doing. His constant
updates leave Eric feeling a little bit annoyed. He thought about closing the GroupBuzz page, but
at the same time, doesn’t want to miss other timely and interesting posts. Instead, he clicks on the
alert control button over Sam. This reduces Sam’s individual alert level to once every 5 posts, so
that he could still maintain his awareness of Sam’s posts, but at a lower frequency level; posts
from others are unaffected. Later on, as Eric gets busier with his work, he goes back and reduces
alert frequency for the whole network. The number of alerts and flashing title bars is now
reduced, but Eric still experiences a minimal awareness of what’s going on.
Figure 6-7. Alert frequency control over individual person and the entire system.
Chapter 7

Scenario-Based Evaluation

In the previous chapter, I described my use of SBD to analyze existing uses of microblog tools and envision a set of features that might improve users’ experience. I also analyzed the implications of the resulting prototype – GroupBuzz – with the recognition that these new features might also have a mix of upsides and downsides. In this chapter I will describe a small usability study that was aimed at investigating some of these new issues.

To review the general design argument, I have proposed an audience size and readership pattern indicator to help users to build a more accurate perception of their actual audience size and reading frequency; this is to address the field study result showing that audience size and usage frequency estimations tend to be based on the few people who are often posting in the microblogging network. I expect that a more accurate audience perception could help to sustain users’ posting behavior.

A second set of design concerns led to a user-controlled notification setting for new posts. The aim is to enable users to adjust the microblog alerting frequency at any time easily through a button click, and to tune individual microbloggers up or down as part of this. Together with other light-weight notification features (e.g., a softer alert sound, and a peripheral visual update), I hope that this new alerting system will fulfill users’ needs for staying on top of new posts but at the same time keep interruption at a comfortable level; and, if notifications become annoying, users will now have an option to make an adjustment rather turning it off.

In this chapter, I will describe the study I conducted to examine users’ reactions to the GroupBuzz prototype that implements these new features; the goal of the study is to gather feedback for design iterations, particularly with respect to the design issues currently in focus. Because of the formative design goals of this evaluation, I did not attempt to organize a large-
scale summative evaluation with precise performance and user experience indicators. Such evaluations are out of the scope of this dissertation work, which was primarily aimed at investigating current practices and drawing design implications from the findings. Thus in the remainder of this chapter, I describe the formative study and its implications for further research on the roles of microblogging for informal communication in the workplace.

**Method – Scenario-Based Evaluation**

In SBD, formative evaluations rely on the concept of *mediated evaluation* that has been described by Scriven (Scriven, 1967). Scriven’s framework distinguishes between *intrinsic evaluation* of a designed artifact (in SBD this is termed *analytic evaluation*) and *payoff evaluation* of an artifact with respect to achievement of its design objectives (in SBD we use the term *summative evaluation*). The concept behind mediated evaluation is to use the results of an intrinsic/analytic evaluation to guide the development of materials and activities suitable for payoff/summative evaluation. From a logical perspective, the analytic work (in my case, represented by the scenario narratives and associated claims analyses) sets up both an expected usage context and a set of possible consequences or hypotheses about aspects of the users’ experience (e.g., as documented by the upsides and downsides of individual features that are analyzed).

To conduct a realistic scenario-based test of GroupBuzz, I would be required to field the tool in a workplace setting and observe it in use, or perhaps to ask particular users to enact collaborative scenarios. Due to time and resource limitations, a field study was not possible for this dissertation, so instead I developed an SBD evaluation method that relies on *scenario simulations*; this can be seen as an extension to scenario-based evaluation approach following the scenario-based design framework (Rosson & Carroll, 2002). Scenario-based evaluation aims at
evaluating feature claims and hypothesized outcomes (pros and cons) along with design scenarios envisioned in claim analysis. And evaluation findings in turn will be interpreted to help refine design efforts and ongoing claim analysis in future. The main challenge for this study is to simulate envisioned design scenarios in a lab environment.

Scenario simulation

To evaluate users’ experience of microblogging in a workplace setting, and to focus on specific possible consequences, my study simulated a daily working environment where microblogging activities using GroupBuzz was already part of the practice. To simulate this, I first created two different scenarios that were similar to the design scenarios shared in the previous chapter; however they differed in that they were detailed down to an event-by-event level. For instance, I needed to consider exactly who might submit what content to the microblog and at what point during the scenario this should happen. Because there was only one (real) user in each session, all of the other activity (i.e., posts from other group members) had to be simulated and managed by the experimenter (me) working with an automated script that “ran” each scenario.

In the user study, each participant was given an instruction to read prior to using the system (in Appendix D: GroupBuzz Lab Study Materials). For each scenario, they were asked to read and then simulate a persona that described a business analyst who was working in an international banking company. S/he would be working in a works in department of Global Stock Investment Strategy, composed of multiple teams focusing different stock sectors (e.g., Technology, Service, Utility, Material …), as described in Table 7-1. In preparation for the scenario, I set up a department microblogging network in GroupBuzz ; the network contained the individuals and subgroups (teams) mentioned in the scenario story, again to simulate the
experience of working teams, as shown in Figure 7-1. GroupBuzz set up for the simulated workplace microblogging study.

A key feature of the simulation method was to introduce colleagues’ microblog posts at various points during study. To support this process, two sets of microblogs were prepared. The first set (50 microblogs) was already in the system at the start of the study. I used these to help the participants become “situated” the simulated workplace, for example becoming familiar with the tool’s operation but also to be “introduced” to their simulated colleagues.

For this first phase of the study, participants were asked to browse the existing microblogs (see Appendix D: GroupBuzz Lab Study Materials). The goal of this phase was to encourage participants to become familiar with the simulated work context (e.g., what colleagues have been posting in the day by far, and some major events happening in the department during the day).

A second set of microblogs (about 20 posts, see Appendix D) was designed to be posted during a simulated business task that participants were instructed to complete (the task required web research and construction of a small report, see Appendix D). These posts were crafted to ensure that a few posts by one particular team member would be directly relevant to the business task, in that they provided helpful hints or even specific websites that could be useful for participants’ web research activities. The remaining posts were not directly relevant to the task, but rather contained more informal information shared by other colleagues in the department (e.g., about department’s all hands meeting in the afternoon; tasks some is working on; and work-related news information). Finally, one simulated colleague “Sam” was given the persona of someone who posts a lot of news of low relevance; this element of the scenario was intended to raise participants’ level of annoyance. Figure 7-1 is a screenshot of GroupBuzz after it was set up to instantiate the simulated scenario.
Note that to evaluate the new notification mechanism, a participant would need to accept the goal of maintaining awareness of his/her surrounding work context and working relationships; this sets the stage for the intended user experience of balancing the need to stay on top of new microblog posts and a tendency to turn the alert off when it becomes too annoying. Regarding the audience size and usage habits, I recognize that it would be extremely hard, perhaps impossible, to simulate a realistic audience-related motivation for posting microblogs (e.g., as I found in the earlier field study). To achieve this, participants would have needed to establish a microblogging practice in the simulated work context, and developed a nuanced set of expectations regarding when and how well their posts are being read. However, my hope is that the organizational context that I set up in the scenario (e.g., the teams, work relationships, and real work tasks) and the continuous real-time posts from other colleagues would create a rough simulation of such microblogging experience, so that participants’ reactions would approximate those in real world versions of similar settings.

Table 7-1. Simulated organizational setting for GroupBuzz study.

| The Global Stock Investment (GSI) Department in an International Banking company (25 colleagues composed of 5 teams) |
| Technology Sector Team | Tom (Manager), Joanna/John *(the participant, business analyst)*, James (Senior business analyst), Alice (Lead analyst), Tara (business analyst) |
| Service Sector Team | Mary (Manager), Dan, Chris, Tim |
| Material Sector Team | Marie (Manager), Jessica, Jack, David, Justin |
| Utilities Sector Team | Robert (Manager), Fai, Ilya, Cathy, Sam |
| Consumer Sector Team | Aaron (Manager), George, Nancy, Emily, Sonia, Larry |
Study procedures

In the scenario instructions (Appendix D: GroupBuzz Lab Study Materials), I explicitly asked participants to pretend to be a person who tries to stay on top of new microblog posts at work, so as to maintain an instant awareness of what's happening in the department. I walked each participant through the simulated organizational setting, their job role, key team members, and other teams in their department, followed by a brief demonstration of the GroupBuzz tools for basic posting and browsing, as well as the new features of interest. After giving receiving this general orientation, participants were asked to browse the existing microblogs posted by other colleagues for about 10 minutes. At this point I discussed with them what they had learned, to
ensure that they had obtained some understanding of what has been happening in their team and
the larger department.

In the second part of study, participants were given a task to research two IT companies’
stock value histories (highest and lowest values in the last 10 years), and work on a spreadsheet
provided (see Appendix D). Participants were asked to work on the task for 20 minutes and told
their work sheet will be evaluated of how much they have accomplished. During the 20-minute
period of the main business task, pre-prepared microblogs were posted in GroupBuzz on behalf of
the participant’s colleagues who were “working” behind the scene. In keeping with their overall
persona of someone who likes to stay up on colleagues’ posts, participants were asked during this
period to do their best to maintain awareness of the new posts. As an additional incentive, they
were told that I would quiz them about the posts afterwards. Again, I hoped that these orienting
instructions would situate participants in a persona and scenario of working while trying to stay
on top of new microblogs.

While participants worked on the web research and spreadsheet editing task, the
background activity (i.e., the simulated posts from colleagues) increased in frequency of new
posts. My expectation was that this would in turn increase their levels of annoyance, so that I
could observe how participants would reacted to the alerts and the new alert control features.
Interleaved with the other posts, several posts were specifically useful to the ongoing research
task. One included a useful website for researching company stock history posted by participant’s
team member “Alice”.

In addition to maintaining awareness of others’ posts, participants were asked to post at
least 3 microblogs while they were working on the spreadsheet task. They were told that these
posts could report anything they found interesting while they were performing the task, or make a
comment on their colleagues’ posts. At the end, I asked their perception of the microblogging
audience, on what they base this perception, and how this perception might have affected their own posting behavior.

A 1-hour lab study was conducted with 8 participants; all were IST graduate students, including 4 men and 4 women. Most of them (7 out of 8) reported prior microblogging experience with Twitter and Facebook. Participants were recruited through my personal connections and word-of-mouth. At the end of study, participants completed a brief survey (in Appendix D). The first part of survey posed several questions designed to test how well they were aware of microblogs posted by other “colleagues” during the study. The second part of survey presented 15 Likert-type ratings (on a scale from 1-7) that probed users’ experience of audience feedback and real-time microblog alerts with GroupBuzz during the study. As part of the set, I included 6 ratings to aimed at general perceptions about their microblogging experience, so as to get a sense of how well participants received the simulated environment. A short (about 10-15 minutes) semi-structured interview was conducted after the survey, so that I could gather more qualitative feedback about participants’ experience with the study and GroupBuzz in general, reactions to the new features, and suggestions for feature improvements. The post-task interview questions are also provided in Appendix D.

Study Results

General experience of the simulated work scenario

All participants worked through the scenario in a lab setting where a large (27-inch) screen was available for their use. Participants were encouraged to lay out the various windows needed for the task on system desktop freely, using whatever strategies they normally follow. About half of the participants kept GroupBuzz in a browser tab and open a new browser tab to
work the task (as shown in Figure 7-2), while others kept GroupBuzz window on the desktop and opened a new browser window to perform the required task (as shown in Figure 7-3).

In general, participants felt that the simulated scenario provoked a realistic feeling of doing work in a shared work environment. All participants made good progress in the main task (e.g., as indicated by their spreadsheet results), while also maintaining a good awareness of what was happening in the group (e.g., as indicated by correct answers to task validation questions at the start of the survey). In follow-up interviews, participants expressed that they felt quite engaged by the simulated scenario. The organization setting and GroupBuzz setup (e.g., teams, team members’ profile icons shown in the sidebar, the history of microblogs) helped to create the feeling of being one member of working group. Through their review of the existing microblogs at the beginning, participants came to know about events happening in the department, which helped to set a general context. Other factors that participants commonly mentioned included: working on a real task and looking for real data online; getting unexpected useful tips from colleague “Alice” in GroupBuzz while working on the task; frequent new posts by others made it feel like a real busy group; and being able to reply and share noteworthy information with others made them feel like they were part of this same group.

Furthermore, survey results (see Table 7-2) indicate that participants’ microblogging experience and consequences were similar to those described in our previous field study. Most of the participants felt that the microblogging mechanism in GroupBuzz was useful for sharing work activities and updates (averaged 5.63 in item 1). They felt that viewing the microblogs was helpful in maintaining an awareness of other team members’ work, as well as offering a good sense of what’s happening in the department in a work day (average of 5.25 in item 5, and 5.88 in item 12). The brevity of the microblog posts made them feel more likely to read and post (average 4.88 in item 3). These general results suggest that the lab study was a reasonable approximation
of a real organizational work setting, enough so that participants experienced similar workplace microblogging practice in GroupBuzz in the short period of the study.

Figure 7-2. Participants’ desktop layout (a) in GroupBuzz study.

Figure 7-3. Participants’ desktop layout (b) in GroupBuzz study.
User reaction to new features

Given the small size of this study, the numeric averages reported in Table 7-2 should be seen as qualitative indicators to be interpreted in concert with the informal interviews, not as measures of central tendency suitable for statistical analysis. The personal selection of participants using my own social network is another important condition working against generalizable results. Thus the interpretation that follows is qualitative in nature, even though I point to numerical results as measures of participants’ reactions – the rating results summarized in the table are useful primarily because they allow me to focus in on specific questions raised by the earlier analysis of scenarios and claims for the GroupBuzz system.

Most participants reported reasonable confidence that in general their posts will be read by others. Two survey items probed feelings about (1) immediate viewing of microblog posts (average 4.63 in item #7); and (2) whom might eventually view their posts (average 5.13 in item #8). Not surprisingly, the participants expressed more confidence that their contributions will be eventually read by others than that this process will be immediate.

However, the specific audience indicator features in the prototype tended not to be seen as very useful. Both ratings that probed these perceptions (13 and 14) had average values that are below the neutral value of 4. In follow-up interviews, some participants (4 out 8) reported that their perception of audience relied on the site visit summary information (i.e., the indication that 15/25 people visited 65 times) displayed in sidebar of GroupBuzz, which was one of the design goals. However many others simply assumed that the behavior of others in the department would be similar to the persona they had been given, and thus that everyone would be monitoring GroupBuzz while working.

These comments expose a weakness of the simulation; because they were not instructed otherwise, they made the simple assumption that colleagues are the same as them. It is possible
that if the lab study had been conducted over a longer period of time, or over multiple sessions, that a more accurate perception might have emerged. That is, the impact of the audience indicator functions might only be felt after some time of seeing it change and reflect the regular rhythms of this particular work environment. In a real situation, participants might start to question their assumption, and seek other indication and evidence of who is reading their posts.

Nonetheless, when asked specifically about this feature, most participants did agree that the audience visiting summary information should be a very useful feature if they were not sure who visits the site, to allow them to quickly gain understanding of audience size and how frequently the site is used. As to the site visit frequency histogram, participants suggested that it might be too much information and that they were not convinced that they need to know their audience visiting pattern in that detailed level. In other words, they would be satisfied to just know a general percentage of colleagues in department who visit the site frequently.
Another design feature in focus was the alert frequency control. Recall that the design problem was that people were bothered by frequent alerts of microblog posts that are not very interesting to them while still appreciating the serendipitous but valuable posts. In this simulated lab study, participants were easily able to differentiate valuable information (e.g., the 2 out of 20 posts that were directly relevant to their current task) from other less interesting microblogs (e.g., general news information). In fact, all of participants replied to the two posts with something akin to a “Thank you” comment. At the same time, most participants mentioned that the general news posts (e.g., stock related news information posted by Sam) were less interesting to them. One participant did find Sam’s posts very interesting, but as it turns out this participant is the only one who actively monitors the stock market on a daily basis.
The lab study successfully simulated the intended design scenario of users who become annoyed by less-interesting microblog alerts; the increase in microblog posting pace up to a rate of one per minute during the 20-minute task (about 5 times more frequent than what’s normally seen in our previous field study) was noticeable and had the desired effect. Survey results indicate that participants indeed felt annoyed by frequent alerts (rated 5.25 on average). During the main task, 6 out of 8 participants used the alert control feature and adjusted the alert frequency on “Sam” (the frequent news poster); the other 2 participants turned down alert frequency for the entire department network instead. Survey results also indicate that participants thought that having such a feature would be useful for managing posts at an individual level (5.38 on average). In the follow-up interviews, participants reported that alert control over individual microbloggers was quite useful, because they were able to mute or reduce alerts from a person who posted a lot “junk” news information, while still being able to monitor the rest of the department for valuable information. An interesting suggestion was to provide a sort of inverse operation, that is a control that muted alerts across the entire networks except for specific persons of interest or importance (e.g., their boss). Some also suggested using customized auditory tones for different users, so as to easily differentiate important ones.

With respect to the tone and volume of the auditory alert and title bar notification, participants had different reactions. The majority (6 out of 8) reported that the auditory alert was helpful to keep them aware of the amount of new microblogs being posted, while the blinking title bar provided a continuous visual cue of reminding about the new posts. However, there seemed to be differing levels of distraction due to the alert when focused focus on the task. For example, one participant reported that auditory alert “makes me jump”, while a second participant reported that he did not even notice the sound when he was focused on his task. Other participants suggested that an even softer tone might help to reduce their frustration level. This finding suggests that a system like this might provide different auditory tone options (e.g., soft sound, and
loud sound, maybe mapping different tones to different colleagues, etc.), so that users can customize their alert options based on how they prefer to keep track of new microblogs while working. All participants liked the feature of highlighting new posts when switching back to the GroupBuzz window; they felt it saved them time in deciding what to read first.

**Discussion**

In this chapter I described a simulated scenario method for conducting a usability evaluation of a group-based tool; the method leverages the SBD framework but goes beyond what has been done in the past. In many ways, this method can be seen as a variant of the “Wizard of Oz” paradigm, in which the experimenter simulates some not-yet-functional aspects of a user interface prototype (Francony, Kuijpers, & Polity, 1992). However unlike the normal Wizard of Oz situation, the GroupBuzz prototype was operational, and what needed to be simulated was the “apparent” activity of a large group of others engaged in the same environment. Although I used it for a specific case of an organization with subteams, messages posted, and so on, I expect that with enough planning, similar methods could be used to simulate a broad range of “collaborative” scenarios without the need to hire and train a large cadre of experimenter surrogates (or “confederates” as they are often called in social psychology experiments).

My discussions with participants seem to indicate that the workplace microblogging simulation was successful and allowed them to react in a meaningful way to the new design features envisioned through the SBD process. That is, I was able to situate participants in a simulated environment, through combination efforts of real group/team settings in GroupBuzz, role playing scripts, a real task to research real data, real-time interaction with others through microblog posts (e.g., unexpected useful tips posted by colleagues). At the same time, participants suggested that it would feel even more realistic if they had been using their own name instead of
the invented name for the scenario persona, and if the simulation could have included replies to their posts. In a word, I hope that the methods I used here can help to extend the boundary of formative lab evaluation methods, especially in the early design phases when one wants to gather valuable user feedback but conducting naturalistic field study is not feasible.

As a result of the small user study, I can draw several tentative conclusions. I found that the person-based alert control was an easy and useful mechanism for users to adjust alert frequency while still being able to keep track of new microblog posts; there may be individual differences in how much effort people are willing to make for such benefits (e.g., some participants chose to mute the entire network rather than just the “offending” individual). The blinking title provided a complimentary continuous visual cue helpful to remind users about the availability of new posts. Participants’ reactions also suggest that the system should probably provide options among various auditory tones and volumes, so that users can choose based on their individual preference. For the most part, the audience summary information was useful for providing an estimation basis for audience size and visiting frequency, but the visit frequency histogram and user list were perceived to be at too detailed level to be useful.

This small user study is clearly only a first step in evaluating these novel concepts for microblogging tools. I did not collect data over a long period of time or from a large population of users. Nonetheless even this small study had yielded a set of valuable findings for future iterations of GroupBuzz (or similar microblog tools), and points to suggestions for iterating the design scenarios and associated claim analyses.
Chapter 8
Contributions and Future Work

Main Contributions

The contributions of the dissertation reported here were of several sorts, corresponding to the different phases of the exploratory research project. Some of these were conceptual in nature, some were empirical findings, and others concerned design reasoning and prototype development. In the following sections I summarize briefly these contributions, and follow that with a more open-ended discussion of directions for future work.

A conceptual framework of informal workplace communication

First, a conceptual framework was offered in the dissertation for understanding and studying informal communication in the workplace. Though there have been a variety of previous research efforts studying informal communication in the workplace, there was still no useful conceptual definition of informal communication in these settings. Thus I began by providing a working conceptual definition of informal workplace communication that drew from classic communication theory (Lasswell, 1948). I unpacked the problem space into four basic elements – subjects (colleagues), content (exchanging work/life activity updates and whereabouts), media (opportunistic catching conversations), and effects (e.g., better information sharing, more efficient work communication and collaboration). Prior research had focused more on how to stimulate opportunistic conversations prompted near water coolers. By laying out the basic elements of informal workplace communication, I hope the conceptual framework can help us understand better what informal communication activity involves. By so doing, the framework
should help researchers to investigate not only how computer-supported communication technologies might mediate such opportunistic conversations but also the actual content exchanged among colleagues, content that in turn can lead to the many sorts of beneficial effects that have been anticipated by prior research.

Furthermore, drawing on prior research on informal workplace communication, I organized prospective benefits as informational and social impacts. By incorporating social psychology and communication theories, I discussed how content exchanged in informal catching up conversation among colleagues may lead to the beneficial effects anticipated by prior research. Informationally, by exchanging recent life/work activity updates with each other, colleagues would have opportunities to exchange information (e.g., news, knowledge, expertise, ideas) that they usually will not gain through other more formal communication channels in daily work activities. In turn, valuable information might be obtained “serendipitously” for one’s own work interests or goals, and further conversations and collaboration activities (e.g., ideas/expertise sharing) be prompted around subjects’ interests. Socially, being aware of each other’s work/life activity updates and personal whereabouts would enable colleagues to know each other’s work better, develop and maintain a common ground that can lead to efficient work communication (e.g., meetings) in future. Emotionally, over time, an improved awareness of what’s happening would help people to develop a feeling of being connected with colleagues and others in one’s organization, which would furthermore lead to readiness of communication and efficient collaboration among colleagues. I hope the conceptual framework proposed can not only help better understand what informal workplace communication is, but also be useful for guiding the study of how computer mediated communication technologies could mediate the sort of content exchanged through classic opportunistic informal catching up conversations, so as to lead to the anticipated beneficial consequences for research work in future.
Microblogging characteristics in general

The first interview study of how people microblog in Twitter (Zhao & Rosson, 2009) was one of first published studies aimed at understanding the social behavior of microblogging. The paper has been cited over 290 times by other researchers in the field, and contributes to the foundation of microblogging research in the multiple disciplines of computer science, communication, education and other social science research fields. In the study, we uncovered unique content and technology characteristics of microblogging phenomenon on Twitter that help us to understand why and how people microblog in the social world.

From a reader’s view, 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. Microblogs tend to convey timely information about what users are doing, reading, thinking, and experiencing in real time, which were considered by our informants as more interesting and valuable than information obtained through other media and prompting opportunistic follow-up communication. The concept of a “people-based RSS feed” was another content characteristic described by our participants; they were able to get trustworthy and useful information from people who they know personally.

From a poster’s perspective, microblog’s broadcast and voluntary readership nature, somewhat like the blogging activity described by Nardi, enabled our informants (reduced cognitive threshold) to share life/work activities, events, other whereabouts and opinions of one’s personal interests with the “world”, which they don’t usually bother to send through traditional CMC media (e.g., email, IM, phone). In addition, the enforced message brevity and access mobility characteristics were found useful for further reducing our informants’ cost of sharing and promoting more frequent updates in real-time than blogging.
In the Twitter study, some preliminary findings of microblogging’s impact on informal workplace communication were also identified under guidance of the proposed conceptual framework. Our informants reported that they were able to explore valuable information relevant to work by monitoring other colleagues Twitter feeds and socially get to know colleagues better as a person besides working relationship and feel more connected with each other. Due to the public setting on Twitter, informants were also cautious of posting work related information. In a word, this exploratory study offered initial understandings of microblogging behavior in social world, and provided a basis for the further investigation of microblogging impact on informal workplace communication later on.

**Primary findings of microblogging impacts on informal workplace communication**

The second field study (Zhao D., Rosson, Matthews, & Moran, 2011) reviewed a Yammer use case across teams inside a research department of a large international IT company, further exploring microblogging’s impact on informal communication in workplace settings. I learned that participants were primarily sharing personal work activity related updates (e.g., problem they are trying to solve, small tasks/milestones they have just accomplished, and early ideas and thoughts). Such personal whereabouts information was perceived as less critical than those they would normally send via email around IM, and thus as content but they usually would not share in a workplace setting. They felt more comfortable to share such personal whereabouts information in microblogs, because it is a personal broadcasting channel and participants do not have to worry too much about being intrusive relative to sending email or IM messages.

The brevity feature of microblogs also helped reduce cost of updating as opposed to composing an email with details. Participants reported that when prompted to share with others while things were happening and work was being carried out, they found themselves able to post
a snippet quickly and easily. To some extent, this confirmed that the early findings of microblogging’s basic content and technology characteristics also apply in work settings.

Because microblogging enabled the more frequent exchange of personal work activity updates/events among colleagues, both within and across working teams, the activity seemed to provide a complementary channel for informal communication; it seemed to fill a niche that was in-between other forms of communication at work. The main findings indicate that microblogging did lead to the anticipated beneficial consequences of informal communication among colleagues both within and beyond one’s daily working teams. (1) Among team members, microblogging of personal work activity updates (e.g., problem one’s solving, a task just completed, and ideas/thoughts in early stage) helped initiate timely conversations as work in progress, uncover potential issues early on, prompt more opportunities for expertise sharing and exchanging feedback to each other’s work. (2) More granular low-level individual work activity updates in-between team meetings helped develop common ground about each other’s work progress, and provided a better context for more efficient communication at meetings. (3) Monitoring other team member’s stream of work/social activity updates helped colleagues to know more about each other and their work, so that they felt more willing to listen and communicate with each other in work-related communication later on. (4) Among colleagues outside of each other’s daily working contacts, participants reported that they were better aware of what other project teams have been doing; learning experience from others with similar technical background; and getting useful inputs from outside the teams. (5) Emotionally, participants reported that microblogs helped create a richer online presence of colleagues and strengthen a feeling of being connected, especially with remote others, and the whole functional group and organization.
A novel microblogging tool - GroupBuzz

Besides noting the positive effects of microblogging, I also reviewed problems and
downsides in the current microblogging system that could be potentially addressed to better
support informal communication at work. Using a scenario-based design approach, I analyzed
existing uses of microblog tools and envisioned a set of features that might improve users’
experience. More specifically, I proposed and designed an audience size and readership pattern
indicator to help users to build a more accurate perception of their actual audience size and
reading frequency; this is to address the field study result showing that audience size and usage
frequency estimations tend to be based on the few people who tend to be often posting in the
microblogging network. I expect that a more accurate audience perception could help to sustain
users’ posting behavior.

Another novel feature design was a user-controlled notification setting for new posts.
The aim is to enable users to adjust the microblog alerting frequency at any time easily through a
button click, and to tune individual microbloggers up or down as part of this. Together with other
lightweight notification features (e.g., a softer alert sound, and a peripheral visual update), I
hoped that this new alerting system will fulfill users’ needs for staying on top of new posts but at
the same time keep interruption at a comfortable level; and, if notifications become annoying,
users will now have an option to make an adjustment rather turning it off.

A novel scenario simulation based evaluation method

I described a simulated scenario method for conducting a usability evaluation of a group-
based tool; the method leverages the SBD framework but goes beyond what has been done in the
past. In many ways, this method can be seen as a variant of the “Wizard of Oz” paradigm. Unlike
a normal Wizard of Oz situation (e.g., using a paper-based story-board to simulate a functional software user interfaces), what needed to be simulated was the microblogging experience with a large group of others engaged in the same working environment. Based on participants’ reaction, the lab study seemed to be successful in situating participants in a simulated environment, through combination efforts of real group/team settings in GroupBuzz, role playing scripts, a real task with real data, and real-time interaction with other simulated colleagues through microblog posts (e.g., unexpected useful tips posted by colleagues).

At the same time, participants suggested that the work simulation would feel even more realistic if they had been using their own name instead of the invented name for the scenario persona, and if the simulation could have included replies to their posts. In a word, I hope that the methods I used here can help to extend the boundary of formative lab evaluation methods, especially in the early design phases when one wants to gather valuable user feedback prior to the point when conducting a naturalistic field study becomes feasible.

As a result of the small user study, I found that the person-based alert control feature was an easy and useful mechanism for users to adjust alert frequency while still being able to keep track of new microblog posts; there may be individual differences in how much effort people are willing to make for such benefits (e.g., some participants chose to mute the entire network rather than just the “offending” individual). Participants’ reactions also suggest that the system should probably provide options among various auditory tones and volumes, so that users can choose based on their individual preference. The audience summary information was useful for providing an estimation basis for audience size and visiting frequency, but the visit frequency histogram and user list were perceived to be at too detailed level to be useful.
Future Research Directions

In this dissertation, I explored how microblogging might lead to informal communication benefits at work, using the qualitative research methods of a field study and interview study. Through these efforts, I learned that microblog’s characteristics of broadcast and voluntary readership, brevity, and mobility can enable people to frequently share personal work/life activity updates, in turn which leads to informational and social benefits as anticipated through opportunistic catching up conversations. However, a set of interesting research questions remain concerning how to measure the extent to which whereabouts information exchanged through microblogging at work will lead to various benefits. I hope the conceptual framework and qualitative findings in the dissertation can help guide further quantitative investigation research in future.

For example, from an informational perspective, it would be interesting to know what types of microblogs would be perceived as more valuable than others by users; how frequent users receive such valuable microblogs in microblogging practice at work in comparison to from other communication media; and what design efforts can be taken to prompt users exchange more of such valuable information. From a social impact standpoint, a longitudinal controlled study might be conducted to further investigate to what extent microblogging can affect various social consequences – person perception development of other colleagues, common ground development with each other, and a feeling of being connected to each other.

From an iterative design perspective, the scenario-based user study is clearly only a first step in evaluating these novel concepts for microblogging tools. I did not collect data over a long period of time or from a large population of users. The small study yielded a set of valuable findings for future iterations of GroupBuzz (or similar microblog tools), and points to suggestions for iterating the design scenarios and associated claim analyses. For example, providing
customized auditory alert sounds might address differences in individual needs for a buzzer or an even softer sound. Monitoring team members’ project related work activity updates can help obtain a better understanding of where colleagues are in their current work, and allow efficient communication in team meetings and collaborations.

It would also be interesting to analyze how to improve microblogging systems to further support project status awareness in-between team meetings. For example, individual project tasks might be imported to a team’s microblogging space, perhaps to prompt employees to post task-relevant microblogs. Another challenge is how to foster focused groups and targeted audiences, while at same time facilitating sensemaking of group-specific contextual posts. Some of our participants suggested that a mechanism for providing a high-level summary of project status information could be helpful in setting the scene for outsiders. However this remains as an open question, namely what and how much information would be meaningful and helpful in making sense of the contextual posts.

A key challenge is how to guide adoption of microblogging in organizations, so that a culture of microblogging is fostered and sustained. One factor that seemed to encourage participants to frequently share personal work-related updates in the field study was the “audience relevance” of this controlled and relatively small microblogging network. Some participants reported that the microblogging network within the functional department created a focused, easy-to-understand audience whom share a general work context and interests. Therefore, they felt more comfortable to post things happening in their daily work activities, in contrast to when using a company-wide social networking site, they were concerned of whether they should post their personal small little things in daily work activities, or just share general content like news that might be interesting to the general audience. That probably, to some extent, explains why people are not found posting frequently in corporate-wide microblogging network as reported in
other research work (Zhang, Qu, Cody, & Wu, 2010; Ehrlich & Shami, 2010; Riemer, Richter, & Bohringer, 2010). Actually, a similar pattern was also found in my field study that participants tended to make more general posts as the audience changed from their teams to the whole functional group. However, in the field study, participants posted frequently in both teams and the functional group network (posted were divided as half and half). A functional group might be at just the right organizational level, such that members still feel comfortable forming microblogs that they think will be interesting to the audience, based on their daily work activities. This possibility however would still need further empirical study and verification.
References


Muller, M., Shami, N., Millen, D., & Feinberg, J. (2010). We are all lurkers: consuming behaviors among authors and readers in an enterprise file-sharing service. *Proceedings of the 16th ACM international conference on Supporting Group*.


Appendix A: Twitter Study – Interview Question Guide

Background questions

• Job title and role
• How often do you update in twitter
• How often do you check twitter
• How many people do you have subscribe to you
• Types of your subscribers
• How many people do you subscribe to
• Types of people you subscribe to
• What Twitter tools do you use often
• The main reason using twitter for
• How do you stay in touch with people?
• How do you stay in touch with work-related information
• Rate your expertise in technology in 1 to 10 scale.

Questions to understand why and how people use Twitter

For producing act:

• Why/what do you tweet for (purpose)?
• What do you tweet about? (content)
• Whom do you tweet with?
• When and in what condition do you usually tweet (time, place)?
• How do your followers find you, and why they follow you?
• How do you know your audience read or pay attention to your tweets?
• How do you interact with your followers (media, for what)?
• Consequential interaction: (conversation through other media, joint-activities?)
• What do you get from microblogging? (Emotionally and functionally)
• Thought on use of other communication media as compared to twitter.

For consuming/following act:
• Who do you follow and why, and how do you classify them (friends?)
• How do you find those people (various ways?)?
• What type tweets do you usually get and what do you do with them then?
• Do you interact with people whom you follow (commenting and other media?) when, why and how?
• What habits do you follow to keep with others' tweets?
• Do you feel overwhelmed by the amount of information available through tweets?
• What do you get from following others and reading their tweets (emotionally and functionally)

Questions to gain people's thoughts about twittering at work
• What types of contents would you update at workplace?
• What types of microblogs would you like to see from others at work?
• Who would you like to follow at work?
• How do you think twitter at work will be different from at social?
• Do you think microblog at work will have some impacts for your collaborative work, and How?
• What other concerns do you have about microblog at work?
• What additional features would you need to support microblog at work?
Appendix B: Yammer Study Materials

Interview Question Guide

1. Overall

1.1 Overall, what is your impression of Yammer after using it for five weeks?

1.2 For you, what have been some of the more useful benefits of using Yammer?

1.3 For you, what are some of the drawbacks of using Yammer?

2. Logistics of checking Yammer

2.1 What tools do you use to check Yammer? (E.g., Web UI, YammerFox)

2.2 How often do you check Yammer and how does it fit into the rest of your work? (E.g., do you check it in between every task, just in the morning, etc.)

2.3 What content do you normally read when you check Yammer? (E.g., my feed, all feed, a particular group, etc.)

3. All colleagues

Next I’d like to discuss the content being posted. For this, it might be useful if you referred to Yammer for examples. There are two types of places that posts can go – to project groups or to all colleagues. I’d like to talk about each of these separately.

3.1 First, let’s talk about posts to all colleagues. Can you describe what types of items you post to all of your colleagues? (After the answer, follow up with why.)

3.2 Ok, now that I understand what you post, can you describe the types of things other people post to all colleagues that you find particularly interesting or useful? (After the answer, follow up with why.)

3.3 What types of things that other people post to all colleagues do you find NOT useful?
3.4 Overall do you feel like you’re learning new things about your colleagues and what they’re working on due to Yammer?

4. **Your Groups**

Now, I’d like to talk about posts to project groups. Let’s talk about [insert project name] as a concrete example. 4.1 Can you describe what types of items you post to [insert project name]? (After the answer, follow up with why.)

4.2 What is your impression of who is reading those things and whether they might find them useful?

4.3 Do you post the same types of things to your other project groups, or are they different in some way?

4.4 Ok, now that I understand what you post to [insert project name], can you describe for me the types of things other people post there that you find particularly interesting or useful? (After the answer, follow up with why.)

4.5 What types of things that other people post to [insert project name] do you find NOT useful?

4.6 Overall, do you feel like your awareness of project status is improved due to Yammer?

5. **Other Groups**

Next I’d like to talk about other project groups that you are not working on directly, but that you might be interested in.

5.1 Are you following any groups like that on Yammer? What’s your general impression of reading other groups’ posts (If no, skip.)

5.2 Overall, what do you get out of following these other groups on Yammer?
5.3. Have you ever posted to other groups and what types of information did you post? And Why?

6. **Comparison with others tools**

Now I’d like to shift to comparing the way you use & the information you get on Yammer with other tools.

6.1 What are the differences between Yammer and email?

6.2 What are the differences between Yammer and IM, again in terms of the way you use it and the info you get?

6.3 What are the differences between Yammer and meetings, again in terms of the info you get?

6.4 Do you use Twitter? (If no, skip.) What are the differences between Yammer and Twitter, again in terms of the way you use it and the info you get?

7. **Wrap Up & Desires**

I’d like to wrap up with some final questions about where you’d like to see tools like Yammer go in the future.

7.1 First of all, are there any higher-level things you’d like to see improved about Yammer or the way people are interacting there?

7.2 Right now, you check the Yammer [insert tool, e.g., Web UI]. If Yammer posts could show up anywhere (email, a shared project space, etc.) where would be the most useful place to show them? (Probe: How might Yammer fit in better with your other tools?)

7.3 Do you have any other comments, questions, or suggestions for us before I wrap up?
## Appendix C: Yammer Study – Complete Interview Coding Themes

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost</strong></td>
<td></td>
<td></td>
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<tr>
<td>(1) Social-Psych Cost</td>
<td>(1.1) Audience Relevance</td>
<td>Comments relating to the audience for their microblogs and whether/how this set of people would want to read the blog content and what their reactions might be.</td>
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<td></td>
<td>(1.1.1) Audience focus</td>
<td>Mentions of how project groups or functional groups provide a predictable audience base relevant to their daily work life and activity, which help them form things to share. May include comparisons between project teams, functional groups, and other microblogging systems, such as Twitter, Facebook Status, and Lotus Connections.</td>
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<td></td>
<td>(1.1.2) Audience feedback</td>
<td>Observations, expectations about, or wishful thinking related to feedback from people who read the blogs. This may reflect concern, e.g. uncertainty about who reads and how they react, or perceived success, e.g. a reply that indicates a blog was read and seen as useful.</td>
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<td>(1.2) Perceived recipient’s cost</td>
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<td>“I am scared to post on Twitter, because I don’t know who is following me, you know, what’s the audience … it’s hard for me to see what these people are interested in. Whereas having this as an isolated eco system (in the study) has made it very easy for me to tell my audience what I am going to accomplish.” “The question I have for my investment of doing that. Does it matter? Does anybody care any of it? I don’t know. And if someone said it’s good, I will do it again, otherwise, I might just stop.”</td>
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**Notes:**
- (1) Cost
- (1.1) Audience Relevance
- (1.1.1) Audience focus
- (1.1.2) Audience feedback
- (1.2) Perceived recipient’s cost
<p>| (1.2.1) Less directive | Broadcasting to a blog audience is less directed and thus creates less of a communication demand for receivers | “… Since with Yammer I was just posting it to the [project group], I am not requiring anybody to answer. So it makes me more willing to mention the problem I am having. Just in case somebody has an answer. Normally I just wouldn’t say anything, because I wouldn’t want to bother” |
| (1.2.2) Less interruptive (time pressure) | “If I post at Sametime to [a team member], asking him a question, it means I need an answer. You know, he can’t just ignore it. He basically has to deal with it. It would be very rude if I did that …” |
| (2) Task costs | (2.1) Posting cost | Comments related to costs of posting/sharing information on microblogs |
| (2.1.1) Audience size | The broadcasting paradigm makes it easy to share information with many people using a single post | “There is a potential of reaching a lot of people. Like, if I send an email of status updates, I select the group that would really go to look at this. But maybe, like [a outside member] is interested in the projects, but he is not actually involved, so I wouldn’t include him” |
| (2.1.2) Compose time | The short form of microblogs minimizes the time required to share a piece of information | “So I thought it’s sort of in between too interruptive like IM and too much time to construct like email. Some people just shot to me short emails, but typical users from my experience spending more time on writing emails than Yammer posts.” |
| (2.2) Consume cost | (2.2.1) Voluntary readership | The less directive/mandatory readership on microblog reduces the cognitive cost of viewing, as it is easy to scan and skip over stuff |</p>
<table>
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<tr>
<th>(2.2.2) Tradeoff: timeliness vs. interruption</th>
<th>Comments related to struggle between wanting to stay on top of what’s happening and annoyance with frequent notifications</th>
<th>“Sometimes it’s a little distracting, I think. So on one hand I really want to post info to it and I really want to be reading it as all the information come in, but then that becomes too distracting for me. I have to turn it off.”</th>
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<tr>
<td>(2.2.3) Managing who you follow</td>
<td>There was an extra cost and confusion related to the following mechanism built into the study (note that this sounds like an artifact)</td>
<td>“I wish I could say, by default if new people join, I want to follow them, and if I found somebody is really annoy, then I would be able to remove them, instead of adding people individually.”</td>
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<td>(2.2.4) Over-specificity of content</td>
<td>Some project-related posts rely too much on prior knowledge or are too low-level to be understandable or interesting to broad audience</td>
<td>“That makes me less interested to follow other groups. If there were more high level interaction in the group, then I am who is outside the group can easily understand and capture what is their plan, their thinking, things like that right, that might benefit me”</td>
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### Benefits

<table>
<thead>
<tr>
<th>(3) Informational Benefits</th>
<th>(3.1) Prompting more information exchange</th>
<th>(3.1.1) Timely feedback and exchange</th>
<th>Microblog supports timely coordination, discussion and feedback through the general practice of updates.</th>
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<td>“… So this back and forth [on Yammer] with [Aaron] has been more frequently than once a week and it’s actually before you check code in, which I would hope saves you time, because once you check it in it’s a pain to go back and change it, you’ve already decided on strategy…”</td>
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<td>(3.1.2) Learning from other projects’ post</td>
<td>Gaining a broad range of experience, ideas, expert knowledge, and possible connections by reading other project group’s posts</td>
<td>“It is interesting to hear their day-to-day conversations about how they dealing with bugs in different versions of browsers and how they make their code to work with them. That gives me a sense of how tightly couple they are with browser technology and what’s problem in browser that I would hit if I write an extension, which I do from time to time.”</td>
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<tr>
<td>Section</td>
<td>Topic</td>
<td>Details</td>
<td>Comments</td>
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<td>(3.1.3)</td>
<td>Provoking cross project interaction</td>
<td>Mentions of offering feedback or comments to other projects after reading their posts</td>
<td>“I get a lot from [a core team member] on [a project], which is a project I’m somewhat aware of… but from him I get, ‘OK, I made the background white today. There’s a new update, here’s the link.’ And I follow it… I can see it right away… I was able to have a conversation with [the project lead] about that later that day, which otherwise, I would have missed that conversation. I wouldn’t have been a part of it.”</td>
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<td>(3.2)</td>
<td>Improved Awareness</td>
<td>(3.2.1) Increased general awareness</td>
<td>Getting access to more information about others and as a result staying more aware of not only what team members are doing but also other colleagues in the functional group</td>
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<td>(3.2.2)</td>
<td>Improved social presence awareness</td>
<td>Gathering more contextual awareness information about a person’s current busy/idle status than otherwise available (e.g., IM icons)</td>
<td>“So there is times where, like, I noticed [a team member] you know he is like a machine, he is the pope. He is doing all these things. And I have all these small little projects which I could use the help from a developer. And I thought, oh, maybe, he would like to take a rest, you know, something different. Because it would take him you know like a few hours to do this and maybe he is excited about it. So I can kind of see he said I finally did something, you know its working, and I was like “oh okay maybe he has a few moments to help me out now.”</td>
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<tr>
<td>(3.3)</td>
<td>Regular microblogging sets up</td>
<td>(3.3.1)</td>
<td>“I get more frequent and detailed…</td>
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<tr>
<td>Context about team project</td>
<td>More efficient communication at team meeting</td>
<td>A better context to understand what others are talking about at a FTF meeting; and make communication at meeting and the meeting itself more efficient.</td>
<td>Updates from Yammer than I would from a meeting. It also helps when I’m going into the meeting, if I have that context, I don’t have to sit there and try to level-set with everybody to try and understand where they are with the things they agreed to work on in the last meeting… I think it makes the meetings much more effective… You can get past ‘here’s what I did’ and get straight to, ‘here’s the problem I had’ and start brainstorming what to do next to try and work around them.”</td>
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<td>(4) Social emotional benefits</td>
<td>(4.1) Person perception</td>
<td>(4.1.1) Ability to to learn about the person as an individual, especially those they rarely communicate with, or who have different technical interests and backgrounds</td>
<td>“I get to know other people otherwise wouldn’t know. Like I read more about [a colleague] on Yammer, you know otherwise, the most context I had with her was Tea Time. And I now know a little more about [another colleague], that’s quite different than what I’ve got in the other way. I can count that in the good category.”</td>
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<td>(4.1.2) Social grounding for conversation</td>
<td>Users mentioned that knowing one’s recent activity updates allow them to get conversation started easily.</td>
<td>“And I am a friend of Tessa, and someway friendly with Clemens. So you know, seeing what they were working on certainly provides me with context if I got to talk to them in some meeting. That awareness helps me quickly connect with them socially to a comfort level for that discussion to be more productive.”</td>
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<td>(4.2) Connectedness</td>
<td>Increased awareness of colleagues’ activities makes them feel more connected to others in their project as well as in the functional group</td>
<td>“I feel tremendously more connected to especially folks in my immediate department, where I get a sense of what they are working on in more regular basis than I would normally. If I were local, I would get it from hallway talk or occasionally lunches or things like that. Those things just don’t happen when you are remote … “</td>
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Appendix D: GroupBuzz Lab Study Materials

GroupBuzz study - participant script

Introduction
During the next hour, you will be first introduced to an experimental Microblogging tool called GroupBuzz that has been designed to support communication and collaboration within teams and larger work groups. Then, you will perform a simulated business task using GroupBuzz. For this experiment I have simulated a business working environment, with microblog messages posted by other people in your team and as well as your larger organization. You will be able browse microblogs posted by others and post new microblogs, so that you can stay in touch with your simulated colleagues and their activities.

Instruction
Before beginning the business task, please read the following persona. It will introduce you to the business professional whom you will pretend to be in the study. The task itself will last for about 25 minutes. Your primary job is to complete the business task; an important secondary task is to use GroupBuzz to keep in touch with your colleagues.

You are Joanna, a Business Analyst in a large international banking company. Your department is a financial investment group responsible for the overall company’s global stock investment strategy. Your group has 25 people working in different sites around the world, including New York, London, Hong Kong, and Tokyo. On a day-to-day basis, you work closely with the Technology team, which includes six people who track and make recommendations regarding the technology industry sector. You and Tom (your manager) work in the New York office, with a focus on markets in North America. James and Alice are at London office, and Tara is at Hong Kong office focusing on both Europe and the Asian Pacific markets. Four other teams in the department are responsible for other industry sectors including Services, Utilities, Materials, and Consumer Goods.

You are a person likes to stay in touch with people in your team and larger organization.
Tom has asked your team to use GroupBuzz to communicate with each other more often, so that everyone will be kept in the loop of what’s happening about team goals and activities, as well as sharing timely information and feedback among each other’s work. You also use GroupBuzz as the primary communication medium for information sharing in your larger group; most employees use it to post work activities, work-related information/news, as well as social or general interest items.

**Task Description: Working on a research task while attending to incoming microblogs**

Your business task is to investigate Cisco and Google’s business performance in the last 10 years. You will deliver a spreadsheet (provided) that lists the following items for each year starting in 2001: highest stock value, lowest stock value, annual revenue, and number of acquisitions for each of these two companies. The spreadsheet will help the company on investment decision-making. Your team member Tara will be working on a similar task project but will be investigating other technology companies; a few employees in the larger group are also helping with this profile.

While working on the task, listen for the GroupBuzz new-post alert, to help you stay aware of things that are happening in the group. You may also find some posts that have information useful for your work task. At the end of the task, we will examine the quantity and quality of the industry research you do (i.e., the spreadsheet contents) as well as probing your awareness of what’s been happening in your team and department while you’ve been working.

You should also post at least 3 messages while you are working on the task, to share with others what you find useful or interesting (e.g., a website you find particularly useful, an interesting finding or idea), and keep others in the loop of your work progress (e.g., small steps you just accomplished, problems and roadblocks you encounter).
GroupBuzz study - Auto-posted microblogs during the study

(1) Tom: “in the global strategy 2011 meeting, a VP is presenting 2012 top 10 potential IPOs in high tech”

(2) Alice: a great way to search company acquisitions “wiki + acquisition + company name”.

(3) Tom: “great chat with a manager from Singapore. Looking forward to collaborating with folks in South Asia”


(5) Sam: Oil declines, wiping out 2011 gains as U.S. economy stalls, article

(6) Marie: @Tom Great! Tell me more! Our Materials team is also looking to get more involved in the Asian market.

(7) Jack: 5 meetings, 3 presentations, closing down for the day. Very tired!

(8) Sam: @Jack, absolutely - go have some beer, buddy!

(9) Alice: done with the day. Good morning to the US gang!

(10) Sam: Audi A6 hybrid coming in 2012. Luxury auto makers are starting the transition to alternative energy

(11) Sam: Gas prices steady despite weak demand, oil price decline, link

(12) Sam: What a productive day!

(13) Sam: Oil industry done! Moving on to alternative energy ...

(14) Sam: California solar development wins $77 million contract

(15) Sam: Another solar energy company IPO for 2012. First Solar’s earnings IPO preview: panel pricing & profitability in focus. Nasdaq review

(16) Tom: @Marie, sure, let’s talk about it offline in the next couple days.

(17) Dan: post-lunch walk with the Consumer team, not as sleepy as usual.

(18) Tom: Facebook is losing users, Pre-IPO market price goes down. First year college students get away from Facebook for MyYearBook.

(19) Dan: @Tom, that’s what I heard too from my cousin in grade 11.

(20) Tom: A great day at global strategy 2011 meeting, met folks from global offices, can’t wait to share with you guys.
GroupBuzz Study - Survey questionnaire

Questions testing participant’s awareness of what’s been happening in GroupBuzz
1. What has your manager Tom been doing today? (briefly)
2. What has Sam from the Utilities team been posting about? (briefly)
3. Did you find any of the microposts to be useful for you? If so, can you remember who posted and what they said?

7-scale questions (from 1=Strongly Disagree to 7=Strongly Agree)
1. Regular microblog posts to my department are a good mechanism for sharing work activity status. _____
2. Microblog posts from my team help me to coordinate my ongoing work tasks. _____
3. The content in a microblog post is too minimal to be useful. _____
4. I am more likely to read and submit microposts because they are so brief. _____
5. Viewing microblog posts from just my (or some other) team helps to focus my awareness. _____
6. The microblog posts from people outside my team are more distracting than helpful. _____
7. When I post my own microblog, I have a good sense of who might view it right away. _____
8. When I post my own microblog, I have a good sense of who might view it eventually. _____
9. The auditory alert notifying me of a new microblog post was annoying. _____
10. The auditory alert notifying me of a new microblog post helped me track others’ activities. _____
11. I found it useful to “turn down” the auditory new-post alert for specific individuals. _____
12. The GroupBuzz system gives me a general sense of how things are going in work day. _____
13. The summary information about use of the system was useful in tracking activity. _____
14. The visit frequency histogram was useful in tracking levels of group activity. _____
**GroupBuzz study - Interview question guide**

*Alert feature questions*

1. What was your reaction to the auditory alert for new microblog posts?
   a. (Follow up as needed) E.g., did you notice it? Did you find it useful as a notification? In what ways did you find it not useful or irritating?
2. Recall GroupBuzz allows you to adjust the frequency of the new-post alerts, either for a group or for an individual. Did you use this feature and if so how? What do you think about this option?
3. In addition to the auditory alert, GroupBuzz flashes its title bar when a new post is received. Did you notice this? If so, what did you think about it?
4. Can you suggest any other feature to help manage new-post notification?

*Audience indication feature questions*

5. Think back to the messages you posted during the task. How many people in the system do you think might have viewed them? What’s that estimate based on?
6. Can you remember what activity information was provided on the right? How often did you pay attention to this information? What caused you to do this?
7. Part of the activity information was a histogram of posts made at differing times during the day. What do you remember about that graph? Was it useful and if so how?
8. In general, how did the activity information influence your thoughts of activity intensity (how many people and how often people visit) in the GroupBuzz?
9. Can you suggest any other way to convey this sort of audience feedback for people who broadcast and share information in GroupBuzz?

*Background questions*

10. How often do you use microblog services such as Twitter, Facebook Status?
11. How often do you use more general blogging services?
12. What sorts of experience do you have working in small teams where you need to stay abreast of others’ progress? What techniques or strategies do you use for managing awareness?
13. Many software systems provide auditory or visual notifications when status changes. Can you think of any systems that you use commonly that provide such information? Are they effective and if so why?

*Open discussion*

14. What’s your general impression and opinion of microblogging at work? And more specifically of the GroupBuzz prototype?
VITA
Dejin Zhao

EDUCATION

MS, Computer Science at University of Auckland, New Zealand, Mar. 2002 ~ May 2005
BS, Computer Science at Beijing Institute of Technology, China, Sept. 1997 ~ July 2001

WORK EXPERIENCE

Senior Software Engineer at eBay, San Jose, CA (Aug. 2011 ~ present)
Graduate Researcher at HCI Center, Pennsylvania State University, University Park, PA (Aug. 2005 ~ Dec. 2010)
Research Intern at IBM Research – Almaden, San Jose, CA (May 2009 ~ Aug. 2009)
Intern at Cisco Webex, San Jose, CA (May 2008 ~ Aug. 2008)
Research Assistant at Software Engineering Research Center, University of Auckland, New Zealand (May 2004 ~ May 2005)

SELECTED PUBLICATIONS