'Today' Messages: Lightweight Support for Small Group Awareness via Email

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Abstract

'Today' messages are short status emails sent daily by members of a project team. We present the results of a field study of the use of 'today' messages by six small work groups over six weeks. The evaluation focuses on the benefits and costs of daily email messages, their effect on group work practice, and a careful investigation using Value Sensitive Design of the effect on human values such as privacy, accountability, and trust. We found that using 'today' messages resulted in a range of group benefits at low cost, particularly in enhancing group awareness. Contrary to our initial expectations, group members did not have significant privacy or accountability concerns with 'today' messages. We conclude with a discussion of the technical implications of our study for systems and practices that support group awareness, communication, and coordination.

1. Introduction

The challenge and importance of supporting shared awareness and coordination among work group members has long been recognized. Researchers have experimented with a wide variety of approaches, including images and audio [7], tools for peripheral awareness [5], electronic versions of in/out boards [20], and the study of work rhythms [1]. Instant messaging has also become increasingly important as a technique for quick, informal coordination in the workplace [13].

In our laboratory, we use short daily status emails, 'today' messages, to avoid the need for status updates at face-to-face meetings. At the end of the day, each person sends a short email to the group explaining what he or she did that day. 'Today' messages normally have "today" as their subject line, and start "Today I" followed by a bulleted list. Figure 1 shows three examples of 'today' messages. Most messages are fairly short, and each person has an individual style that determines how much detail and personal information to include.

'Today' messages represent an interesting point in the space of possible tools to support group awareness. Simple techniques and processes lead to a low conceptual load for the users. 'Today' messages rely entirely on self-reporting (rather than, for example, on automatically sensed data),

and senders are free to include as much or as little information as they wish. Their granularity is a single day, in contrast to continuously updated displays on the one hand, or weekly status reports on the other. They are also very flexible. Group members write them only on days they work on the project, and there are no explicit content requirements. The use of 'today' messages raises interesting considerations concerning group members' privacy and accountability.

Given the substantial amount of research on novel systems for supporting group awareness and coordination, it is appropriate to investigate how well this lightweight technique can achieve some of the same goals using existing technology. In this paper we report on a field study of the use of 'today' messages by forty-three people in six workgroups, with an explicit focus on the implications of 'today' messages, both positive and negative, for human values. We found that 'today' messages offered many benefits, including increased group awareness of each other's tasks and activities at very low cost. The messages adapted easily to different contexts of use, and, contrary to our initial expectations, group members did not have significant privacy or accountability problems with 'today' messages.

The contributions of this paper include: (1) identifying design features that can help support privacy, and appropriate levels of accountability for group awareness systems, and (2) describing technical modifications that could enhance the use of 'today' messages, and potentially other systems for group awareness and communication. We hope that these results will be useful both to researchers in such fields as collaboration systems and computer supported cooperative work, and to members of small groups interested in using this techique.

2. Related Work

There has been considerable research on communication within small groups. Email has long been seen as critical tool for group coordination and awareness. Two studies [11, 12] of student project teams highlighted the value of email for coordination, and suggested a positive relationship between email use and group performance. Several other studies have compared the results from groups that use email with those that use other methods of communication such as face-to-face [e.g. 18, 21].

Today	Today I:	Today I -
• Wrote a specification to change the logit computation in response to Task 256, immediate bug from TWZC regarding overflow in the logit computation. This new spec is a much better and more general solution than the previous fixes to this in UrbanSim 1. It handles both overflowing denominators and overflowing individual utilities, and protects the probability distribution	• Made another change to the http server to properly handle SocketExceptions that occur when the server is closed (UrbanSim runs very quickly) before the client accepts().	- finished off the online paper prototypes
	• Replaced 147 uses of GOOD_DB_1 with Testville_tab.	- worked on the specifications for the indicators
• Modeler meeting	• Eliminated TestDataReader.java. Finally!	- attended cse590et
• Reviewed household synthesis documentation and fit test tables, and rewrote the documentation.	• Enhanced CompareDatabases to compare the entire database, not just a single table.	- attended streetscapes meeting
• Verified 156 and 159 with Bob	• Substantially simplified accept_test1 and accept_test2, and documented what they do. accept_test1 now use the new database compare mechanism to compare the actual and expected database outputs.	- had to leave early to get a sick colin so I missed the habermas meeting
Modeler Group	**Software Engineering Group**	**HCI Group**

Figure 1. Sample 'today' messages from the three UrbanSim groups. These 'today' messages were provided as examples to the external groups that participated in the field study.

Management literature highlights the importance of status reports, communicating status, and the potential value of using email [e.g. 16, 17]. An article by Snyder [17] emphasizes the value of collecting status updates before project meetings, one of the main reasons our research group starting using the messages. Research by Markus [14] also showed that managers used email more than information richness theory predicted. Other researchers have studied the introduction of group support systems (GSS), and developed models to predict adoption and use [2, 3]. While 'today' messages are more a communication tool than a group support tool, factors as represented in these models (such as ease of use and perceived value) similarly affect the adoption of 'today' messages.

While there has been considerable research on email as a communication mechanism and on the importance of status reporting, we are aware only of two systems that use updates similar to 'today' messages, neither of which has been extensively evaluated to our knowledge. In the GroupSense system [6], 'futurence' email reports, which describe group members' upcoming events over the next two weeks, are sent each morning. In contrast to the 'futurence' emails, 'today' messages focus primarily on what the person has accomplished that day. Google uses snippets [15] as one method of communication. Each week, employees send email with a short list in bullet-point format of what they did last week and plan to do during the current week. These snippets are automatically assembled into a company-wide web page, grouped together by project.

3. Applying Value Sensitive Design

'Today' messages, as well as other group awareness systems and processes, have implications (both positive and negative) for human values such as privacy, accountability, honesty, recognition and credit, and trust. To investigate these implications and tradeoffs, and to pro-actively affect the design, we drew heavily on the Value Sensitive Design methodology [9, 10]. Value Sensitive Design is a theoretically grounded approach to the design of technology that seeks to account for human values in a principled and comprehensive way throughout the design process. It employs an iterative and integrative tripartite methodology, consisting of conceptual, empirical and technical investigations.

3.1. Conceptual Investigations

We identified privacy, accountability, and trust as the values most strongly implicated by 'today' messages, based on our initial analysis [4] and own experience with their use. While 'today' message are self-reports, they still ask individuals to report on their activities, possibly raising privacy concerns. Their frequency also means individuals are reporting their accomplishments on a daily basis both to their groups and managers, significantly changing the granularity of accountability in comparison with the more common weekly, monthly, or quarterly reporting. Our early investigations also suggested that trust among group members would be important for the success of 'today' messages.

3.2. Technical Investigations

Value Sensitive Design recognizes that technologies afford different value suitabilities. Technical investigations include work both on how existing technology supports or undermines given values, and also on pro-active design or redesign to better support the values of interest, and

Benefits and Costs	Group Work Practice
B1. Today messages are low cost to read and write.	G1. Today messages successfully replace status meetings.
B2. The benefits of (selectively) reading today messages outweighs the cost of receiving them.	G2. Today messages support group task awareness and coordination.
Content	G3. Today messages lead to additional communication between group members, such as follow-up email or hallway chats.
C1. Groups include different kinds of information in their today messages.	G4. Today messages are not as useful for people who see each other every day (as compared with groups whose members see each other in person only infrequently).
C2. Today messages often include personal as well as work-related information.	
Value Implications	G5. Today messages are a good way to share news or small pieces of information that don't warrant a separate email or announcement, but are nice to share with the group.
V1. Today messages raise significant privacy concerns for some group members.	
V2. The increased accountability caused by today messages will make group members uncomfortable.	G6. The behavior of the group's manager is the most important determinant of frequency of sending today messages: if a manager sends a today message most days, so will group members.
V3. Today messages only work in groups with high levels of trust.	

Figure 2. Today Message Hypotheses. Hypotheses are labeled e.g. "B1" for reference in the study findings section.

perhaps to make different tradeoffs among these values (e.g., between shared awareness and group members' privacy).

'Today' messages use the technology of email, in particular email distribution lists, making it very low cost for groups to adopt. Email is a "push" delivery mechanism (assuming that group members check email regularly for other reasons), in contrast to a "pull" mechanism that must be checked explicitly with a distinct action, such as a 'today' web page. This choice means that group members do see the 'today' messages without needing to perform a separate action, at the potential cost of more email overload. Another important technical issue is the potential for archiving when using email as the delivery mechanism, since all 'today' messages could be easily saved and referred back to at a later time. This has implications for accountability, and can also help maintain group and individual memory.

These technical investigations led us to include several questions in the field study to gauge how participants felt about using email for 'today' messages. These questions included whether 'today' messages were worth receiving despite the cost of more email, and whether participants would prefer alternate delivery mechanisms, such as web pages, that could be explicitly taken down after a certain time, and that would not add to the user's inbox burden.

3.3. Empirical Investigations

The empirical investigations focus on people's reactions to the technology or technological practice, and on its impact on their values. Empirical investigations can draw from the entire range of quantitative and qualitative methods used in social science research to understand people's reactions. As part of our empirical investigations, we included in our field study a number of survey and interview questions that addressed privacy, accountability and trust.

4. Field Study

We initially undertook a small study of 'today' messages and their effect on group dynamics within our laboratory, reported as a short paper at CHI 2003 [4]. This initial study, combined with our use of Value Sensitive Design, gave rise to a richer set of hypotheses, which are shown in Figure 2. To test these hypotheses, we studied the use of 'today' messages by six groups, two within our own laboratory and four external, over a period of six to eight weeks for each group. We also checked back with the groups six months after the field study to follow-up on their experience with 'today' messages.

4.1 Background

In our laboratory, we are constructing a sophisticated simulation environment, named UrbanSim, that models urban development under different possible scenarios, and that allows users to interact with simulations and explore the results (www.urbansim.org). The research project is highly interdisciplinary. We have about twenty members, in three sub-groups: the modelers, the software engineers, and our own HCI group.

The UrbanSim project groups have all been sending 'today' messages for more than a year. 'Today' messages started initially in the UrbanSim software engineering group, as part of that group's agile software development process [8], and subsequently spread to the other groups. The field study data includes the modeling and software engineering groups from UrbanSim, and excludes our HCI group to avoid bias.

Table 1: Field study group characteristics and statistics on messages collected during the study period. Average and leader participation was calculated using the weekday messages sent during weeks we have complete data.

Group	Size	Project(s)	Location	Formation	All Msg. Collected	Weekend Messages	Full weeks of data	Participation Average	Participation Leader
1	6	Single	Same	~June 2002	177	18 (10%)	8	66%	70%
2	9	Multiple	Same	~Fall 2002	220	12 (5%)	8	58%	53%
3	6	Single	Multiple	April 2003	79	5 (6%)	5	40%	12%
4	8	Multiple	Multiple	March 2003	200	23 (12%)	7	60%	86%
5	8	Multiple	Multiple	~Jan. 2002	148	8 (5%)	5	70%	96%
6	6	Single	Same	May 2003	49	7 (14%)	5	23%	28%

To investigate how 'today' messages function in other groups, we recruited four external groups to try 'today' messages for six weeks during July and August of 2003. We provided groups with three example messages (Figure 1), and information about our study interests. Groups were not compensated for participating.

4.2. Group Characteristics

Table 1 shows characteristics of the groups that we studied. All groups were relatively small, and were evenly split regarding three other characteristics: working on parts of a single project vs. working on multiple projects; having all the members co-located vs. having some members in different locations; and being relatively new vs. more established.

Group 1 is the UrbanSim software engineering group. The group makes extensive use of other online coordination tools, including a locally-customized task management system and a wiki web. During the field study, group members met briefly every morning at 9 am to coordinate the day's activities.

Group 2 is the UrbanSim modeler group. The group uses the same coordination tools as Group 1, and meets once a week throughout the year.

Group 3 is an academic inter-disciplinary group with members in computer science and cell biology, working on a hardware simulation of cell biology reactions. The group met once a week during the field study. The group ended in fall 2003.

Group 4 is an academic research group working on projects related to medical informatics. During the field study, the group met twice a week.

Group 5 is a non-profit organization providing technical support to environmental organizations. Group members work in small teams on many different projects. The group meets once a week. One member of the group is located in another city and attends meetings by phone.

Group 6 is an academic research group building software tools for radiation therapy planning. Only a fraction of each group member's time is devoted to work related to this group. The project has been active for many years, and during the study period met once a week.

4.3. Data Collected

We collected data in the field study with interviews, a pre-survey, a post-survey, post-study group debriefings, and by collecting and analyzing the group's 'today' email messages.

Interviews: In Spring 2003, we conducted one-hour interviews with each of the twenty members of the UrbanSim team, including our own group, about their experiences with 'today' messages. Interviews were transcribed, and data from the interviews was used in developing the surveys given to all the groups.

Pre and Post-Surveys: Twenty-seven people (96%) from the four external groups took the anonymous online pre-survey and thirty-nine people (91%) in all six groups responded to the anonymous online post-survey about their experience with 'today' messages.

Post-Study Group Debriefings: We had informal discussions with each external group after their six-week use of 'today' messages. These discussions were very helpful in understanding factors that contributed to the success or failure of 'today' messages in that group.

'Today' Email Messages: We collected 'today' messages from all six groups. The external groups each started and completed their six-week trial at some point during our eight-week study period of July 7, 2003 to August 31, 2003. We obtained messages for five to eight weeks depending on the group.

Table 1 includes summary statistics for the collected messages. This includes the total number of messages sent, the number sent on weekends, the number of full weeks for which we collected messages, and the average participation by group members and leaders. Average and leader participation was calculated using the total number of weekday messages sent during weeks for which we have complete data.

Table 2: Average number of bullets per message with a particular property for a random sample of 60 'today' messages (Group 6 sent only 49). Numbers in ()'s denote other groups whose average number of bullets is significantly different using an independent-samples t-test with p <= 0.01.

Group [# of msgs]	Personal	Negative	Inform	Internal Tool Ref.
1 [60]	0.32[3,4,5,6]	0.38[2,3,4,6]	0.40	0.58[2,3,4,5,6]
2 [60]	0.10[4,5]	0.05[1]	0.33	0.15[1]
3 [60]	0.07[1,4,5]	0.02[1,5]	0.67	0.03[1]
4 [60]	0.73[1,2,3,6]	0.12[1]	0.25	0.17[1]
5 [60]	0.82[1,2,3,6]	0.18[3]	0.42	0.03[1]
6 [49]	0.04[1,4,5]	0.10[1]	0.29	0.06[1]

Content Analysis of Messages: To better understand what people write in 'today' messages, we analyzed the content of a random sample of 60 messages from each group over the study period, for a total of 349 messages (Group 6 sent only 49 messages). For each message, we counted the number of bullets (or paragraphs) that had several different properties including:

Personal: Anything not work related, e.g. "met a friend for lunch."

Negative: Any negative statement about self or other person, e.g. "very unproductive day."

Inform: "For Your Information," requests, reminders, and nags, e.g. "cardboard with food waste on it is not recyclable!"

Internal tool reference: Reference to an internal tool used by the group, including the file system or work request software, easily accessible from the 'today' message recipient's desktop computer.

Table 2 shows the average number of bullets with each property per group. In all cases, we conservatively counted each bullet at most once for each category. For example, if a single bullet mentioned multiple personal items we counted one "personal" item for that bullet. We split the groups between two coders, and then checked for inter-coder reliability by both coding a subset of 60 messages (10 from each group). Absolute agreement between coders for the subset was 85% or better for all properties.

5. Study Findings

In this section we discuss the findings of our study organized by our hypotheses. Overall, we received a positive response to 'today' messages, with only two of the thirty-nine post-survey respondents saying their group should stop writing 'today' messages. Table 3 shows median responses to selected questions from the post-survey, and Table 4 shows the benefits and concerns respondents selected.

5.1. Benefits and Costs

Post-survey responses verified hypothesis B1, that 'today' messages have a low cost to read and write. The majority of respondents feel they take less than 10 minutes each day to read the messages (87%) and more than half the respondents (64%) say they consistently read all 'today' messages, while 31% are more selective, consistently reading messages from some, but not all people. Respondents also felt that writing the messages was low cost. Most (86%) took less than 10 minutes to write their messages and the overall median response was "Disagree" that "Writing 'today' messages is annoying," although group medians varied considerably (Table 3, Q1).

Respondents also verified hypotheses B2, that the benefits of 'today' messages outweigh the cost of receiving them. The median response was "Agree" on both the pre-survey and post-survey to "It's worth getting more email to receive other people's today messages" (Table 3, Q2).

5.2. Content

As Table 2 shows, groups had very different norms for what they included in their 'today' messages (hypothesis C1). For example, Group 1 members included more negative information, while members of Groups 4 and 5 included the most personal information.

However, the flexible nature of 'today' messages does have some costs. One survey respondent wrote, "Unstandard format is kind of annoying. It would be good if everyone used the same title, etc." and another person offered "standardize a bit" as a suggestion for changes the group should make. Based on informal discussion with groups, particularly Group 5, there seems to be a fine line between standardizing contents of 'today' messages and making the process so rigid people do not want to use it (as members of Group 5 felt about their formal project tracking system).

We had hypothesized (C2) that 'today' messages would often include personal information. However, data from our content analysis shows this was only true for some groups (Table 2, Personal). Survey responses reflect these differences. Respondents from Groups 3 and 6, who had low percentages of personal information in their messages, "Disagreed" that they shared personal information in their messages (Table 3, Q3).

Perhaps the most important concern overall in the field study was about the content of 'today' messages. A concern voiced repeatedly during the study was that they may not fit well with some types of work. There was a sense that the content of 'today' messages focuses on tasks that produce a visible artifact. As one survey respondent

Table 3: Median responses to selected questions from the Today Messages Post-Survey. 1 = I Strongly Disagree, 2 = I Disagree, … 5 = I Strongly Agree. Numbers in ()'s denote other groups whose median values for that question are significantly different based on a Mann-Whitney U test with p <= 0.05. For underlined numbers, p <= 0.01. ⁺For these questions Group 6 has 4 respondents for 38 total respondents (one person answered only questions about reading).

Questions	1 [5]	2 [8]	3 [5]	4 [8]	5 [8]	6 [5]	Total [39]
1. Writing today messages is annoying.	2 (2,5)	3.5(1,3,5,6)	2(2)	3(5)	1.5(1,2,4)	2(2)+	2 (Disagree)+
2. It's worth getting more email to receive other people's today messages.	4	3.5(5)	4	4(5)	5(2,4)	4	4 (Agree)
3. In my today message I sometimes share personal information about activities that aren't strictly work related.	4	3(5)	2(5)	4	4(2,3,6)	2(5) +	4 (Agree)+
4. Today messages have led to more informal interactions with members of my group	3	3(4)	3	4(2)	3	3	3 (Neutral)
5. Today messages from people I typically interact with in person during the day are still valuable.	4	4(5)	4(5)	4(5)	5(2,3,4,6)	4(5)	4 (Agree)

commented, "What to include in a 'today' message when I spent most of the day thinking and reading?"

It is interesting to consider 'today' messages in light of the well-known exchange between Suchman and Winograd [19] ("Do Categories Have Politics?"). 'Today' messages do not impose a rigid structure, and our data demonstrates that users adapt their content to a variety of circumstances. But they are not entirely unstructured; indeed, our interview data indicates that they are strongly biased toward reporting completed tasks, and against less clearly demarcated activities such as reading.

5.3. Group Work Practice

The original reason for sending 'today' messages was to replace status updates in meetings, and we hypothesized (G1) they would successfully do this for all groups. However, only 58% of post-survey respondents felt they received this benefit from 'today' messages (Table 4). In Group 2, only 25% of respondents felt they received this benefit, while Groups 1, 4, and 5 had a more positive response. Members of Group 5 reported in the post-study debriefing that 'today' messages had completely changed the format of their group meetings.

Survey results strongly validate our hypothesis (G2) that 'today' messages support group awareness. Ninety-five percent of post-survey respondents felt 'today' messages help them stay aware of what others are doing (Table 4), something that respondents on both the pre- and post-survey "Agreed" was important. Respondents felt less strongly about coordination, with 67% agreeing that 'today' messages helped them coordinate with others (Table 4).

Besides improving group awareness and coordination, we hypothesized (G3) that 'today' messages might increase the amount of informal communication in a group as people responded to 'today' messages by email or in person. Survey and interview data suggest that 'today' messages do lead to some additional communication, but not a large amount. As Table 3, Q. 4 shows, post-survey respondents felt "Neutral" about whether 'today' messages

led to more informal interactions. However, 18% of post-survey respondents said they followed up with someone based on something from a 'today' message at least once a week, and 38% followed up every so often. Frequent responders (people who follow up at least once a week) were concentrated in Group 4 (38%) and Group 5 (25%).

Initially, we thought that 'today' messages would not be valuable for groups with members who interact regularly in person during the day (G4). However, the interview data suggests that some people valued getting 'today' messages from people they see during the day. One interviewee commented "I'm probably more likely to read it [the today message] from somebody who [is] in my office." When asked on the post-survey, respondents "Agreed" that 'today' messages were still valuable from people they interact with in person (Table 3, Q5).

We thought that 'today' messages might encourage people to share more small pieces of information or news that do not warrant a separate email (G5). The prevalence of informational content included in 'today' messages (Table 2, Inform) suggests many groups found 'today' messages to be a useful way to share this information. In the post-study debriefing, a member of Group 5 felt that by using 'today' messages as a place for little announcements he was less likely to interrupt group members.

We originally hypothesized (G6) that the sending behavior of the leader would greatly influence the group sending behavior. However, the number of messages sent by the leader per week was correlated to the average number sent by the rest of the group for only two groups. In Group 5, the leader sent a 'today' message almost every day and so did most of the group (cc= .990, p < 0.001). In Group 2, the messages sent by the leader varied per week, and this was tracked to some degree by the average number of messages sent by the rest of the group (cc=.709, p < 0.05). In other groups, there was not a correlation; in fact, in Group 3, the leader sent the second smallest number of 'today' messages.

Two other unanticipated benefits were being able to see the range of project activities (74%, Table 4) and the sense

Table 4: Percentage of respondents selecting a benefit or concern about reading and writing 'today' messages on the post-survey. The table includes benefits selected by more than 50% of respondents and concerns selected by more than 20% of respondents. +For these questions Group 6 has 4 respondents for 38 total respondents (one person answered only questions about reading).

	Benefits and Concerns from Reading and Writing Today Messages	Group [number of respondents]						
		1 [5]	2 [8]	3 [5]	4 [8]	5 [8]	6 [5]	Total [39]
Benefits	Helps me stay aware of what others are doing.	100	100	100	88	100	80	95
	Helps show everyone else the work I've done	60	75	80	88	100	25+	76+
	Helps me see the range of project activities	80	50	60	88	100	60	74
	Helps me coordinate my work with others' work	60	75	40	63	88	60	67
	Helps give me a sense of accomplishment about what I did that day	80	38	40	63	100	50+	63+
	Gives me a sense of involvement with the project	80	50	20	63	63	80	59
	Helps avoid status briefing in meetings	60	25	40	75	88	50+	58+
	Helps keep me organized	20	50	40	50	75	75+	53+
Concerns	Makes me uncomfortable when I don't accomplish much.	80	63	20	75	63	25+	58+
	Sometimes makes me feel competitive with my co-workers	40	38	40	50	13	0	31
	Makes it easier for people to track what I'm doing	60	38	0	25	25	0+	26+
	Makes me feel like I'm bragging when I report that I have accomplished a lot.	0	25	0	50	38	0+	24+

of involvement people receive from 'today' messages (59%, Table 4). Survey comments and interview data highlight in particular the value of 'today' messages for involvement for people who are in remote locations or are only working part-time. One survey respondent said: "As a remote office, it's a great way to see who is doing what and for whom [...] 'Today' messages have provided me a much clearer understanding of what others do and opened lines of communication."

Another interesting aspect is the relationship between 'today' messages and other tools that groups used for coordination. In our content analysis we found that only Group 1's messages had a large number of references to other systems the group uses (Table 2, Internal Tool Ref.). However, during the group debriefing, members of Group 5 discussed at length ways of better linking 'today' messages with their project tracking system.

5.4. Value Implications

Privacy: Our hypothesis (V1), informed by our first survey with UrbanSim group members, was that 'today' messages did raise privacy concerns. However, field study participants overall did not seem to have privacy concerns regarding 'today' messages. On the pre- and post-survey, the median response was "Disagree" to "Sharing what I've done each day in my 'today' messages will threaten my privacy," and there were no significant differences between any of the group median responses. For the external groups, the group median from the pre-survey was the same or went down on the post-survey. Surprisingly few people

worried about the tracking aspects of 'today' messages (26%, Table 4).

The fact that 'today' messages are self-reports, allowing authors to share differing amounts of detail, seemed to alleviate most privacy concerns. One post-survey respondent commented "There seems to be a lot of concern over whether it makes people uncomfortable to send them or privacy issues, but none of that is a problem if people realize that sending a 'today' message is optional on any given day." During interviews with the UrbanSim groups, comments included "Well, just don't put anything private in 'today' messages" and "I self-edit."

In fact, it was in our own HCI group that the greatest privacy concerns surfaced. In the UrbanSim project, we allow people to sign-up to receive 'today' messages from any of the three sub-groups and have found this helps with project coordination. However, the lack of feedback about who receives a person's 'today' messages caused a loss of trust for one group member, who became very uncomfortable with 'today' messages after receiving a reply from someone that the person did not know was receiving the messages. This person adjusted behavior to protect privacy by including no personal information in further 'today' messages, but continued to feel very uncomfortable with sending them. In fact, the list subscription information was available to group members, but we now realize it needs to be more publicly advertised. We describe the approach have implemented in Section 6.3.

Accountability: When sent daily, 'today' messages increase individual accountability, and we thought that some people might find this accountability too frequent (V2). Although post-survey respondents did "Agree" that

"On days that I didn't get much done, writing 'today' messages make me uncomfortable," and this was the most frequent concern of respondents (58%, Table 4), the median response was "Disagree" to "The daily accountability I have because of 'today' messages is too frequent."

Survey comments and data from interviews reveal a more nuanced view of the accountability issues among UrbanSim groups, with several people commenting that daily accountability is too frequent if one is working on a task or project that spans days. One survey respondent commented "The daily system is too frequent and regimented and doesn't allow for flexibility to report what you've done when you've completed something over several days." Some people interviewed solved accountability discomfort by not sending a message when they worked on the same task for several days. This highlights again the advantage of making sending 'today' messages very flexible.

In interviews with the UrbanSim group members, we also addressed questions about daily accountability by asking participants what they would do if they had the option of writing 'today' either daily, sporadically or not at all. In Group 1, everyone interviewed felt that daily messages were valuable, while in Group 2 (perhaps foreshadowing their abandonment of 'today' messages in January 2004) 77% of the group felt they should write the messages sporadically or not at all.

Trust: When sending 'today' messages, group members are relying on the other members to use the information appropriately, particularly when including personal or negative information. Our hypothesis (V3) was that 'today' messages would only work in groups with high levels of trust. Our findings are inconclusive for this hypothesis. For groups in the field study, group members appeared to trust each other. The median response on the post-survey in all groups was "Agree" when asked "I trust that group members will use the information that I provide in my today message appropriately." One element that may contribute to feelings of trust among group members is that all of the groups we studied had been in existence for at least three months before the field study (Table 1, Formation).

Investigating the use of 'today' messages in newly forming groups might lead to more informative results on the importance of trust among group members. Our intuition is that 'today' messages would not work well when a large percentage of the group does not know each other. However, we have seen 'today' messages work well when people join groups that are already writing them.

5.5. Using Email for 'Today' Messages

As part of our technical investigations (Section 3.2), we identified two principal technical issues with email that had strong value implications: first, the possibility of archiving 'today' messages, and second, whether participants would prefer alternate delivery methods, such as a "pull" rather than a "push" technology.

In the interviews, the UrbanSim group members in Groups 1 & 2 did not seem concerned about archiving 'today' messages. While 80% of Group 1 and 55% of Group 2 saved all 'today' messages, the universal response was that the group did not need do have explicit rules about which 'today' messages could be saved. It would be interesting to explore further formally archiving the messages with potential for having them serve a role in preserving organizational memory. Our intuition is that this would raise significant value concerns, change the contents of the messages and make them much less informal. In fact, we have explicitly set up the archives on our Mailman distribution lists to be deleted weekly. However, these concerns about archiving may not hold, since so many people are already archiving the messages personally.

In exploring alternate delivery mechanisms, we asked both about email delivery alternatives and different technology options such as webpages. For email delivery, our initial hypothesis was that people would prefer a single daily digest message with all 'today' messages as a way to reduce the amount of email received. However, both interview data, and group members' behavior once we switched to Mailman distribution lists that provided digests, support the conclusion that most group members preferred separate email. In March 2004 less than 25% of subscribers to either Group 1 or Group 2's 'today' mailing lists are signed up for the digest option. Reasons given in interviews for preferring individual messages included easier filtering and that people felt they would be less likely to read one long message

More generally, when comparing email with other delivery mechanisms such as web forms, in the interviews all but one person in Groups 1 and 2 felt email was the best appropriate way to receive 'today' messages. Many felt they were unlikely to read a webpage of 'today' messages as compared with an email that arrived in their inbox.

6. Discussion

We now discuss the factors that we believe contribute to the success of 'today' messages, and the technical implications of our study for other systems to support group awareness and coordination.

6.1. Factors for Success

One important factor that helped determine whether groups found 'today' messages valuable appears to be the leader participation rate. Group 6, which eventually stopped sending 'today' messages during the field study, had very low leader participation (28%) and low overall participation (23%). The group members also mentioned

there was a lack of activity on the project and a reluctance to send messages when working on a single task for several days.

Group 2, which also had relatively low leader participation (53%), continued to write 'today' messages at the end of the field study, but the writing decreased during the fall of 2003 and by January 2004 the group had stopped writing 'today' messages. Informal conversations suggest an important factor leading to the group abandoning 'today' messages may have been discomfort with the fit of daily reporting for tasks that took many days or weeks to complete. However, there also appears to have been little encouragement for new group members to start the practice. Several members that joined the group during the fall of 2003 were not added to the 'today' messages mailing list.

An interesting anomaly to this trend is Group 3, which had the lowest leader participation (12%), and low overall participation (40%), but reported in the post study group debriefing that they still found the message useful for communication and coordination because the group was split between two locations.

The other two groups split between multiple locations, Groups 4 and 5 also found 'today' messages valuable. In particular, members of Group 5 were the most enthusiastic about 'today' messages and had the highest overall and leader participation rates. They also included the most personal content in their messages. Group 5 has recommended the practice of 'today' messages in an email newsletter they distribute to over a thousand people.

Lastly, Group 1 is the group where 'today' messages originated and it had high leader participation (70%). Group members appear to find 'today' messages very valuable. One interesting aspect of Group 1 messages is they had the highest amount of negative content (0.32 bullets on average) in the messages we analyzed. We believe this is due to the example set by the group leader and other senior leaders.

We believe the experience of the six groups highlights the importance the group leaders plays in facilitating and encouraging people to participate in the ongoing conversation created by 'today' messages, as well as the potential for additional benefits if groups are split between multiple locations.

6.2. Technical Implications

While the major factors contributing to the success or failure of 'today' messages in the groups appear to be social, there are several technical implications that could help systems better support group awareness and communication in a value sensitive manner.

Address Value Concerns With Self-Reports and Flexibility: The self-reporting nature and flexibility in sending of 'today' messages allows authors to self-edit to their level of comfort and to skip days when they feel they do not have enough to report. We believe these two factors minimized the value concerns participants had about 'today' messages.

We also feel strongly that value concerns cannot be addressed with technology alone, but requires an interaction between the values the technology affords and the dynamics of a group. The context of use in each group and tone set by the leader has a large effect on the comfort level of group members.

Support Flexible Subscriptions: Using a mailing list forces subscription to an entire group's 'today' messages. While appropriate for one's immediate work group, allowing people to easily subscribe to mail from groups or individuals would provide better support for the dynamic nature of groups and collaborations that span organizational boundaries. Flexible subscription also potentially offers a way to address scaling issues with 'today' messages, allowing group members to receive only messages from selected people.

Promote Reciprocity: With 'today' messages, particularly if there is flexible subscription, it is important to keep everyone informed of who receives their messages and to promote reciprocity. People should be able to determine easily who is receiving their messages. While mailing list software, such as Mailman, often provides methods for looking up membership of a distribution list, we believe this information should be more proactively pushed to the user. We have modified the monthly reminders sent by Mailman to include the number of people on each distribution list and a link to the configuration page with the list of names. Another possible solution to increase awareness of who is receiving one's 'today' messages is to send notifications when someone subscribes to a group or individual's 'today' messages.

A more drastic solution would be to require complete reciprocity, sending one's 'today' messages only to people that send them in turn. We believe there is a delicate balance to strike between requiring reciprocity and the discomfort we have seen from extended periods of non-reciprocity. At this point we believe that increased awareness would go a long way in providing comfort, and that complete reciprocity is unnecessary.

Support Active Links with Other Tools: In our content analysis (Table 2, Internal), we noticed that only one group often included references to other systems used to coordinate group activity. Informal discussions suggest that by automatically parsing internal references in messages to make them active, 'today' messages could more readily serve as a link between the different tools a group uses. For example, a work request number could be automatically replaced with a link to the work request. This should be done carefully, to preserve the flexible nature of 'today' messages, perhaps by adapting the other tool to allow a convenient reference via an easily-typed URL or keyword.

7. Conclusions and Future Work

A few caveats should be noted, which also suggest topics for further investigation. We relied primarily on collected emails and survey responses. Adding field observation, particularly for the external groups, would provide valuable additional data, such as observing people reading and writing 'today' messages, as well as observing status meetings before and after the introduction of 'today' messages.

We purposely sought to explore the effects of a low cost mechanism. However, our results suggest interesting avenues for future research and development on more sophisticated mechanisms, particularly the use of 'today' messages for group memory. Blog software and RSS aggregrators offer the potential of creating searchable group blogs, while still allowing individual group members to have 'today' messages pushed to their inbox.

In conclusion, 'today' messages represent an interesting point in the space of possible tools to support small group awareness, both in terms of supporting software needed (just email and a group mailing list), and in terms of contents and granularity. Our study of six groups using 'today' messages demonstrates that they are low cost, and successfully support group task awareness. In applying Value Sensitive Design, we identified factors, such as self-reporting and flexibility, that helped provide appropriate levels of privacy and accountability; and made technical changes based on our analysis.

8. Acknowledgments

9. References

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