The Design and Usage of Tentative Events for Time-based Social Coordination in the Enterprise

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ABSTRACT

Existing enterprise calendaring systems have suffered from problems like rigidity, lack of transparency, and poor integration with social networks. We present the system design and rationale for a novel social coordination mechanism, called "Suggestions," that addresses these issues. Our system integrates ideas drawn from designs of lightweight polling systems and one's social network into an open calendar tool, providing a space for users to coordinate, socialize around, or negotiate the "what" and the "when" of their events. Suggestions was released inside a large enterprise setting, where initial interviews revealed users' thoughts on transparent scheduling, reaching wider audiences and task appropriateness, and suggested ways to improve our design.

Categories and Subject Descriptors

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Design, Human Factors

Keywords

Social software, social coordination, electronic calendars, GCS, calendar, microcalendar.

1. INTRODUCTION

Enterprise users are using a wide array of tools for the purposes of scheduling – from paper planners, telephone and face-to-face meetings to e-mail, sophisticated electronic calendaring tools, and even instant messaging (IM) (e.g. [16] or [32]). This diversity of different communication media reflects the rigidity of today's online calendars: Most properties of an event need to be decided at the time an event is created and there is limited support to involve others in any decision process around these properties right in the context of the calendar. While calendars do support scheduling, i.e. deciding the 'when' of an event, the procedures are hierarchical and non-transparent: only the organiser of the meeting can see responses submitted by other stakeholders and needs to resolve conflicts manually. Finally, the closed, restricted

setup of the typical enterprise calendar does not afford coordination around events that are more open in nature, e.g. gathering availability information about whoever is interested in an upcoming talk. These limitations have resulted in people using different specialised tools for such functions. For example, while traditional calendars are used to schedule formal meetings, a group going out to lunch might use IM to coordinate. We believe that a more integrated, transparent, and social process is likely to increase the effectiveness of event coordination.

Recent research on online social networking sites has shown that people have appropriated the communication channels that these sites afford to perform a variety of tasks, including socializing around and coordinating events [25]. Social software systems, particularly microblogging, encourage an open information sharing model. User accounts and status updates are public by default. Can such an open infrastructure together with social networks be leveraged to satisfy the coordination needs of enterprise users?

To explore this idea, we designed and implemented a coordination mechanism for events called "Suggestions." It is based on the notion of a "tentative event" which can be a locus of discussion, voting and negotiation before being cast as a full and final event in users' calendars. Our system leverages the existing social networking infrastructure of an open calendaring site, called Timely, within a large enterprise. Our design tries to promote openness and transparency, whilst supporting the freedom and flexibility that coordination tasks typically require. This paper reports on the rational and design behind Suggestions. We deployed our system to early adopters of Timely and conducted semi-structured interviews with those who used Suggestions. We carried out a preliminary user study addressing the following three research questions:

RQ-Need: Is there a need for social coordination in the enterprise?

RQ-Benefit: What aspects of social coordination are beneficial for enterprise coordination needs? Are any aspects not beneficial for this particular population and their needs?

RQ-Attitude: What are enterprise users' attitudes towards social coordination?

The rest of this paper is organised as follows. We first review relevant related work that led to our design. Then, we describe our system design, emphasising our design choices and the rationale behind them, and the results from preliminary user interviews. Finally, we discuss how our findings can improve the design of future enterprise calendaring systems.

2. RELATED WORK

2.1 Scheduling in the Enterprise

Electronic calendars became available to enterprise users in the early 1980s as a feature of office productivity tools [15], [21]. These tools were not well adopted within the enterprise for ten years, primarily due to the lack of usability and the fact that enterprises were often not fully connected. They had island solutions in place, and therefore, the critical mass and spread required to make a scheduling system work effectively was not achieved. However, since the 1990s, Graphical User Interfaces have solved several of the usability issues, and the Internet has solved a lot of the networking problems. By the end of the millennium, electronic calendars became a well adopted key office technology [15], [29].

Early research on electronic calendaring focused mostly on Groupware Calendaring Systems (GCSs) for personal and group time management. The 90s saw innovations like Woitass's system that tried to engage electronic calendars of those who maintained them and other users directly, and the priority-based visual calendaring system by Beard et al. [1] but did not receive widespread use because of critical mass problems. Grudin and Palen [15] examined the successful adoption of group calendars as collaborative meeting schedulers at large companies like Microsoft and SUN. Palen ([28], [29]) investigated group calendaring at SUN where open calendaring systems facilitated social coordination and also functioned as distributed information and communication systems. Recent work has investigated into algorithms that try to automate some of the sub-tasks involved in scheduling in an attempt to make the well-known complicated process easier for users [26], [34].

2.2 Media Choice for Scheduling

Is the traditional electronic calendar the most ideal medium for scheduling? The problem of media choice has been well studied in the literature. The choice of media to use depends on a number of factors like the natures of the task to be supported, the medium itself and what it can afford, and the task-medium fit. Research has also explored the role of social interactions and availability information in deciding what media to use for scheduling meetings.

There are two primary theories governing media choice:

- **Media richness / contingency theory:** According to this theory, the best medium is the one that affords the richest interaction suitable for the task concerned [3].

- **Media synchronicity theory:** This theory stipulates that no one medium is sufficient for performing complicated tasks, like scheduling. Instead, users should look at using multiple media together to achieve their goals [4].

A number of media have been used for coordination and scheduling purposes in the past. A lot of research has studied the appropriateness of these media as well. Traditional electronic calendars have been designed in accordance with the media richness theory – designers have tried to make it the richest medium, capable of supporting all kinds of scheduling tasks. The previous section discussed relevant related work about these systems. We will survey some alternative media choices in this section.

Face-to-face settings provide a rich set of visual and auditory information about the recipient's activities, allowing one to understand their availability and interruptibility better, and hence perform coordination better (e.g. [6], [9], [22], [32], [33], [35]). Such information is clearly absent when initiator and recipient are not co-located, which is an increasing occurrence among enterprise users, who work from geographically distributed work sites.

Our most pervasive communication technology, the telephone, provides only little direct support for the complexities of coordination tasks. Its benefits are the immediacy and it works well for the coordination of small groups. However, on the downside, it can be intrusive because it is hard with the phone to shield oneself from unwanted interruptions [2]. Secondly, from the meeting initiator's point of view, there are no awareness mechanisms that provide information about the recipient's availability, responsiveness, and interruptibility, allowing initiators to determine an appropriate time to call (e.g. [23], [27], [33]) Finally, coordinating a complicated event with multiple stakeholders would involve making many phone calls, and hence, use of telephone does not scale well with the size of the event.

Besides traditional electronic calendars (discussed in detail in the previous section), e-mail is a powerful computer-mediated communication tool that is also very flexible. Although initially designed for regular messages, it has been overloaded and used for a variety of purposes [36]. A lot of informal and formal coordination tasks are carried out over e-mail. Researchers have studied the use of e-mail for coordination purposes, and found it a difficult medium for this purpose [7]. Primarily, this is due to the fact that e-mail is unstructured, and hence, does not support computations like finding availability and common meeting times.

Instant Messaging (IM) has found several uses in the workplace. Due to its lightweight nature and low intrusiveness (you can easily ignore a person's instant message), it has been adopted to check availability of a person [16]. Researchers have also found cases where IM was used for complex event-related discussions [19].

Recently, research has also highlighted the use of mobile phones for coordination. Researchers have proposed and studied systems built using mobile phone technology for meeting scheduling purposes, making this medium a possible choice ([13], [30]). Increasing proliferation of mobile phones in today's world means that this is a promising area for scheduling research.

Research by Wiberg and Whittaker [37] studied users' availability management techniques ethnographically and concluded that support for rich negotiation and lightweight nature are important for the media chosen to support such tasks. Our design builds upon these findings.

2.3 Social Software

Research has shown the utility of several different types of social software for event coordination purposes. People have been found to use their social networks for coordination purposes. Research has shown that social networking sites like Facebook have seen a substantial usage for coordination and scheduling [25].

The use and success of social software, in general, in the enterprise is a promising area, rich with several success stories. Social systems like blogs [18], [20], social bookmarking [24], and wikis [17] have been shown to be beneficial to enterprise users. Prior work has studied the use of social networking sites by

describing the design of a workplace social networking site called SocialBlue (fka Beehive) and studying user motivations, use of new social content types, impact on social capital and the use of incentive and recommender systems [5], [8], [11], [12], [31]. More recently, microblogging has successfully made its move into the enterprise. Zhang et al. [38] describe adoption patterns, general use and value of a microblogging system in a medium size enterprise. This encouraged us to apply a microblogging concept for tasks important to enterprise users, like scheduling and coordination.

Our research and design extends and applies several of the findings from prior literature and is inspired by the successes of several instances of social software in enterprise settings. The main design principles that we took away from prior work and utilised in the design of Suggestions were: lightweight in nature, high flexibility for negotiation, integration into social networks and calendars, openness/transparency, and discoverability.

3. TIMELY

Our Suggestions feature was built as an extension to a novel social calendaring site called "Timely" [10]. The design of Timely is based on the social infrastructure underlying micro-blogging sites like Twitter. Instead of sharing text messages, however, users share events, i.e. each user creates a stream of events and users can subscribe to other users (similar to the following feature on Twitter). As shown in Figure 1, the home page then shows all upcoming events in the network of a user. Unlike microblogging, Timely uses when the event is taking place as an ordering principle and displays the time left before the event occurs.

Events afford socialising via comments, and are integrated with other social networks like Twitter, and an enterprise microblogging service which is part of an internal social networking suite. This integration allows users to post events and comments to those external services. These posts contain pointers back to the event page in Timely. During the first 6 weeks of deploying Timely, more than 2,000 events were shared by employees ranging from customer meetings to personal deadlines. See [10] for a more detailed analysis of the site.

4. SUGGESTIONS SYSTEM DESIGN

The Timely system supports sharing events with certain attributes, for example, date and time (when), title (what), location (where), participants (who), description etc. Like traditional online calendars, users need to specify at least the "when" and the "what" in order to be able to create an event in the system. Other fields are optional and not required at creation time, but can be added later.

The Suggestions design is based on a few observations. Firstly, coordination around events typically occurs around one or multiple of these attributes that have not yet been completely decided. Sometimes, the "what" is decided, but the "when" is open to negotiation; e.g. when to schedule the next architecture review call? At other times, the "when" is decided, but the "what" is fuzzy; e.g. what to do for Halloween on October 30? Just like traditional calendars, Timely was not equipped to handle situations like these. Our Suggestions feature fills this gap by enhancing Timely with tentative events, i.e. events can be flagged as needing input from others or missing information.

Secondly, planning happens *before* an event is decided, which means that the creator *does not know* all the details of the event before he/she starts the coordination procedures. Today's electronic calendars force the user to specify both the "what" and the "when" of the event, before any coordination can happen on it. Any negotiation that has to happen with this event happens after the event is created using techniques such as countering the time and proposing a new time. We consider this to be inconsistent with the typical coordination workflow. Prior research has attempted to solve this problem using concepts of "tentative meetings" and a polling mechanism [14]. Suggestions took this idea a step further by allowing users to create incomplete events and share them with other people so that there could be interaction and negotiation about this event.

Thirdly, traditional calendars are closed in their nature – only the creator or organiser of the event can see all the responses from other participants. If one of the participants proposes a new time, this information travels first to the organiser, following which the organiser has to dissipate it to the other participants, resulting in an excessive number of interactions. Simple polling systems like Doodle (www.doodle.com) have tried to address this problem by reducing the number of emails sent (and hence the number of interactions) to a mere two. However, these systems sit outside of the user's calendar and are not integrated with user's social network. Our design attempts to bridge these gaps and bring the rich and easy negotiation offered by systems like Doodle to within a calendar and a social network.

Finally, several events are such that they benefit from mass discoverability. While a meeting request for a small team of engineers would be relevant only to the engineers in question, a proposed visit to a popular lunch place would be relevant to any user that is interested in the proposer's activities; in other words, any user that is a part of the proposer's social network. We believe that Timely's social networking aspects, based on the follower-followee model, serves a good fit for situations like these – only users that are interested in a particular person's events would subscribe to him/her. Hence, Suggestions was implemented as a feature of Timely.

The following usage scenario illustrates how Suggestions can be used within Timely:

Sandy works in Human Resources. After she arrives in her office Monday morning, she pulls up Timely to check her schedule for the day. In the list of upcoming events, she notices that her weekly HR team meeting is coming up in an hour (Figure 1 A). She notices the event has been updated with comments (B). She opens the event page and looks at the comments. One of her team members reminds everyone that the summer company outing needs to be planned soon. Chris suggests adding the item to the agenda of today's call.

Sandy dials into the HR team meeting. Near the end of the meeting the team discusses options for the company outing, but they cannot come up with a good decision. Sandy is put in charge to narrow options and come up with a final plan. After the meeting Sandy uses Timely to create and publish a tentative event. The event is flagged as needing suggestions from co-workers about what to do for the outing (C). Sandy notifies all of HR about the event using one of her Timely social circles.
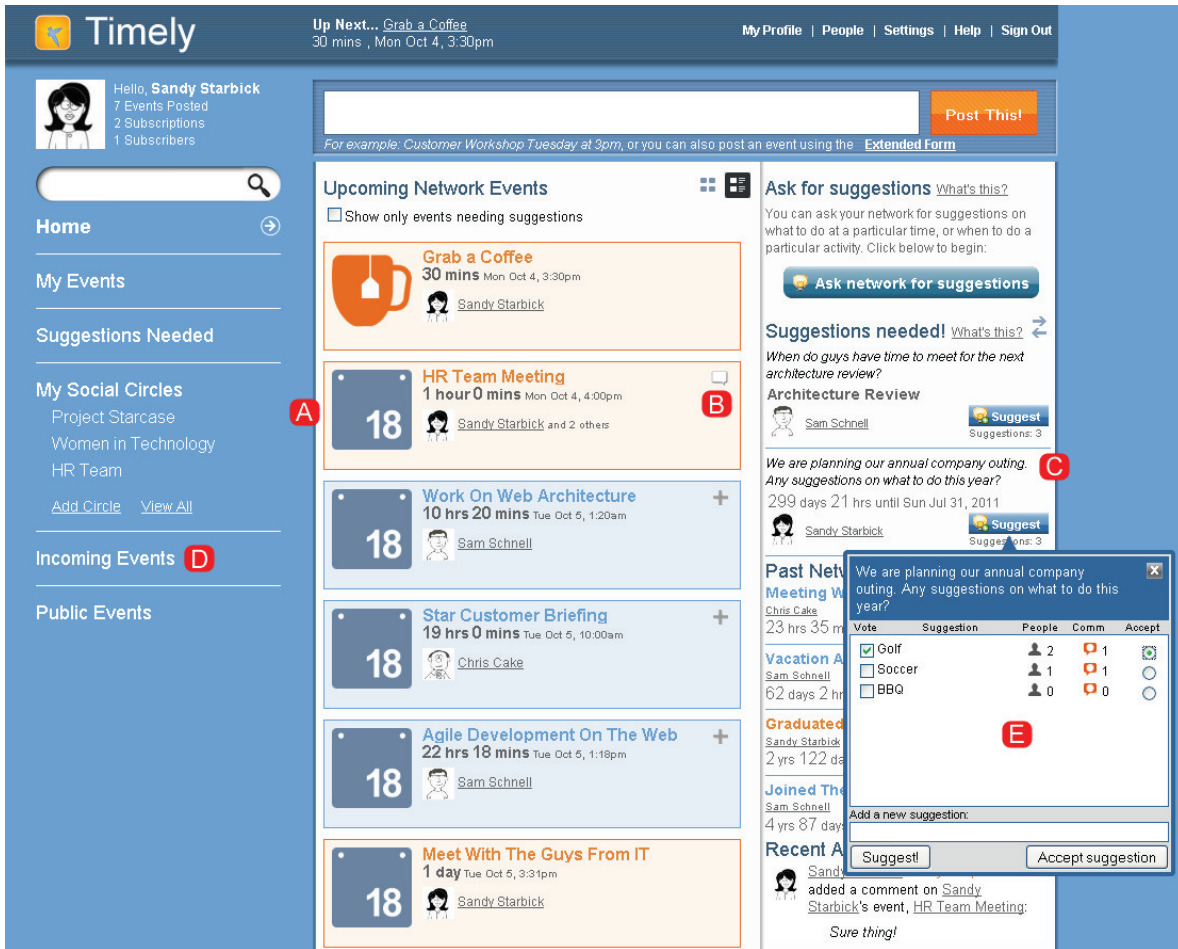
Figure 1. The Timely Home Page showing what's coming up in your network of subscribed users. The Suggestions feature is contained within the right side column of most pages.

Sandy's co-workers see the event in their incoming event stream (D). They add it to their own event stream. The system allows them to provide suggestions and comments on what to do for the company outing (E). Sam clicks on the Suggest button and proposes Golf, Chris suggests a BBQ, and Mark wants a soccer game. After receiving enough suggestions, Sandy inspects the results and presents them during the next HR team meeting. The team decides to go with "golf". Sandy updates the Timely event by selecting "golf."

In the following sections, we will describe various design elements of Suggestions that we believed would enable Timely to better support the kind of coordination activities described above.

4.1 Tentative Events

Suggestions enables users to instantiate events without all of the attributes specified. The specific way in which we designed this functionality is illustrated in Figure 2. In our first release, for simplicity reasons, we decided to focus only on the missing "what" and "when" scenarios. The general concept can easily be

applied to other attributes such as location (where) or participants (who). In our simplified version, the "where" can be also handled by overloading the "what" of the event with the location of the event; e.g. lunch at Rio Grande.

We restricted users to create events with either a missing "what" or a missing "when", but not both, as an event with no activity and time information seemed rather a rare occurrence.

The Suggestions feature automatically turns on a negotiation mechanism consisting of voting on and suggesting values for the missing attribute (this mechanism is described in more detail in the following sections). Essentially, users would view an event with a missing attribute as asking for suggestions on it; e.g. a missing "what" would be interpreted and displayed as being "what to do at this time?" with provisions to supply answers.

Users create tentative events by filling in a very simple form (see Figure 2), basically providing the following input:

- What they need suggestions on: the "what" or the "when"?

Figure 2. Creating a tentative event.

- What is the question regarding the missing attribute that they wish to have answered? E.g., for a missing "when", a question to the event's stakeholders would be: "When is a good time to hold this meeting?"

- Who should be notified about this? Users have the option to specify people who should be explicitly involved in the decision-making process. This sends out email notifications and hence increases the likelihood that someone discovers the event needing suggestions. However, this event is visible to all those users who are subscribed to the creator's events. This is similar to visibility of tweets in Twitter. This decision was based on the design principle of integration with social networks. This setup makes it possible that people outside of the ones explicitly notified could also see this event and possibly respond with helpful suggestions. As we shall see later, users we interviewed spoke positively about this phenomenon.

Instantiating such an event would create a visual representation as shown in Figure 3. It appears very similar to the representation of a regular event, except the incompleteness and the provision to

Figure 3. Tentative Event representation with Suggestions affordance showing user comments and suggestions.

supply input is prominently displayed. Further, such events are displayed in a separate list for ease of discovery (see Figure 1).

4.2 Submitting Suggestions

A tentative event is considered to be an event inviting input or suggestions on its missing attributes. The interaction between the event organiser and all the stakeholders is critical to the success of the coordination effort. Hence, this interaction must enjoy a high amount of flexibility. For this purpose, we adopted the polling style of Doodle and extended it by enabling users to add new options to the poll. This is consistent with our design principle of high flexibility for negotiation and lightweight nature, and findings from research by Wiberg and Whittaker [37]. Each individual option was termed as a suggestion. It was these items that lent their name ("Suggestions") to the system. The user can view suggestions, comments, who voted for which suggestions, and add suggestions of his/her own – all quickly from within the Suggestions popup.
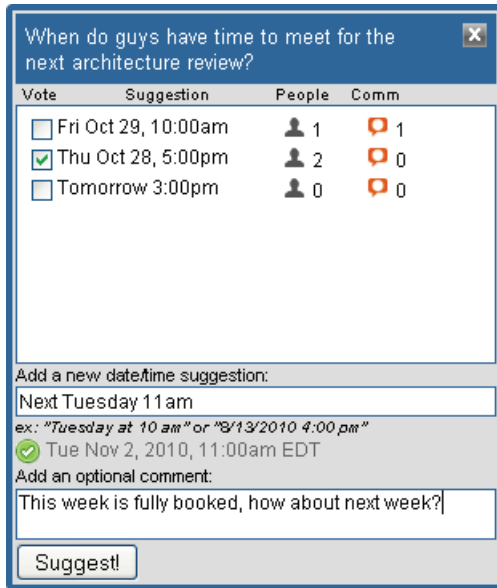
Figure 4. Adding new suggestions.

Figure 5. Viewing comments inline.

In order to discuss and negotiate the incomplete ("what" or "when") aspects of events, users could do the following actions:

- **Add new suggestions:** Figure 4 illustrates adding a new suggestion to a tentative event asking for a date and time. If a suggestion is a date/time value, it is automatically parsed as such. A single user may add multiple suggestions to an event. If the creator of event desires, she may even seed the event with some initial suggestions, thereby inviting other users to merely vote and comment on them. A user may also submit a new suggestion along with a comment, possibly explaining the suggestion. Comments are automatically added to the regular comment section of the event but flagged as suggestions (see Figure 3). This design tightly incorporates the negotiation part of the overall social interaction around an event on Timely.

- **Vote on existing suggestions:** Checkboxes next to each item allow users to vote for an item that has already been suggested and add an optional comment along with that vote. The user can vote for multiple suggestions, just as she can add multiple suggestions. The number of votes is displayed with each item (*People*) as well as the number of comments (*Comm*).

- **Comment on existing suggestions:** Figure 5 shows how a user can pick on any suggestion, view existing comments and add a new comment to it. This feature enables rich discussions around individual suggestions – we designed the system so, so that users can be empowered to effectively negotiate around events to reach a consensus. These comments join the rest of the comments directly attached to the event itself (if any).

Timely's first release supported limited access control: only public and private events were allowed. Because of this transparency, all voting and commenting done on public events through the Suggestions mechanism is viewable to all, not just the creator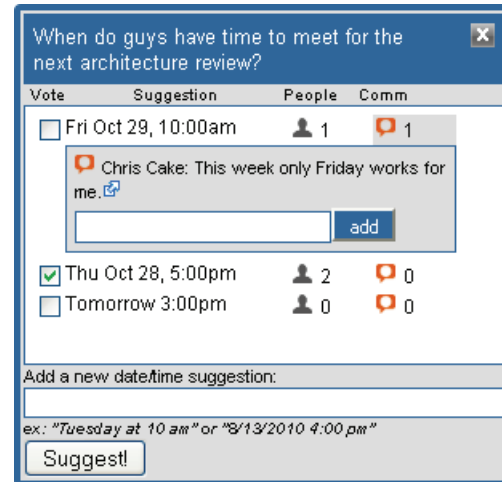 of the event. Further, for Suggestions to be effective, the events concerned have to be visible to at least possible stakeholders. More complex models in which visibility is limited to certain groups of people, e.g. social circles, could be supported if the underlying calendaring system supports them.

4.3 Accepting Suggestions

The creator of the event can view all the suggestions, votes and comments at any time. Whenever she feels that the negotiations about the incomplete aspects of the event have converged or otherwise decided, she can "accept" any one of the suggestions to complete the event. Figure 1 shows the affordances for the creator of the event in the popup Suggestions box (radio and accept buttons). This action updates the incomplete part of the event – the missing attribute – with the chosen suggestion.

4.4 Coordination History

Once a tentative event is "completed" – the result of accepting a suggestion by its creator – the event attains the status of any other fully specified event in the system. However, since at least a part of the details of the event was obtained via coordination among several users, the history of that decision making process is still available alongside the event details. The goal is to maintain transparency about the process used to resolve the incompleteness of a tentative event. This history display is very similar to the regular adding/viewing suggestions and comments interface as shown in Figures 4 and 5, except that it is locked – no more adding of information is allowed.

5. DATA COLLECTION

The data we used for our initial analysis is based on the deployment of Timely with the Suggestions feature inside IBM. The database includes data representing the first 87 days of usage from July 27, 2010, the day our site was launched, to October 20, 2010. At that time, 2767 users had registered with Timely and created a total of 2606 events. We have collected logs of user activity since users started using the system. We logged when users created events asking for suggestions, and whenever they received any responses. These logs form our first source of data. We chose 6 users for semi-structured interviews based on their usage of Suggestions on the site. They were not affiliated with our project nor were they part of our group. Three members of the

team conducted these interviews over the phone (5) and in person (1). The interviews lasted between 30-40 minutes and covered general aspects of the site and the Suggestion feature with a focus on open access. Table 1 summarises our users.

6. RESULTS

6.1 RQ-Need: Is there a need for social coordination?

Our preliminary data suggests that users see a place for social coordination within the enterprise for certain kinds of events. During the first 87 days of usage a total of 40 tentative events where created. 61% of the events were asking for suggestions on the date and time ("when") versus 39% asking for the "what". 12.1% of all tentative events were later flagged as completed / resolved by their creators. We inspected the 40 events and classified them along two dimensions:

- Work/personal: Whether the user was asking suggestions about a work-related event (e.g., a team meeting), or a personal event (e.g., a weekend activity).

- Individual/group: Whether the event concerned just the creator (e.g., the creator's vacation), or a group of people (e.g., a team meeting, or a group lunch).

We found that people used tentative events for a variety of events – work or personal, individual or group (see Table 2). Not surprisingly, given the context of our deployment, most tentative events (82.5%) were work-related. More than 50% tried to coordinate work-related group activities, e.g. "Next Blogger Brainstorming Meeting?", or "My manager is in town on Wed. Any suggestions on where to go to lunch around the [town name] office?" An example for an individual work-related tentative event was a user trying to collect ideas for a periodic blog newsletter. Personal individual and group tentative events included figuring out weekend activities or organizing a party.

In our interviews, we asked users roughly what percentage of their monthly events required negotiation before they were setup in their calendars. We found that this proportion depends on the job role or work of the person. Some users coordinate very little, others coordinate a lot, e.g. managers versus individual contributors. When we asked them how they currently negotiated these events, we received a variety of answers like the traditional electronic calendar, e-mail, instant messaging, and telephone. Many of our interviewees worked from remote work sites and different time zones, which meant that face-to-face negotiation was not an option for them. To probe further, we asked them how they would rate each of the media mentioned above on a scale of 1 (very poor) to 5 (excellent) for the event coordination tasks that they did (3 meant average), and reasons for the rating. Table 3 outlines the responses we got.

From the ratings and the user comments, we see a good support for the design choices we made for Suggestions. People did not overly like the automated meeting scheduling of calendars when it came to handling different kinds of free/busy time and managing conflicts of individual participants leading to multiple rescheduling actions. Although researchers have tried to automatically infer free time [26], people do have to manually respond to scheduling requests, and for larger groups, this becomes inconvenient. Further, people liked the quick and lightweight nature and "social" feeling of instant messaging but

User	Gender	Job Description
A	Male	Business partner organization
B	Male	Client technical advisory
C	Male	Enterprise web user experience team
D	Female	CIO innovation team
E	Male	Business development
F	Male	CIO innovation team

Table 1. Description of our interviewees.

	Work	Personal
Individual	11	6
Group	21	2

Table 2. Categorisation of tentative events created.

indicated that chat works only for coordinating small groups of people. As the main disadvantage of these media users mentioned their lack of integration with the users' primary calendaring tool.

Thus, our interviews suggest that there is a need for a social coordination mechanism that is integrated into people's calendars and social networks, as well has a lightweight and of less clunky nature. Suggestions is a step in that direction.

6.2 RQ-Benefit: What are the benefits of social coordination?

The follower-followee infrastructure supported by Timely meant that a user asking for suggestions on an event could receive suggestions from those outside their network of subscriptions. Anybody can subscribe to a user's event stream and, since the events are public by default, could discover them. In our interviews, we asked our users how they felt about this open approach. 5 out of 6 users said they expected answers from "outsiders" and/or liked it.

Besides the advantages of social coordination that we expect based on our design choices, the following are specific aspects of social coordination that our interviewees spoke about.

Tool for gathering public opinion. When a user creates a relatively open event, it can be an efficient way to gather as many responses as possible. For example, one of our subjects created an event called "World Usability Day" at the date November 11. He had marked it as requiring a suggestion on its "what". He wanted to gather suggestions and votes on what the company should do as a part of the World Usability Day celebration.

"That was the hope, somebody I don't even know, would stumble across it and respond … that is even better, I didn't even know this person and they contributed."

Bonus responses. Sometimes, a user creates an event expecting that a certain set of people see it and respond to requests made within it. However, if people outside of this set responded, the creator was benefitted further. For example, one of our users who dealt with a lot of external customers of the company created an event asking for information about a customer he was to visit next. His aim was to ask people who have interacted with that customer before, what their experiences were. However, he hoped

Medium	Mean Rating (out of 5)	User Comments
Traditional electronic calendar	2.75	*"…in a social setting, if you want to have a beer with colleague, that often happens, too easy to reschedule, so the meeting gets rescheduled often."* *"There's a lot of times where something looks blocked but not quite blocked, there's different types of free time. For me, free time is wide open anyone can come back, there's other time that's blocked so someone on my team can grab it if important, but a random* [Company Name]*'er, like on a Friday afternoon, has to wait till Monday."* *"it is great that you can see when people are available"* *"You get one person saying I can't do this time, here's an alternative, someone cancels from meeting, someone declines without option to be included. It is a debauchle."*
E-mail	3.08	*"… because I forget to put in in my calendar, then I forget the meeting. Especially because I do email with client, I schedule a meeting with clients then I forget it."* *"email is to me for a small group"*
Instant Messaging	3.75	*"I typically don't use* [IM Product Name] *to negotiate calendaring unless it is immediate."* *"…to quickly discuss things we want to put in an agenda or something"* *"because of immediacy, you can do multiple person chats"* *"It is mostly the social part."*
Telephone	2.58	*"If you have an agenda in front of you, you decide. Much more interactive…"* *"Phone is the best then you have the best social connection. That is why* [IM Product Name] *is so good, then you have the social negotiation of what and when and how. Phone is even better. … bad part is no connection between phone and my calendar."* *"… sometimes really useful for small group to figure out."* *"only on a 1-to-1 basis"*

Table 3. Media Choice for Scheduling.

that if people other than those he explicitly notified had information to share, they would do so, and these responses would be bonus ones:

"Two reasons … first of all, I am going to have a discussion with a client on this topic and I already looked around [the company] and I did not get the right people at the table to give me the content so that I could bring it to the client. So I thought, use a gun, to shoot inside [the company] to see who looks at this and who can help me. A shotgun. So I try to see if somebody sees that who can help me."

Network expansion. There are several ways a person's social network expands. One of the ways is by reciprocation. Consider the scenario where a user creates a tentative event, asking for suggestions about some aspect of it. As mentioned before, the openness of Timely meant that the creator could get responses from those outside his current network. This may lead to the creator subsequently following one of the responders, as aptly put by one of our subjects:

"I think that the basic definition of respond work strategy in smarter planet … social media is about helping followers and following helpers."

6.3 RQ-Attitude: What are the attitudes of users towards social coordination?

Another theme that came up in interviews was the necessity of the Suggestions system to be appropriately placed within the ecosystem of existing systems. Although the users we interviewed

liked the system overall, integration and adoptions emerged as their primary concerns.

Integration with existing calendars. The users we interviewed complained heavily about non-integration with the existing traditional electronic calendaring system. IBM has had Lotus Notes in place, which has been in use for over 20 years at the time of this study. The Notes Desktop Calendar is where the majority of coordination and negotiation around events happens today. While social software, based on openness and sharing has been finding increased usage, displacing an existing calendaring system is a challenge also from an organizational IT management perspective.

"The main reason was because I think, it is a new tool, so I think like Twitter began. It becomes more popular when more people start using it, more people start following people the chance of getting a valid response goes up."

Since Timely was a novel system in its infancy, it was not yet integrated it into the existing calendar systems during the study period.

"Would use if there is greater adoption." Several subjects said that they would definitely find value in Suggestions if more people used it. Some users said they did not find more value in the feature or expect responses from their network because they knew that it was an experimental system and not everyone was using it yet. Further, some usability issues with the system resulted in severe under-utilisation of its notification feature. This feature was critical for notifying specific users they wanted involved in

the event decision-making process. Without this explicit engagement of others in the process this problem was further aggravated.

While these do not seem to be fundamental problems of the design of our social coordination system, they need to be addressed for the success of any social software.

7. LESSONS LEARNED

While we did not expect users to displace the widely used and deeply rooted enterprise calendaring tool, we were expecting a higher uptake on the Timely system by early adopters. The uptake of the Timely system itself had an immediate impact on the adoption of the Suggestions feature. The existing traditional electronic calendar was very widely used and has grown very sophisticated over the years. Of course, it still was not the perfect solution, as our interviews pointed out; but, the culture and norms of the company ensured its continued high usage. Most of all, people did not want to duplicate entering events, i.e. managing two calendars in parallel. Integration is essential and we are currently working towards a better data exchange between the two systems so they can be used in parallel. For example, Lotus Notes supports extensions that can be used to integrate Timely and Suggestions into a calendar sidebar. This would allow users to easily publish events to Timely, or add the results of a successful negotiation to their Notes calendar with fewer clicks.

During the development of Suggestions, we had carried out a number of usability tests with a small group of employees. These tests gave us insights into the ways users thought about tentative events. Although our initial idea was to design tentative events as structurally identical to ordinary complete events, user feedback suggested more of Q&A style of interface. This raises an interesting question as to whether, from a system architecture perspective, tentative events should be separated out from the actual coordination task, i.e. the questions being asked.

Scheduling is more complicated than any one of its perspectives. For example, we have seen anecdotal evidence of cases where people have been asked to rule out or vote *against* available options, instead of vote *for* others. Choosing a medium for scheduling using the media richness theory is, in our view, a hard problem. We tried to bring useful factors from several different media together in Suggestions, but clearly, it has a long way to go before it realises its ultimate goal. A more rigorous study of how people do event scheduling in today's socially connected world is necessary to create a recipe for the correct mix of features. While calendaring has been studied extensively, there are only few works on event scheduling and coordination behaviours, especially in today's world of social media. We are planning to conduct a larger study in the near future. Until then, we believe the media contingency theory is the right way to look at solving scheduling problems – use the medium that is most appropriate for the task and situation at hand.

Currently, Timely is an internal system available only to enterprise users. As a result, employees cannot use the mechanism to coordinate events with people from outside the company. Several of our interviewees mentioned this as a significant drawback, especially when dealing with external customers. To that end, we are planning an external release of Timely in the future. That would be an excellent platform to study the behavioural impact of a social event coordination system through a controlled study or a before/after experiment. For example, the availability of a mechanism to effectively coordinate events could positively impact people's willingness to openly share their time commitments with others. Another interesting consequence of the external release would be the possibility of comparing social coordination mechanisms inside and outside of the enterprise setting.

We also heard in our interviews that while open sharing is good in general, it is not appropriate in some cases even within the protected boundaries of the enterprise. Privacy becomes even more an issue for an external deployment of Timely. Some of our interviewees suggested a finer level of access control, for example, sharing events and Suggestions only with certain social circles. This kind of scoped access will also benefit event coordination because it offers more privacy for certain kinds of coordination tasks.

Our Suggestions design addresses the problem of coordination and negotiation around tentative events. One could possibly imagine a situation where similar dynamics needs to be achieved in another domain, for example, sharing to-do lists and plans. While we think that a Suggestions-like solution would be a good candidate for this generalised class of issues, further experimentation would be needed to explore this idea.

8. CONCLUSION

We have described the design of a novel social coordination tool for time-based events within an open, social calendar. Our design was informed by previous research on calendaring and social software. Our preliminary evaluation suggests that users generally see a lot of value in a more transparent, social approach to setting up meetings. Today's calendars are mostly static repositories for events but do not very well support the dynamics of setting up events including the communication and social aspects of events. A system that affords a more integrated, open approach can potentially increase the effectiveness of event coordination by reducing the overhead introduced through the use of multiple parallel disconnected communication channels.

The research in this paper was focused on the design and rational of a novel social coordination system. The results of our preliminary evaluation suggest that we have been moving into the right direction with our design but they are also limited given the number of subjects interviewed and the number of tentative events created. As Timely evolves inside our enterprise, we will continue iterating on our design and quantitatively study the use of the Suggestions feature with a larger group of users.

9. ACKNOWLEDGEMENTS

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