

# IM Here: Public Instant Messaging on Large, Shared Displays for Workgroup Interactions

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## ABSTRACT

Instant messaging (IM) in the workplace has proven to be a valuable tool for facilitating informal communication. Its benefits, however, are generally limited to times when users are in front of their computers. Because so much work takes place while people are mobile within their workplace, we sought to extend the benefits of IM beyond people's personal machines and into publicly accessible groupware. We first conducted a study of large display groupware applications (LDGAs) to understand the affordances that large displays offer for groupware, and the factors surrounding their adoption. We developed the *IM Here* system for shared IM on large displays using the lessons learned from the study. In this paper, we present the findings of our LDGA study, the design of IM Here and the preliminary results of our evaluation of IM as a public resource for workgroups.

## ACM Classification Keywords

H.5.3 Group and Organization Interfaces; H.4.3 Communications Applications

## Author Keywords

Large displays, public displays, groupware, instant messaging, computer mediated communication

## INTRODUCTION

Informal communication is an important part of many workplace tasks. Instant messaging (IM) is valuable for facilitating informal communication between workgroup members for such purposes as scheduling, negotiating availability, and maintaining awareness [11]. However, much of the work people do takes place away from their personal workspace [18], limiting the value of IM for these tasks. We sought to extend IM access beyond people's PCs, making IM available in other places where work occurs. We aimed to discover new value by breaking the current paradigm of personally-owned IM and introducing IM as a shared public resource.

We developed the IM Here system as an awareness and communication tool that takes advantage of IM for lightweight

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interactions and large-scale displays for their walk-up-and-use nature. The system uses the large, highly visible form factor to promote group awareness of upcoming events. The large display also emphasizes the fact that its IM capabilities are a *shared* resource for the workgroup.

Many large display groupware applications (LDGAs) have been developed and researched to facilitate a variety of CSCW purposes in recent years. Applications have been built to support collaboration and whiteboard interactions [8, 9, 13, 15, 17], electronic bulletin board posting [1, 2, 3], and awareness and communication [1, 5, 9]. These systems have met with varying degrees of adoption success.

In designing and deploying IM Here, we aimed to understand the factors affecting the success of adoption for LDGAs. While these applications face many of the same challenges to adoption as conventional desktop-based groupware, the public and shared nature of these systems heighten these challenges and present additional difficulties that affect adoption and success. To help inform our design and deployment of IM Here and to better understand large display groupware in general, we conducted a study of nine existing large display groupware applications (LDGAs). Our study identified several factors of LDGA design and deployment that influenced their adoption and usage within the workplace. The factors served as guidelines for building and introducing IM Here in our 24-person workgroup.

In the remainder of this paper, we describe the potential value for group accessible, shared IM in the workplace specifically for use as groupware on large, public displays. We present the results of our study on the adoption of LDGAs in the workplace and use of these lessons in informing our design and deployment of the IM Here system. Finally, we present the preliminary results of the IM Here evaluation, and reflect upon IM Here as an LDGA.

## MOTIVATIONS FOR PUBLIC IM IN SHARED SPACE

To help facilitate informal communication in the workplace, we aimed to create a publicly available IM tool that would reside on a large display in a shared workspace, extending the value of IM beyond the personal machine. Our work was motivated by prior research on informal communication and IM and our own observations of workgroup communication.

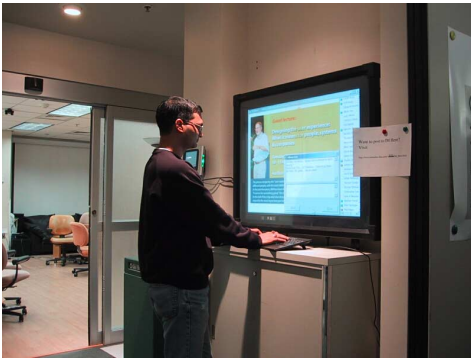


Figure 1. IM Here deployed near a conference room.

### Not all work takes place in the personal workspace

Studies done by Whittaker *et al.* [18] show that people spend much of their workday engaged in work activities that do not take place at their desks. During this time, people engage in informal communication that facilitates work tasks. These tasks include formal and informal meetings, collaborative activities, and other activities that require people to work outside of their personal workspace and away from their PCs.

### IM helps people with work tasks

Studies of IM in the workplace by Nardi *et al.* illustrate IM's value as a tool to enable informal, lightweight communication between co-workers [11]. She points to the affordances of IM, such as its casual and non-distracting nature, as well as its immediacy and visual persistence as reasons why it is preferable to other channels, such as telephone or email, for certain work tasks. Her studies demonstrate the utility of IM to facilitate "outeraction" – communication not for conveying informational content, but to facilitate further interaction. Examples of outeraction for which IM is used are negotiating availability and scheduling. Supporting outeraction when people are away from their workspaces was a key motivator for the design of IM Here.

### The need for access to communication in our workplace

Observations of practices within our workgroup provided further motivation for group-accessible IM in shared spaces. For instance, despite the ubiquity of networked laptops, workgroup members often did not take these machines with them when they worked outside of their personal workspace, especially for spontaneous or unplanned work. Contacting people outside of their immediate vicinity required that they leave the current work area to find people or return to their personal workspaces to communicate using their machines.

We also observed that people commonly needed to contact others during or before collaborative tasks or group events. For example, we noticed one particular behavior associated with a common room often used for meetings, gatherings, and planned or impromptu collaboration. Before a scheduled event, the organizer, host, or speaker would notice missing parties or a poor turnout, thus prompting him to run about the building wing knocking on office doors or trying to locate or recruit people. This practice took the organizer away from the event venue and also reduced the amount of time available for the event. Behaviors like this further suggested that providing

ways for people to contact others from shared workspace could be valuable to the group.

We also observed an ineffective use of email as a medium for announcing events that suggested another potential use for public IM. The organizer of the event typically would send an email announcement to the group several days before the event, and then another immediately preceding the event to let group members know that the event was starting. This second email often was not noticed by recipients in a timely fashion. The visible alert and immediacy of IM seemed potentially valuable for this type of communication.

### EFFECTS OF LARGE DISPLAYS ON GROUPWARE

To help us design and deploy our public IM tool, we wanted first to understand some of the factors affecting the adoption of LDGAs. In his seminal CSCW article, Grudin outlined a number of challenges for the successful creation of groupware applications [4]. In the realm of LDGAs, we observed that common characteristics of these systems that distinguish them from desktop applications heighten the existing challenges and present new ones. Four of these characteristics are:

- *Form factor* – The size and visual impact of large displays cause users to perceive and interact differently.
- *Public audience and location* – The location in shared space affects the amount of attention users direct at LDGAs as well as the visibility and privacy of interactions.
- *Not in personal workspace* – The location outside of users' personal workspaces affects the amount and type of interaction and exploration in which users engage.
- *Not individually owned* – The lack of personal ownership of LDGAs affects the extent to which people use them or interact with the content.

In order to identify common factors affecting the success of LDGA adoption, we conducted a study involving three different groups of people: a) researchers working on LDGAs b) members of workgroups in which LDGAs were deployed, and c) salespeople for a corporation that produces large displays and LDGAs. Our study entailed semi-structured telephone and onsite face-to-face interviews and observations of nine systems. Some systems had been adopted into everyday work, but many suffered from disuse. Our questions specifically probed issues of adoption and long-term use. The set of systems consisted of research and commercial LDGAs in real use settings and much of our study took place within these settings. Because some study data consists of currently unpublished findings, we do not identify the individual projects in our discussion. For more information on the LDGAs in the study, see [1, 2, 3, 6, 8, 9, 13, 15, 17].

### FACTORS AFFECTING THE ADOPTION OF LDGAS

We identified five important adoption factors that were common across many of the LDGAs we studied. Although several different factors affected the adoption of each system, the five that we describe here were those that emerged as critical factors for at least four of the nine LDGAs. Each factor stemmed from the four common characteristics of LDGAs that

we identified. The factors are a combination of technical and social issues that influence design and deployment techniques that affect adoption and use.

### 1. Task specificity and integration

*The value and usefulness must be more evident than for conventional groupware because users may spend less time exploring and experimenting with LDGAs.*

In many LDGAs, the specificity of the tasks involved was crucial to the adoption of a tool that seemingly supported general collaboration practices. Systems introduced for the sake of promoting specific collaboration or information sharing tasks generally were more successfully adopted than those introduced for general collaboration purposes. Tools deployed to support specific tasks were more likely to be successful if they were deployed for either a task for which their use was critical or a task whose content itself was critical to the user. In one example, professors teaching certain classes chose to make use of a collaborative display for teaching and class discussions. The use and interaction with the technology was critical for the tasks of taking or teaching the class; students taking the class used the display not because they were required or told to do so, but because it was deeply integrated into critical tasks involved with being a part of the class. In another case, an LDGA was introduced and adopted for space exploration planning, an inherently collaborative critical task for which the LDGA increased scientists' ability to carry out the task efficiently.

### 2. Tool flexibility and generality

*LDGAs that support general collaborative practices may be adopted by new user groups or for novel tasks because of their high exposure and public and shared nature.*

We have also observed the value of broad and flexible collaboration support in LDGA design. While this factor may seem to be in conflict with our discussion of the value of task specificity, it should be made clear that important flexibility is built into the *design* of the tool, while task specificity and integration pertains to the purposes for which it is *deployed*. Most successful systems we studied provided support for a breadth of different practices that people employ to collaborate, even though the systems were deployed to support specific tasks. In short, tools that offer a variety of interaction methods that users can select as needed have been more widely adopted than those that lock users into very specific interactions.

A flexible tool that is deployed to support a specific task may also be appropriated for other tasks as people realize the tool's potential. A system that supports a broad set of collaborative practices may be used beyond its intended purpose. In one case, an LDGA designed to help visiting scientists collaborate was appropriated by teams of resident engineers because it provided them with general tools for creating shared digital artifacts as well as an easy method of distributing these artifacts among users.

### 3. Visibility and exposure to others' interactions

*The interactions of others demonstrate usage and value because the form factor and public nature of these applications can make user behaviors highly visible.*

Although certain features existed of which users were aware, they were exposed to the potential value of the features after observing others making use of them. In one particular instance, the item forwarding feature of an information sharing application in an LDGA existed in the interface for approximately three months before it received use. Though the feature was highly visible and people were aware of it, users did not perceive it as useful until they saw others using it. Through seeing people forwarding items and possibly from receiving forwarded items, users began to use that feature and it became widely adopted. Because large displays are perceived as more public than desktop systems [16], the value of exposure to others' interactions on LDGAs can influence use and the perception of value.

### 4. Low barriers to use

*Barriers to use must be low so users can quickly find value because LDGAs may be less amenable to exploration and have a lower frequency of use than desktop groupware.*

It is important that users be able to interact successfully and easily with the system early in their usage in order for the system to be adopted into everyday tasks. Systems that require significant time to install or configure, have time-consuming steps to initiate use, or have functionality that is not visible tend to find small audiences or a drop in usage after the initial deployment. In one application that requires user-submitted content, users have the option of posting information via a web form or an email address. Because email is perceived as quicker and easier than going to a form and filling it out, it is often used to post, while the web form is not. Another system that requires users to install and configure an application on their desktop machines in order to use the LDGA is used by only a small portion of its workgroup, despite a long-term deployment. The researchers attributed this to the lack of an easy installation process.

### 5. Dedicated core group of users

*Advocates and a core set of users early on help others to perceive usefulness and reduce hesitancy to use the system stemming from their form factor and location.*

With all groupware applications, achieving critical mass is crucial to adoption [4]. Because LDGAs are generally less amenable to exploration and experimentation than desktop groupware, they are more likely to fall into disuse soon after deployment. Researchers who developed systems that were not very task specific found that adoption was aided by having a dedicated core group of users early in the deployment. This group, which often included the researchers, used the system regularly and encouraged usage by others after the initial burst of "novelty use" died down. Continued use by the core group ensured that displays remained dynamic and content fresh rather than stale. The perception that displays were being used and viewed encouraged further adoption into everyday use by

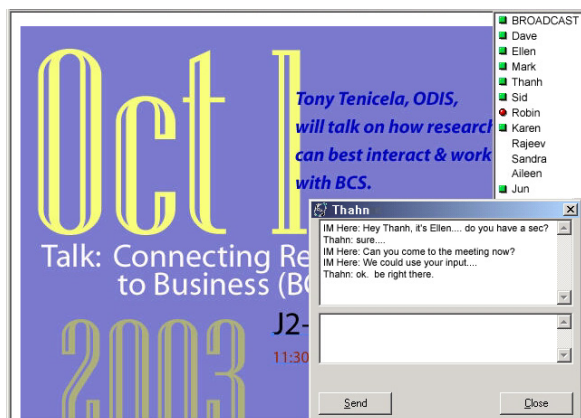
a wider audience. Additionally, the core group advocated others' use by directly encouraging others to use the applications. For one application designed to share user-submitted items, core users encouraged coworkers to post information to the displays that they had previously emailed to others. This encouragement was positive feedback to senders of the information and lowered the hesitancy they felt over interacting with a new system, technically and culturally.

### THE IM HERE SYSTEM

We undertook the exploration of LDGA adoption not only to understand the successes of other projects, but also to apply these factors to our own public display groupware tool. We designed the IM Here system to enable users to communicate in a quick and lightweight fashion while mobile within the workplace by making IM publicly available in common or shared workspaces. Our design and deployment are greatly informed by the lessons we learned from our LDGA study.

#### System design

The IM Here application consists of two primary components: The IM Here Event Display provides lightweight information about upcoming events and announcements; the IM Here Messaging Client allows users to send instant messages to workgroup members from the display in a walk-up-and-use fashion (Figure 2). Together, these two components comprise an LDGA that provides awareness information to the workgroup in its passive state and also affords quick connections and conversations through overt interaction. The system was deployed near the entrance of a conference room that is frequently used for formal and informal meetings, social gatherings, talks, and spontaneous or planned collaboration (Figure 1). The area where the system resides is well-trafficked both by people using the conference room as well as passersby.



**Figure 2.** IM Here in use for messaging with the Event Display on the left and the Messaging Client on the right with a messaging window open.

#### IM Here Messaging Client

The IM Here Messaging Client provides a publicly accessible channel for low-barrier instant messaging. It is interoperable with the Sametime instant messenger client and was built using the Sametime IM toolkit [14]. The compatibility with Sametime allows users of IM Here to communicate with users

of Sametime, the primary messaging client used within in our workgroup.

In its passive state, the client provides persistent awareness cues in a public location. The contact list for the client lists workgroup members and uses Sametime's status cues beside the names to indicate whether group members are available (green square), idle (yellow diamond), busy/do not disturb (circle with a slash) or not logged on (no indicator). The persistently visible list provides value by supporting lightweight awareness about presence and availability [11].

For messaging, IM Here functions similarly to conventional IM clients with a few key differences:

**Broadcast** – The Broadcast feature of IM Here allows users of the kiosk to send a message to everyone on the contact list who is logged onto Sametime. This feature was motivated largely by our observations of people running around to knock on doors or sending mass emails directly before a group event. Broadcast allows people to send messages to the group quickly and easily, and in a way that is both immediately visible and lightweight to the recipients.

Providing users the ability to mass-IM the group creates the possibility of overwhelming the group with unsolicited, irrelevant messages. However, because group members are generally judicious with other forms of mass communication or have some idea of what is socially appropriate for announcing to their community, we expected this to be the case as well with IM Here broadcasts. Rather than building in technical barriers to prevent unnecessary broadcasting, we opted to explore whether social norms and practices would prevent abuse of the feature.

**No login process** – All messages sent from the IM Here kiosk to Sametime users appear to come from the account called "IM Here" rather than from the Sametime username of the sender because IM Here has no login or authentication process. The design decision not to require authentication provides senders and recipients with three major benefits.

First, it keeps use barriers for the senders very low, making the system truly walk-up-and-use. Users can quickly tap on a recipient's name and start typing messages; the interaction is immediately available with little or no overhead. Another option was to use a method of automatic identification such as active RFID tags, or a badge-swipe. However since badging in requires another step and group members do not already carry active tags, either method would have added an extra barrier to use.

Secondly, as most IM clients only allow a single account to be open on one machine at a time, eliminating the user's need to log into IM Here prevents the closure of existing Sametime sessions that might be open on the user's desktop or laptop machine. We expected that most interactions on IM Here would be transient and brief and people would not want to lose existing personal sessions. Many IM users treat their personal clients like voicemail, leaving them open even when they are not present. Our observations of our group and previous IM

research have shown that some IM users send “sticky note” messages even when they know that the recipient is not present [7]. Messages such as, “Can you IM me when you get back to your desk?” are a common use of IM. It would be inconvenient if personal sessions were closed every time people used IM Here for quick messaging.

Finally, the fact that the recipient of messages sent from IM Here sees the messages as coming from the user “IM Here” rather than the sender’s normal Sametime login provides context to the recipient about the sender’s situation. The recipient knows that the sender is in a public location, not in personal workspace, possibly not alone, and likely not in that location for long. This bit of social context helps the recipient mediate her messaging, possibly by avoiding confidential or personal subject matter or saving involved discussion until later.

Though the use of the dedicated IM Here account provided the above three benefits to both senders and recipients, having an anonymous IM user presents potential problems. Does the lack of an identifying account name confound the recipients of IM Here messages? Would “vandals” take advantage of the anonymity to masquerade as other group members or send prank messages? When using communication channels without built-in explicit identification of the initiator, such as phones without caller identification or notes left on office doors, people generally make clear who they are. For messaging using IM Here, we wanted to explore whether the social practice of identification would develop or carry over from other channels. Additionally, since prank-playing and identity forging are generally considered unacceptable in workgroup phone or paper note use, we also expected that they would become unacceptable in regular IM Here use after the system novelty had worn off. We opted to try to take advantage of social norms and people’s standard communication practices rather than building in additional technology and a burdensome login process.

### IM Here Event Display

The Event Display takes advantage of the affordances of large displays for promoting awareness of various upcoming events that are of relevance to the workgroup in general. The display presents graphical and text postings regarding announcements or events on a continuous cycle; each posting is shown for a default of 25 seconds. The content of the posting ranges from formal (an invited speaker talk in the auditorium) to casual (an informal afternoon gathering because a colleague has baked a cake for the group). Content for the Event Display is generated using a web-based interface accessed on a personal machine. The form allows users to enter information about the event such as the title, description, date, location, and expiration date; a posting is automatically generated from this information and put into the cycle. The posting remains in the cycle until it expires.

For this design, we placed the primary responsibility of maintaining content on an administrator who regularly created postings from email announcements and the company web page. Although users were welcome to post their own items

and occasionally did, our focus was not on getting users to post, nor did we want to rely on getting user-submitted content for value. Our focus was instead on the IM interactions and adoption, while the events served as a way of making the display attractive and providing value in the passive state. Similar systems whose focus is on presenting user-submitted content offer lessons on how to foster this, especially as pertains to the low barriers for input [1, 10].

### Balancing public and personal in IM Here

The tasks IM Here supports have public and personal aspects that we attempted to address in our design. Announcements and event postings are clearly for group awareness, but they also serve the purpose of being informative to individuals. The contact list provides awareness to the group but also informs personal IM interactions. IM itself is generally a personal interaction, but the large public display makes it less private than using one’s personal client. The display encourages the perception of the system as a public tool [16] and because so much group work takes place in the space, we wanted to encourage it as a shared tool. Our design attempts to keep IM conversations more personal by positioning IM windows low on the screen, making the interaction in the user’s field of vision and less visible to others (Figure 2). Because of the nature of the space and the tool however, we did not expect that users would conduct private discussions using IM Here; maintaining a sense of personal interaction in the design was more for user comfort and appropriateness than for stringent conversational privacy.

### ADDRESSING THE FIVE FACTORS FOR LDGAS IN THE DESIGN AND DEPLOYMENT OF IM HERE

The factors we identified as affecting the adoption of LDGAs in our initial study greatly influenced our design process and deployment plan for IM Here. We sought to provide value to users through the communication channel and interactions of the system, and the factors served as guidelines in designing these interactions and introducing the system.

1. *Task specificity and integration* – IM Here was demonstrated to the workgroup not as a general purpose communication tool; rather it was presented as a solution for people who were running talks and meetings or collaborating within the space. We made potential benefits concrete by illustrating how the system could help users avoid having to run around to people’s offices or go back to their own office to call or IM someone. This served to make the value explicit and immediately recognizable.

2. *Tool flexibility and generality* – IM Here makes use of a general purpose communication tool already in use by nearly all members of the workgroup. It is also easily appropriated as needed because of its public form factor and location in the environment. IM is clearly flexible and IM Here maintains that flexibility even though it was deployed for task-specific purposes.

3. *Visibility and exposure to others’ interactions* – Messages and broadcasts sent from IM Here are easily and immediately identifiable by the recipients as having been sent from that



system thus increasing the perception that system is being used. Additionally, the public location allows others to observe it in use. Broadcasts for events are especially visible because many people receive the information being sent.

4. *Low barriers to use* – The system has no authentication process so the functionality is persistently accessible. There is also no overhead for seeing the event postings or contact list statuses. IM Here acts similarly to existing clients so there is almost no learning curve for IM users. Its interoperability with Sametime also means that people do not have to install anything on their machines in order to receive IM Here messages and broadcast announcements.

5. *Dedicated core group of users* – In addition to the researchers, we explicitly recruited a small key set of enthusiastic group members to use it and encourage use. We selected people who frequently had a need to communicate from the common room including an intern who was collaborating with several researchers and a researcher who was in charge of the weekly research talk in that room.

### RESULTS: HOW IM HERE WAS USED

We conducted an evaluation during the first six weeks of the deployment of IM Here in our workgroup. During this time we logged IM Here use, made informal observations, and conducted casual, open-ended interviews with 11 group members. The user population consisted of 24 researchers, engineers, and administrative assistants who had had varying degrees of experience with large displays and IM. Of the 24 members listed on the contact list, 13 of them described themselves as regular Sametime users who would be logged on at least one third of their work hours. According to our logs, there were 41 instances of IM Here use over 30 business days. Of these instances, 17 were dyadic conversations ranging in length from 2 to 12 messages, 14 were broadcasts to the group, and 2 were one line messages that required no response. Additionally, there were 8 attempts to start conversations from IM Here that met with no response from the recipient. This is common even in conventional IM, and may be attributable to people not responding immediately or being away from their machines [7, 11]. Within the 41 instances of use, there were a total of 165 messages transmitted. A graph of usage over the six weeks (Figure 3) shows that the instances of use remained fairly steady while the number of messages spiked initially before leveling off in the third week to approximately 20 messages per week (4 per day). Non-broadcast messages were sent to a total of 17 different people. Because there is no login process for using IM Here, we could not accurately assess the number of people who sent messages from the system, but based on the transcripts, we can surmise from context and self-identification that at least 8 people sent messages from the system.

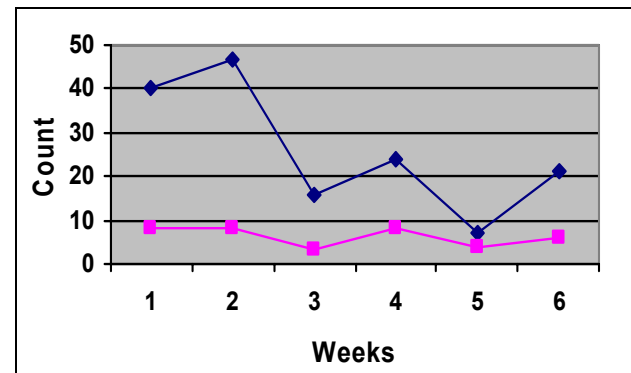


Figure 3. IM Here use over a six-week evaluation period.. The lower graph shows the number of instances of use. The upper graph is the number of individual messages transmitted

We found the usage numbers to be promising; IM Here is used on a daily basis, and a significant portion of the workgroup has sent and received messages using it. The number of broadcasts corresponds roughly to the number of scheduled groupwide events for the common room. Although the numbers of messages and conversations are perhaps lower than for a desktop IM client, the system is intended for brief, walk-up-and-use exchanges on an as-needed basis rather than continuous use throughout the day by dedicated users. Considering the size of the workgroup and context of use, the extent of the use suggests that IM Here is being successfully incorporated into everyday work activities.

People's reactions to the system based on our observations and interviews were generally positive. They found it to be convenient and useful, especially because of its proximity to the common room. Group members who had not sent messages from the system usually attributed this to lack of occasion to do so rather than not seeing value in IM Here. Most people who said they had not sent messages from it qualified that they would likely do so in the future, especially for broadcasting talk announcements.

### How IM Here addresses our motivations for public IM

Logs of conversations and broadcasts also showed that IM Here addressed our initial motivations for making IM a group-accessible tool in shared space. The following brief exchange illustrates the value of IM Here when people are engaged in tasks outside of their personal workspace:

*1:41:06PM IM Here: We're here now, Mark and Sid.*

*1:41:11PM Naomi: OK*

Naomi, Mark, and Sid are scheduled to meet in the conference room to work. Because IM Here is close by, Mark and Sid use it to let Naomi know that they there and waiting for her, saving them the trouble of physically trying to find her or returning to their offices to message her. Again, because IM Here has no login process, messages sent from it appear to come from the account "IM Here."

The next transcript demonstrates the use of the system for accomplishing the "outeraction" tasks described by Nardi. In it, Karen uses IM Here because it is close by and therefore the most convenient way for her to contact Carl:

4:32:10PM IM Here: *it's karen... where are you?*  
 4:32:20PM IM Here: *going back to my laptop... don't reply here*  
 4:32:22PM Carl: *im in a conference call right now*  
 4:32:25PM IM Here: *still???*  
 4:32:29PM IM Here: *you're yakking it up!*  
 4:32:34PM IM Here: *could you IM me when you're done?*  
 4:32:47PM Carl: *yes!!! I promise*  
 4:32:53PM IM Here: *:) ok*

Karen was mobile in the workplace and used the system for scheduling further interaction, and, as in the previous transcript, negotiating availability.

In this next instance, we can again see the convenience of having the system situated by the common room. A user went to the room thinking there was a tea there, and did not see anyone preparing for the event.

3:55:09PM IM Here: *Is there teatime today?*  
 3:55:15PM Janet: *no*  
 3:55:28PM IM Here: *Ooops. I guess we'll wing it then.*  
 3:55:37PM Janet: *thx*

The user used IM Here to message Janet, the coordinator of the usually weekly event, to check if it was happening. Upon finding out that no one was slated to bring in food for the event, the user decides to “wing it” – the group’s jargon for foraging for available snacks in the office to serve at the tea. The user obtains the information about the event in the place where it is relevant.

The use of the Broadcast feature was similarly valuable for group events in the common room. The act of broadcasting the group before weekly scheduled events, such as a lunchtime research talk and the tea, became a regular practice for advertising these events immediately before their start.

3:56:15PM: **IM Here Broadcast:** *Moon cakes now in [the common room]*

Broadcasts like this one provided information and served as a more timely and visible reminder than email. They also prevented legwork on the part of the host. One user mentioned that broadcasts were especially effective for him because he was not diligent about maintaining his calendar and would otherwise have missed some of the events. This user expressed a preference for IM Here broadcasts over last minute email announcements because, “email is not a notification system.” Another user found the broadcasts useful, but did not like that they arrived in an IM window because they appeared at first to require interaction.

#### IM Here for awareness

Many users mentioned the value of IM Here in its passive state because of the IM status information and event postings. Nearly all users reported that they checked it regularly; one even said that he had changed the route he took to his office in the morning so he would pass by the display. Another user mentioned checking the IM statuses every morning on the way to her office to make sure she was not “the last one in” of her close colleagues. One user requested mirrored content on additional displays throughout the workspace. Some requested alternate posting methods for the Event Display, using email

or IM to input; we plan to include a lower barrier posting mechanism in future iterations. Although we relied on the administrator to create postings, 8 of the 47 postings came from users.

#### Emerging and unexpected uses for IM Here

IM Here was originally conceived as a tool to allow people working in the shared space to send messages and initiate communication with people working on their personal machines. Our logs showed that IM Here was occasionally of value for allowing people to access people in the shared space, especially for the purposes of obtaining information about that space:

11:11:53AM Dave: *Dear passerby -- Can you tell me if [the common room] is scheduled from 1- 2PM? (I'd look at the server myself, but I can't get there from here for some weird reason...)*

11:14:51AM IM Here: *1 to 2 PM today looks open. 2 to 2:30 is booked.*

11:15:06AM Dave: *Thanks! (I'm at 2 - 2:30) -- BTW - who are you?*

In this instance, Dave messages the IM Here kiosk from his office, asking passersby to check RoomWizard (the information appliance that displays conference room schedules [12]), which is located nearby. From the timestamps on the messages and the fact that Dave received no response to his final message, we surmise that someone happened to walk by and notice Dave’s query, checked the RoomWizard and walked off after responding to the initial request. Again, the location of IM Here provides value because of its volume of traffic as well as its situation in an area in which important events and information reside.

Another unexpected use of the system arose from the juxtaposition of the IM Here Event Display and the Messaging Client. On a few occasions, users cut and pasted event postings into IMs or broadcasts. The system provides a means of obtaining awareness information as well as a way to pass that information along to others easily.

#### Social norms for mediating IM Here use and abuse

IM Here did not encourage prank playing, despite the anonymity built into its design. Since its deployment, only one instance of use might be construed as a “prank” taking advantage of anonymity. As expected, this joke usage occurred in the first few days of the deployment and can likely be attributed to novelty. By the use of nicknames in addressing the recipient, it is likely that the prank message was meant more as a joke among friends than to annoy a colleague anonymously. We conclude that due to social norms, group accessible anonymous IM did not encourage abuse of anonymity for the sake of intentionally irritating colleagues in our workgroup.

IM Here’s anonymity also was not a problem for message recipients. According to our follow-up interviews, recipients felt that IM Here users identified themselves in a timely fashion. Additionally, they believed that because IM Here was accessible only by the workgroup because of its location,

anonymity did not pose a problem. Some believed it might be a problem if IM Here were more accessible by outsiders.

Broadcast was also used judiciously. There were no instances of broadcast being used for pranks. Users expressed the opinion that broadcasts were relevant and effective reminders rather than annoying or “spam-like” because people were careful in selecting what and when to broadcast.

#### REFLECTIONS ON PUBLIC IM FOR WORKGROUPS

We believe that the use of group accessible IM in shared workspaces has potential benefit as a supplement to existing channels for informal workplace communication. IM Here demonstrates this value by allowing users to have convenient means for quickly establishing contact with colleagues whose locations are not nearby and possibly not known. Previous work has shown that awareness cues built into IM clients allow for opportunistic conversation as colleagues log on and become available [7, 11]. IM Here allows for this type of opportunism as well as *locational opportunism* by being in the environment. Additionally, the location of the system *where work happens* allows users to communicate with others in the place and context in which the conversation is likely to be most relevant to their task.

#### VALUE OF THE FIVE FACTORS FOR IM HERE

Using the five factors as guidelines for our design and deployment helped to make the system appealing to users and promote adoption. Although it would be difficult to prove the direct effects of using the factors to inform the system, observations and conversations with users indicated that decisions we made based on those factors did foster IM Here use. The visibility of others’ interactions and encouragement by the core set of users increased the perception that the tool was being used. The flexibility of the IM medium in combination with the demonstration of its value for specific tasks allowed users to see the potential use and benefits of the system immediately. Users responded very positively to the low barriers for use, citing the lack of login as greatly enhancing the system’s convenience.

#### FUTURE WORK AND CONCLUSIONS

Our evaluation reflects the use of IM Here during its early deployment. We plan to continue studying use and adoption over time to better understand the value of public IM for workgroup communication, possibly by deploying more kiosks to make them truly ubiquitous. We intend to refine our findings on the adoption of LDGAs and the dimensions, roles, and use of these systems within workgroups.

Public displays and IM both have many affordances that make them valuable for facilitating workgroup interactions. IM Here, as influenced by our study of LDGA adoption, demonstrates how the combination of the two technologies yields a tool that benefits workgroups by supplementing current channels for informal communication.

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