

# Addressing the Opportunities and Challenges of Working Anytime from Anywhere

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## Introduction

As an organization, one of FXPAL's core research concentrations focuses on understanding, building and evaluating tools to support workplace collaboration; specifically those that better mitigate the challenges of working anytime from anywhere. A central motivation of our research is the belief that the world is changing in fundamental ways that will significantly increase the breadth and depth of distributed communication tool use across companies of all economic sectors and sizes. A global drive to reduce the corporate carbon footprint, an increased trend to globalize company operations, and pressures to provide opportunities for more flexible work practices, are just a few of the many motivators for this increase.

We are very interested in participating in this workshop as we feel that our research to date provides experiences and insights that could help to contribute to an engaging and productive academic discussion on the current state-of-the-art in telepresence research. Participation would also provide the opportunity to understand the experiences of others in the field, learn from their insights, and potentially leverage them to improve our own research. However, we most look forward to participating in the *soapbox* discussions. We agree with the workshop organizers that this would be an exciting format to tease out a collective assessment of the current challenges in this space.

We have organized this position paper to summarize a few ongoing research projects at FXPAL related to workplace communication. In this document, we point to specific elements of our work that would be of the most interest to the workshop organizers and participants. We end with a presentation of our *soapbox* topics that we hope to propose at the meeting in February.

## THE ECOLOGY OF COMMUNICATION TOOLS

A multi-year project at FXPAL has concentrated on studying the trends and patterns of communication tool use in the modern workplace. In this work, we specifically seek to understand the emergence of new communication technologies in the workplace, how these tools are used and accepted by workers (or subsets of workers), and how the workers build their own ecology of communication technologies.

Our study metrics were comprised of two organization-wide surveys, one year apart, addressing various aspects of communication use. In addition, a subset of participants

filled out diaries on their communication use. A number of one-on-one interviews were conducted over the period of the study.

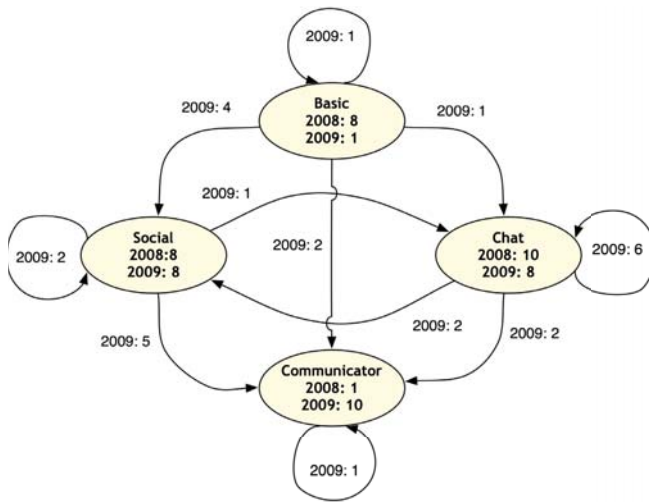
At a high level, we observed that participants were very articulate in reasoning about their communication technology choices. That is, users were carefully choosing tools based on how they fulfilled a specific role, enabled a specific modality of communication, or provided a certain level of expressiveness.

A particularly interesting result we found was that the adoption of new tools (e.g., IM, social networking, blogging, Twitter) did not significantly detract from the use of more traditional techniques/technologies (e.g., face-to-face, email, telephone). Instead, participants added the new tools to their communication toolbox or increased their use without replacing or reducing the use of existing tools. As a direct result, the reasoning by which methods were chosen for communications become increasingly fine-grained and sophisticated.

Based on patterns of tool use, we identified distinct classes of users. Using hierarchical cluster analysis on a subset of variables common to the two surveys for users who took both surveys ( $n=27$ ), we analyzed how behavior changed over time. The resulting analysis produced four well-separated clusters (see Figure 1). Examining the mix of communication methods within each, we identified the following groups, each with its own communication ecology:

- *Basic*. Tends to use face-to-face, email and, to a lesser extent, the telephone, for communication.
- *Social*. Basic plus use of social networking sites on a regular basis. May use IM infrequently.
- *Chat*. Basic plus use of IM on a regular basis. Occasionally use voice or video chat, SNS.
- *Communicator*. Use most channels at least monthly, but may weekly or daily, including blogs and microblogs.

Over the year measured in the surveys, we noticed a large movement between the groups. In the first survey, there were eight people in the Basic and Social groups, 10 in Chat and only one in Communicator. One year later, only one person remained in the Basic group, with eight each in Social and Chat, and 10 in Communicator. Few people stayed in the same group over the year. People in Basic migrated to Social although a few moved to Chat or directly to Communicator. Those in Social generally moved



**Figure 1. Groups of participants identified by hierarchical cluster analysis show different mixes of communication methods.**

to Communicator. Chatters were most likely to stay in the same group, but if they changed, they generally became Communicators. No one moved from Social, Chat or Communicator back to Basic.

To understand how people assembled their communication ecologies, survey participants were asked about strengths and weaknesses of communication tools in open-ended questions. Additionally, in the interviews we asked people about their preferred communication method and what considerations they took when choosing a method.

The results provided information about the judgments people make when selecting a tool. Interestingly, people from different clusters identified different sets of strengths and weaknesses. The value of a particular communication tool can be drastically different depending on a person's particular communication ecology. We believe this result highlights the need to look across different ecologies when evaluating new communication tools and their impact on work practices.

**SUPPORTING WORKPLACE AWARENESS**

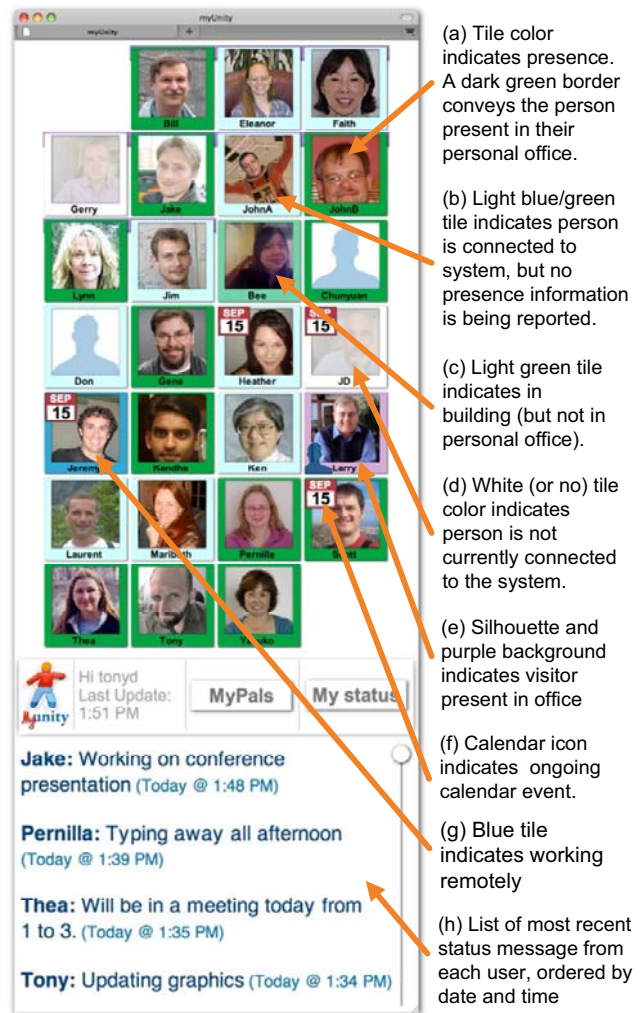
A second ongoing project at FXPAL is engaged in the design, development and deployment of technologies to improve workplace awareness. We use the term workplace awareness to broadly describe a growing set of information that is used collectively to initiate, solicit, or maintain collaborations among co-workers. These include, but are not limited to, physical location, current task or activity, available connectivity, preferred channels of communication, and other contextual information that make up a worker's contextual environment. Prior research has served to motivate our work, identifying both the high cost of maintaining workplace awareness and its necessity for effective work practice.

As a first step, we developed MyUnity, a prototype system that assists workers in building and maintaining workplace awareness. Designed specifically for small to mid-sized organizations or workgroups, MyUnity enables immediate access to key information needed to build useful awareness

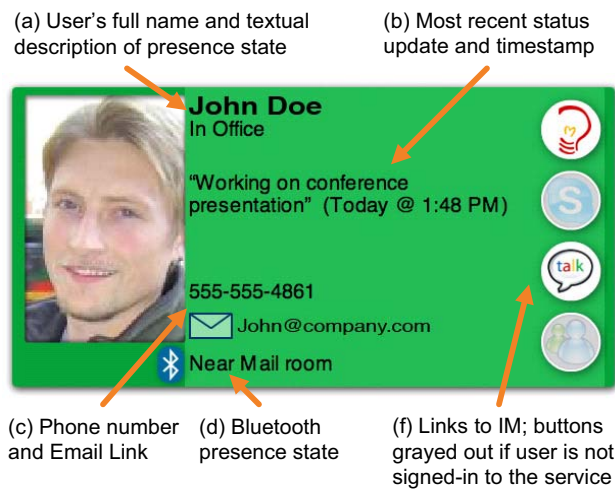
of co-workers. This information is gathered from multiple sources, both automatic and user-supplied. Figure 2 shows a screen shot of the main information dashboard of the tool with call-outs explaining the specific information represented.

A key feature of MyUnity's design is that it allows workers to independently configure and choose the information sources collected about them. We believe this to be a crucial characteristic of any awareness tool, as it allows workers to participate in the tool's user population without having to compromise their concerns about privacy or data-sharing. Users can modify their settings to adjust to changing conditions or situations in the workplace.

MyUnity also provides presence information for employees working from an alternative location. To facilitate communication, it provides peers with the specific communication tools through which a worker is available. Combined, these features allow workers to quickly determine the best available communication channel to collaborate with peers (see Figure 3).



**Figure 2. The MyUnity dashboard shown populated with 26 users. Call-outs explain features.**



**Figure 3. Business Card view providing details of a specific user. Call-outs explain features. (anonimized for review)**

### Field Study of MyUnity

We recently completed a four week field deployment to understand the value and impact MyUnity has on workplace awareness and, more broadly, on work practices.

For a period of one week, we logged and observed the communication tool use and practices for 20 people in our organization. We then performed the same data collection during a three week deployment of the MyUnity system. These data included interviews, a lightweight communication diary, questionnaires to measure situational awareness, and a log of activity on MyUnity.

Our participants included research scientists, software developers, administrative/support staff, executives, human resources, and multimedia specialists. All workers had offices located on the same floor of an office building — a typical configuration for an organization of this size.

Among many results, we found that the use of the tool did, in fact, increase workplace awareness. Perhaps more interesting to the specific themes of this workshop, results also showed that MyUnity fostered a greater sense of community and connectedness among workers and resulted in a significant shift in the use in various communication channels. We discuss these results in more detail below.

#### *General vs. Specific Awareness*

One of the specific goals of the study was to understand how well the system supported both general and specific awareness of its population to its users. By general awareness we refer to the user's sense of who is around and perhaps what they are currently working on. Specific awareness provides contextual information, such as location, status, indications that someone is busy at the moment.

Nearly all participants (90%) reported obtaining some degree of general awareness from MyUnity. In the communication diaries, they reported using MyUnity an average of around 3 times per day without having a particular person in mind. Most (75%) reported using it to get "a sense of who was around." Some made it a standard part of their day's

activities. "I look at [MyUnity] at the beginning of the day to see what's up and to see who's around," said one participant. Others mentioned glancing at it now and then to keep up with "the ebb and flow" of the office. People used it to "be aware of where people are," "get the office's availability," "out of curiosity," "just socially," or "just for fun."

Participants reported that they used MyUnity an average of 3.4 times per day ( $SD=3.15$ ) to check the status of a particular person. In describing how he would use MyUnity to decide how to communicate, one participant said, "If here or not [color, presence state (see Figure 2, Figure 3)], I would do face-to-face, otherwise email. Isaac is on the computer from home [color blue], so I would send email. Danielle is in Yosemite [status message], so there's not much point in sending email." So while general awareness provides an overall sense of the office, specific awareness is focused on a particular target.

Most (85%) participants recounted at least one instance in which they used MyUnity to check the status of someone before initiating a communication. The most common type of information people sought was location. Generally, it is not difficult to go to someone's office if a face-to-face conversation is desirable. However, a number of people checked a person's color before going to talk. "Sometimes it saves me a walk to the other side of the building. Not that I mind walking there. But I check if the color is right before I go," observed one participant. Another needed to talk to a person she knew was in a meeting. She waited until MyUnity indicated he was back in his office to go there.

#### *Sense of Community*

Even in the short period of time we observed our participants, several commented on an increased sense of community as a result of their use of MyUnity. One participant summed it up this way: "I know they are here, and that's nice... It's done a lot for my sense of community." Another thought it "promotes the feeling of having people near your office." In commenting about the use of status messages, one person said, "It is nice to have. And it gives a sense of community."

Participants also commented that the tool helped to improve connectedness when working away from the office (e.g. at home or traveling), since the system would explicitly show when they were online remotely and available to communicate. For example, several users found it valuable to know when others were working late from home and available to communicate on time-sensitive tasks.

#### *Interaction of Presence Information and Media Choice*

We hypothesized that the information provided by MyUnity would help determine an appropriate method of communication in some cases. That is not to say that we expect people will always consult a person's status before making the choice of method. But we believe that people would use it to help coordinate communication and that it would play a part in some communication acts where more than one method would be appropriate.

We found that about two-thirds of the participants were using MyUnity to mediate their choice of communication method. The most common instance of this was looking to see if a person was in their office before initiating a communication. If the communication needs to be face-to-face, a person may coordinate that through email or by keeping an eye on the person in MyUnity until they are free. One participant needed to talk to a colleague about a complex topic. Using MyUnity, he saw she was working at home, so he “decided to send email to schedule a face-to-face the next day.”

Through the user diaries, we collected over 6,000 communication acts from our participants. A particularly interesting result from the analysis of these data is that although the overall amount of communication acts per day remained the same, there was a small but significant shift in communication channels after the MyUnity deployment. Face-to-face communications increased from an average of 9.2 to 10.8 per day. The amount of received email decreased from 11.2 to 8.8 per day.

This result is particularly noteworthy and of concern to the telepresence and distributed collaboration community as it shows that even when someone had made himself explicitly available through computer-mediated communication channels, work practice and user preference still heavily favors deferring collaboration until it can be performed face-to-face. This observation signals that awareness alone is likely not enough, and strengthens the community’s argument that existing computer-based communication tools are poor at supporting key activities, such as building common ground, conflict resolution, and group ideation.

#### **SOAPBOX MESSAGES**

Based on our experiences in this domain, we have several *soapbox* issues that we feel would be interesting to discuss at the workshop.

1. *Why are we focused on building one killer application, and not on building a medley of tools that complement, support, and enable transition between them?* It seems the trend, especially in commercial offerings, is to consolidate communication technologies into a single platform. However, research (our own and others) has shown that people prefer to build their own unique toolbox of communication tools, where the toolbox is dynamic, changing both in terms of its composition and the tool

choices used in support of tasks. Consolidation constricts the organic ability to find the best tool that meets the needs of the situation.

2. *Why do we build tools that have such a high setup and/or buy-in cost?* Nearly all of the communication tools we use today require the user to create accounts, establish and maintain contact lists, and configure supporting hardware. Tools and systems need to be designed to allow users to start using the core features of the tool right away, while supporting customization and configuration only when desired by the users. For instance, people should be able to engage in a video call simply by clicking on a link in the user’s personal website or corporate portal. The technology limitations here are solvable. This is largely an issue of how we design the interaction experience with these systems.

3. *Why is telepresence just about communication and not about the broader problem of building relationships and community?* The tools we use today (video chat, instant messaging, virtual world) are useful in supporting in situ communication. However, these tools have little value when there is no active communication between participants. To fully transcend the boundaries of telework, the tools we use need to not only support active communication, but also the almost subconscious processes that allow colleagues to build relationships, pinpoint expertise and responsibility, foster community and camaraderie, and much more.

4. *Why are some of the best telepresence tools designed only for the boardroom and not the cubicle?* Many of the more sophisticated video presence tools are designed for executive conferences rooms, narrowly scoped in their design to supporting remote groups each lining the side of a conference table. While useful and valuable for this set of tasks, these expensive rooms and equipment are often left running idle with very little use. The capabilities of these technologies need to be redesigned and captured in tools that support a variety of workers in the organization. How can we design the tools and the spaces in which they are installed so that they are accessible to all workers; allowing them to coordinate, initiate, and transition communications using these tools?

We look forward to discussing the many implications following from our research at the workshop.