

Reflecting on Several Metaphors for Media Spaces

Saul Greenberg and Gregor McEwan

University of Calgary

2500 University Drive NW

Calgary, AB, Canada T2M 1N4

+1 403 210 9501

saul.greenberg@ucalgary.ca

I and my students have been doing research in media space systems for well over a decade. As part of this work, we designed and used three media spaces that collect both video snapshots and groupware artefacts. While each has superficially similar capabilities, they are designed around quite different metaphors.

Teamrooms, commercialized as Teamwave Workplace, is based on the notion of multiple rooms [3,8];

Notification Collage is a shared live bulletin board viewable on a large public display and from people's workstations [4];

Community Bar is an expandable sidebar that holds multiple places [5,7].

This paper briefly reflects on each system – and each metaphor – as a communal place.

1. TEAMROOMS

Teamrooms was designed around a rooms metaphor, where our goal was to provide multiple virtual rooms that exploit features inherent in physical rooms used for team purposes (e.g., team rooms, war rooms, etc.). Its interface, features, and use are fully described in [3,8], while Figure 1 shows a screen snapshot. Some of its key ideas included:

- a *bounded space* that affords *partitioning* into a collection of rooms;
- *containment* within through individual rooms, where they collect people and groupware objects;
- *permeability* of rooms allowing people and things to enter and leave them;
- *persistence* of objects within the room over time;
- *socially mediated ownership* that controls who should enter and use that room and how privacy is managed;
- *customization* of that room by how its occupants create and manipulate objects within it;
- *spatial location* where objects and people within a room are spatially positioned in a way that maintains common reference and orientation, and where proximity influences action and reciprocity;
- *habitation* where people can be aware of others across and within rooms, and where they can inhabit particular rooms;

We thought that groups would construct social places within these rooms, as the system no longer had many of the 'seams' found in conventional groupware. Rooms could serve as a place for both individual and group work; the distinction between the two was simply a matter of who occupied the room and the purposes the room was used for. Rooms also encouraged modeless interaction: real time interaction was just a consequence of people inhabiting the same room at the same time, while asynchronous interaction

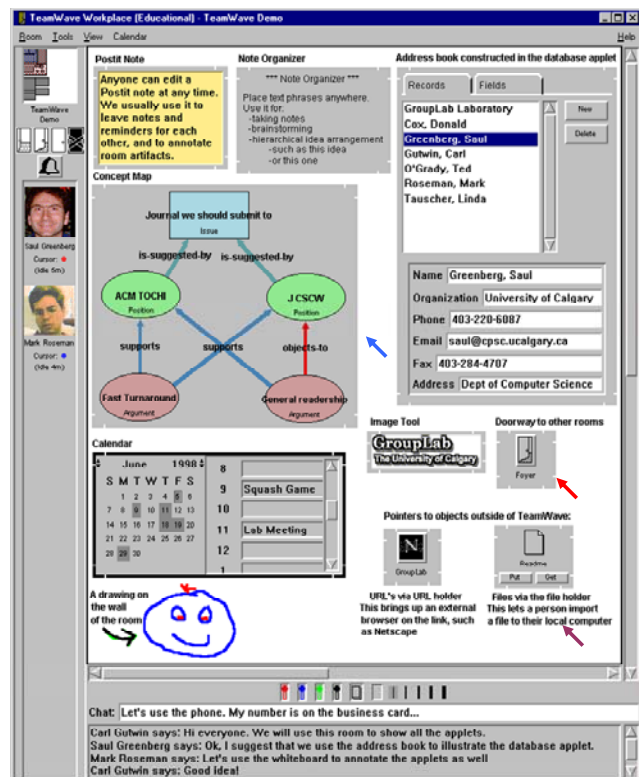


Figure 1. Teamrooms

was a consequence of how people left artifacts (i.e., groupware objects showing content) within the room for others to see. Rooms would also let the social place develop over time; because things persisted (including writing that people could put on its back wall), people could craft the social meaning of the room by how they included objects within it, and how they decorated it. The collection of rooms would also form a community; while access control dictated who was allowed into a particular collection of rooms, any community member, once in, could create a room, could enter other rooms, and could see who was around. That is, access within a community was mediated through social vs. technical protocol.

In spite of the rich intellectual premises behind its design, Teamrooms did not live up to its promise as a social environment. While people did create their own rooms, we saw little actual interaction over time. Eventually, the commercial version of this product – Teamwave Workplace – was pitched as a place to hold planned classroom meetings rather than as a media space supporting social interaction and on-going work.

We believe that Teamroom's shortcomings was not with the room metaphor, but with the ways rooms were realized within it. The first major problem was that Teamrooms did not effectively support awareness leading to casual interaction. A person could see who was around and thus available for interaction only after they actually logged into the system. Because logging in was relatively heavyweight, people would rarely do it just to see if someone was there. As well, people would not leave the system up and running just for awareness purposes, as it consumed considerable real estate. This defeated the 'always on' premise behind most media space designs. Thus there was little opportunity for casual interactions simply because no one was in a room long enough for others to notice. The second problem was that Teamrooms did not really support actual work. It only had 'toy' applications within it. While people could do simple tasks, they could not really share their real work done with commercial applications such as Microsoft Word, Excel, and so on. As well, voice was not supported, meaning that people would have to use an awkward chat system to mediate their real time interactions over these applications.

2. NOTIFICATION COLLAGE

The Notification Collage (NC) is a groupware system designed around the metaphor of a public bulletin board containing a collage of interactive information fragments [4] (Figure 2). These fragments are called media items, which in turn are interactive groupware applications that let people display and manipulate content. Distributed and co-located colleagues comprising a small community post media items onto a real-time collaborative surface that all members can see. Akin to collages of information found on public bulletin boards, NC randomly places incoming elements onto this surface. People can post assorted media: live video from desktop cameras; editable sticky notes; activity indicators; slide shows displaying a series of digital photos, snapshots of a person's digital desktop, and web page thumbnails. While all see the same items, people can rearrange them as desired on their individual displays. In particular, items placed on the right of a separator bar are never covered by new items.

We chose this metaphor for several reasons. First, unlike Teamrooms with its many rooms as social places, we wanted to give a group a single public place that holds meaning to them. As a media-rich bulletin board / chat room, we hoped that their focus on this single place would encourage sufficient postings and interactions to make it worth keeping on their display. That is, like a media space, we wanted to encourage its always-on, always-present property. Second, because it is a single bulletin board, we could post it in a large public display as well as on people's individual workstations, e.g., in a room populated by co-workers who are part of the NC community. Thus people could see its content as they walked by, or engage with others over it. Third, the overlap of items inherent in a large collage acknowledges that there may be a large number of information fragments, too many to tile neatly on the display. Finally, collages are customarily used to present unstructured information comprising diverse media, conceding that awareness information comes in many forms.

User experiences show that NC did evolve as a communal place, and that it served as a rich resource for awareness and collaboration. First, it gave people a keen sense of presence,

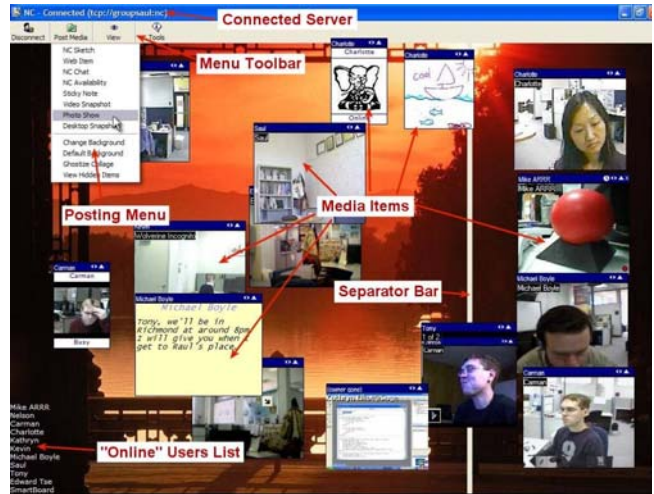


Figure 2. Notification Collage

especially because most community members chose to indicate their presence to others by posting live video. People's instinct was to create a visible presence for themselves: they wanted to see others, and others to see them. Second, media items triggered interaction. People acted on its information by engaging in text and video conversations. Unlike instant messaging and conventional media spaces, conversations sometimes began from people seeing interesting artifacts within the space and wanting to talk about them (e.g., photos or desktop snapshots). Third, the public nature of all actions encouraged interaction. All people could overhear conversations and see all postings; because even directed conversations and postings were visible to the group, anyone could monitor and join in. Furthermore, those cohabiting a public physical space could tell a collocated person about a note addressed to them. Fourth, media items concerning communication and information sharing (vs. the work-oriented groupware of Teamrooms) encouraged social engagement. People posted items they believed would interest others, such as desktop snapshots, announcements and vacation photos. Fifth, the public display acted as a way for telecommuters to reach people (including room visitors) visible from its attached camera, and for those people to respond.

While successful as a place supporting a single small community, the Notification Collage had several limitations that restricted how it could be used by less well defined groups. As a single public place, it was all or nothing. People were either 'in' or 'out' of this community. This meant that people on the periphery of this group were sometimes reluctant to join in. The group was very conscious of the appearance of 'strangers' (usually a friend of only one group member), where conversations would cease until that person was somehow introduced by an 'in' group. Similarly, Community Bar did not really support ad hoc groups. People were either a member of the community, or they were not.

3. COMMUNITY BAR

The Community Bar (CB) [5,7] extends our earlier work in the Notification Collage. Its design is theory driven, where it is built around the Locales social science framework [2] and the Focus and Nimbus model of awareness [6]. Its 'sidebar metaphor', illustrated in Figure 3, leverages the query in depth properties of the Microsoft Sideshow awareness display [1],

The Locales Framework suggests that people inhabit multiple social worlds, where each ‘world’ contains not only people, but offers a site and a means for their interactions. CB supports multiple locales through rapid creation of ‘Places’. For example, the particular individual’s CB client in Figure 3 displays four Places (i.e., four sites), each comprising different sets of media items representing the people within a place (e.g., through video) and various means (e.g., chat boxes, web items). Long standing and ad hoc groups can create, maintain, and destroy places as needed. People within a place can present themselves to others, engage in conversation, and interact with group artefacts as desired. Each person can act in distinct ways in each of the Places they inhabit. Within a Place, all information and interactions are public to all other people currently in that Place. Place members are able to share awareness information, to send broadcast queries (e.g. “Is there anyone who knows about X?”), and to overhear conversations and join those of interest to them. Unlike Notification Collage, CB supports multiple places rather than a single place. Unlike Teamrooms, people can be in multiple places at the same time, and interact within any Place at leisure.

The Sidebar metaphor is important for lightweight transitions from peripheral awareness to foreground interaction. It recognizes the tension between a person’s desire for a *minimal* amount of unobtrusive yet dynamic awareness information of their intimate collaborators, against the need to act upon that information, e.g., to explore that information in depth, or to engage in rich communication as desired. Community Bar relieves this tension by offering people a progressive view of information. Rich yet not overwhelming awareness information is located at the periphery of the screen in a space conservative sidebar (shown in Figure 3). Moving the mouse pointer over items causes a “tooltip grande” to appear (example shown in Figure 3) that displays more information and provides interaction opportunities. Clicking on the tooltip grande title raises a “full view” permanent window (not shown) providing full information and interaction opportunities. Collectively, this progression of views allows the user to quickly stay aware of peripheral information, and to easily move into foreground interaction with information and people.

Finally, Community Bar represents the centre and periphery relationship via the focus/nimbus model [6]. People express their involvement within a Place by using sliders to adjust both their nimbus (what others can see of them) and focus (how much they see of others). In this way, views and membership become somewhat more fluid. Unlike Teamrooms, where people are either in or out of a room, people can now adjust their focus/nimbus to control how much they are ‘inside’ a place.

We performed a field study of CB in use. Many things worked as predicted by the Locales theory, in particular, how people were able to maintain awareness and how they could move into interaction with others. However, the multiple Place functionality was not used heavily by this user community. We initially thought this was because the group was fairly cohesive, where they enjoyed working within one large Place (i.e., as in the Notification Collage). We thought this group did not see a strong need to splinter themselves into long-term sub-groups. Yet on closer inspection, we found that our study participants were easily divided into two groups: a ‘core’ group who often worked together closely and interacted with each, and a peripheral group comprising everyone else who had less work ties to the first

- P = Presence Item
- C = Chat Item
- S = Sticky Note Item
- W = Web Item

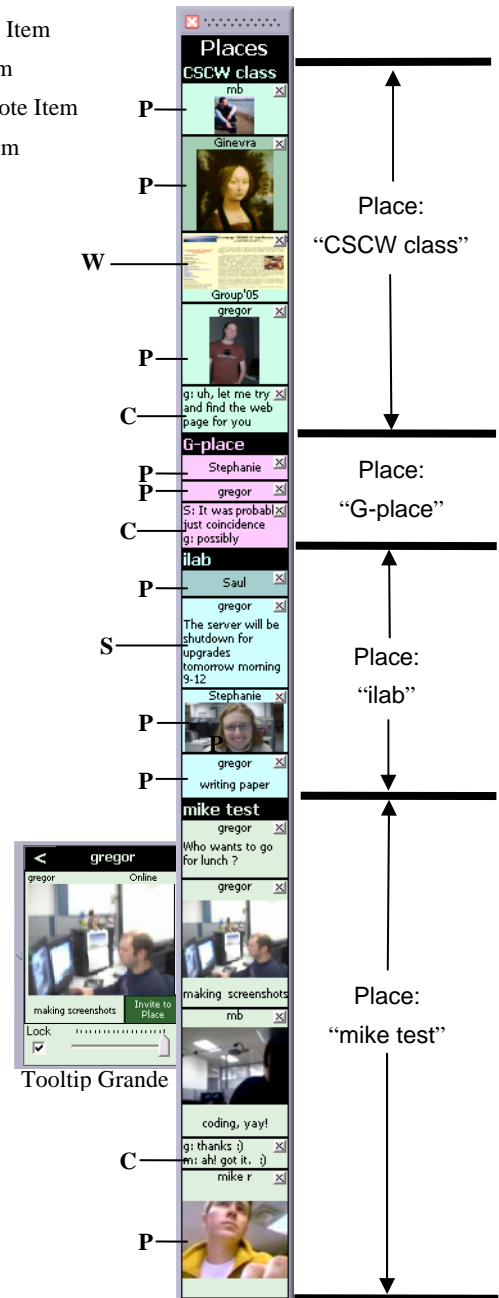


Figure 3: Community Bar. Visible are four labeled places, 4 types of items, and the presence tooltip

group. This led to a divide in how CB was considered. Core group members consistently talked about the sense of belonging to the community that CB gave them. In contrast, peripheral members often reported that they felt like outsiders, and that most of the explicit communication on CB did not involve them directly. This was not necessarily a bad thing, as all people, whether core or peripheral, expressed sentiments on how useful CB was for maintaining an idea of what was going on with the rest of the group. We would have thought that this difference in member makeup would have encouraged multiple places. Yet when asked why they did not create new places, participants responded in very similar ways, saying that they were not needed in the

existing community social structure. When asked about the situations under which they would use different places, most participants hypothesised that they would use different places if they were also involved in *distinctly different groups* that did not know each other. That is, a CB Place seemed to define a community rather than a public locale.

A deeper analysis of CB use revealed that there were multiple locales within it, but this happened implicitly within a single Place. We realized that people tended to use sub-collections of media items as implicit locales, where they would ‘tune in’ to media items of interest and ‘tune-out’ items that were of lesser interest. They also formed implicit ad hoc groups as a function of their awareness and CB activities. For example, this was evident by the way chat items were used. Typically, only subgroups partook in discussions in chat items, and different chat items were often created (or taken over) for different purposes and people. Similarly, different sub-groups were interested in different things at different times: this likely led to some of the differences in how people interpreted some media item awareness information as useful vs. as clutter and distracting. Yet people seemed comfortable – even those who were ‘on the periphery’ – of doing all this ad hoc group formation within the context of the larger CB community vs. within the explicit structure of CB Places.

4. DISCUSSION

All three systems were built around the notion of a collection of public media items that portray people (usually as live video snapshots), their interactions (usually as text chats), and their things (usually as information containers or mini-groupware applications). They differ considerably in the metaphors they follow, which in turn affects how each system structures and presents these items. What we saw is that many factors – both large and small – profoundly affect how these media spaces are adopted by the community. In spite of its rich room metaphor, Teamrooms was not well adopted, simply because it lacked the lightweight awareness critical to casual interaction and because the walls comprising its room were too hard – they isolated community members rather than brought them together. This left it more suitable as a meeting tool rather than an always on media space. Notification Collage did work as it offered a rich multimedia space for casual interaction. However, it was limited as being an ‘all or none’ system; people were either in the group defined by the single media space, or out of it. Community Bar achieved the same effect as the Notification Collage while doing a better job at balancing awareness and distraction. Still its key property – that of Places – was not used in the way we expected, i.e., it defined community vs. ad hoc groups. Yet we did see sub-groups evolve within a single Place through how people used its items and how they attended them.

It seems there is a tension between the explicit structures offered by media space design (rooms, places, bulletin boards and so on) vs. the very light weight and often implicit ways that people form and reform into groups. In real life, we do this by physically moving closer together, by how we share things, by cohabiting a

space, by moving between multiple spaces, and by selectively attending and responding to the world around us. In the computer world, these everyday physics don’t apply. Instead, we try to introduce explicit structure through our metaphors that anticipates how groups form and reform, and that controls what people attend. In practice, we see that these structures are often ignored or become hurdles. Rather, systems with little structure do seem to work because people use their own attentive and social resources to define their group; this is often subtle, highly flexible, and tacit. Yet we expect an unstructured approach will have problems, as they likely will not scale beyond reasonably cohesive groups.

5. ACKNOWLEDGMENTS

Research was partially funded over the years by the NSERC Discovery Grant, the NSERC NECTAR Research Network, by Microsoft Research, and by the iCORE/Smart Technologies Chair in Interactive Technologies.

6. SOFTWARE AVAILABILITY

Community Bar is available for download at <http://www.cpsc.ucalgary.ca/grouplab/cookbook/>.

7. REFERENCES

- [1] Cadiz, JJ, Venolia, G.D., Jancke, G., and Gupta, A. Designing and deploying an information awareness interface. *Proc ACM CSCW* (2002), 314-323.
- [2] Fitzpatrick, G. *The Locales Framework: Understanding and Designing for Wicked Problems*. Kluwer Academic Publishers, (2003).
- [3] Greenberg S. and Roseman, M. (2003). Using a Room Metaphor to Ease Transitions in Groupware. In M. Ackerman, V. Pipek, V. Wulf (Eds) *Sharing Expertise: Beyond Knowledge Management*, 203-256, January, Cambridge, MA, MIT Press.
- [4] Greenberg, S. and Rounding, M. (2001) The Notification Collage: Posting Information to Public and Personal Displays. *Proc ACM CHI*, 515-521, ACM Press.
- [5] McEwan, G., and Greenberg, S. (2005) Supporting Social Worlds with the Community Bar. *Proc ACM Group 2005*, ACM Press.
- [6] Rodden, T. Populating the Application: A Model of Awareness for Cooperative Applications. *Proc. ACM CHI*, 1996, 88-96.
- [7] Romero, N., McEwan, G. and Greenberg, S. (2006) A Field Study of Community Bar: (Mis)-matches between Theory and Practice. Report 2006-826-19, Department Computer Science, University of Calgary, Calgary, Alberta, Canada, T2N 1N4, March 17th.
- [8] Roseman, M. and Greenberg, S. (1997). A Tour of TeamRooms. Video *Proc ACM CHI*, ACM Press. Videotape.