

Using the Notification Collage for Casual Interaction

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INTRODUCTION

The Notification Collage (NC) is a groupware system designed to support casual interaction between both co-located and distributed members of a small group [1]. The NC uses the metaphor of a public bulletin board, where instances of the board appear on individuals' workstations and on a large rear-projected display located in the group's public space. People post items to the NC (annotated in Figure 1) which displays them as a collage. Posted items are dynamic multi-media elements including:

- periodically updated video captured by cameras located on the public display and on individual computers;
- sticky notes showing characters as they are typed;
- thumbnails displaying web pages a person has visited;

- slide shows that cycle through a collection of images;
- desktop snapshots that present an image of an individual's screen contents;
- activity indicators graphing a person's presence over time.

We designed NC to promote casual interaction: through its visual elements, people can see who is around, can nonchalantly share information, and can move into casual interaction. We also intended the Notification Collage to serve as a peripheral display of (mostly) ephemeral information; we expect that since people might be absent or their attention could be focused elsewhere that they may or may not see elements as they are posted.

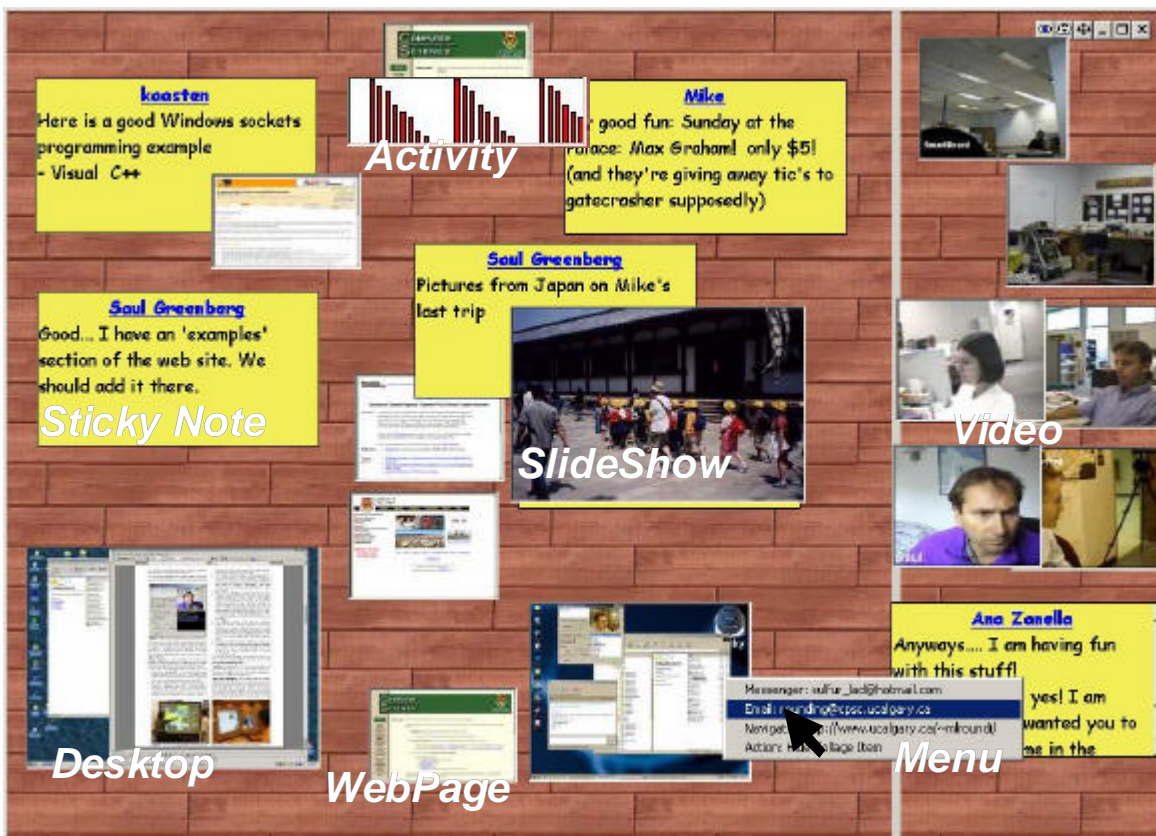


Figure 1: The Notification Collage with various media elements pictured.

NC users can have different, personalized views of the collage. First, the NC creates the collage by randomly positioning media elements as they are posted onto the left side of the vertical bar that splits the board. Second, individuals can move items around their own instance without affecting others: if a person moves items he or she considers important to the right of the vertical bar, they will never be covered by newly posted items. Third, people can hide items they are no longer interested in seeing.

USER EXPERIENCES

The first version of the Notification Collage was created in May 2000. Because it was new software still under active development, we initially deployed it only to our own research group. What follows is a summary of some experiences.

The group and its setting. Our group comprised mostly research assistants, graduates, and faculty: only two were directly involved in the NC project. Much of the group inhabited a research laboratory whose floor plan is shown in Figure 2. The left side of the laboratory comprised workstations and workbenches for graduates and research assistants. Computers were typically equipped with a camera and two monitors. The right side was a small, public meeting area containing a 72" rear-projected Smart Board, also equipped with its own camera. Partitions are short, so people anywhere in the laboratory had some peripheral awareness of activity elsewhere in the room, including what was on the Smart Board. The Smart Board (which had its own 'user identity') always ran NC and a client that would post the video from its camera (a panorama of the room).

While some group members regularly worked in the laboratory, others did not. Faculty had separate offices. Other members were telecommuters: one regularly worked at his home office 110 km away, coming into the laboratory only occasionally. Another group member was on a work internship 1000km away for part of the evaluation period. A few others alternated between work and home offices.

Bootstrapping. Our first version of the Notification Collage was accessible only by co-located group members. Not surprisingly, we saw very little activity on it since these people could see each other directly. A dramatic change happened as soon as people could easily access NC across the Internet. There was a noticeable buzz of excitement: people wanted to join in, and those connected became evangelists for getting other team members to join. People saw and used NC as a way for dispersed group members to reconnect with each other and to those in the laboratory.

A sense of presence. People's first instinct was to post their visible presence to the NC via the *Video* element. This mimicked what is usually seen in most media spaces and instant messengers: all could sense who was around. Typically, people would move video images to the right side of their NC so they would not be covered up. As telecommuters became visible and reachable, the people

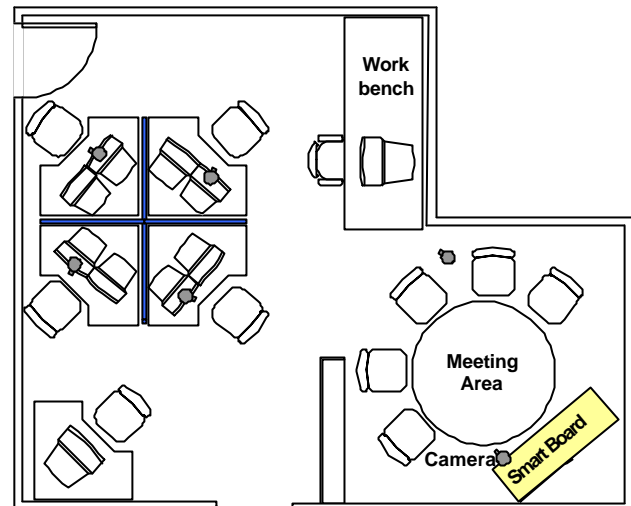


Figure 2. Floor plan of the laboratory.

inside the laboratory also became highly interested in the NC i.e., they would connect to it and stay connected to it.

The role of the personal display. Our expectation of NC was that people would run it only on the single large public display in the research laboratory, and that those outside the laboratory would connect to it every now and then from their personal machines. In practice, the NC quickly found its way to almost permanent display on everyone's desktop, even if those people were in the same room as the public display. We saw that people with multiple monitors did their main work on one monitor and had their view of the Notification Collage running on the other display: this accords with Grudin's findings that second displays are often used to hold peripheral information [2]. While those in the laboratory could glance around to the Smart Board, it was not in their direct line of sight. They felt that having an instance of NC on their own machine made them more aware of changes, and they were better able to respond to particular events.

Those with only a single monitor were concerned about the screen space required by NC. Consequently, we added a transparency feature where people could see through any overlapping windows onto the NC underneath. People could solidify the NC for greater clarity at will. This was positively received, as people could now work in their full environment without sacrificing their knowledge of 'what was going on' in the NC community. Even people with dual monitors sometimes used transparency, at times overlaying other windows holding peripheral information they wanted to track [2].

The role of the public display. When the NC appeared on the public display, people used it somewhat differently than when it appeared on their personal computers.

First, people not at their workstations used the public display as another means of tracking and posting information to the NC. This depended on several things: whether they were logged onto a workstation in the room,

whether they were closer to the public display than to their workstation, and so on. As expected, people would also bring other people's attention to items on the public display and would converse around them.

Second, telecommuters used the video generated by the camera attached to the Smart Board as a means to monitor and communicate with people seated at the meeting table or workbench, and with people wandering about the laboratory. This was a particularly important way for telecommuters to contact laboratory inhabitants when they were *not* at their workstations, as well as laboratory visitors and associates who did not have a personal NC. For example, we saw telecommuters notice and contact part-time members of the group who appeared occasionally in the laboratory.

One-to-one, overheard, and broadcast communication

People often took advantage of the presence information by using the NC as an instant messenger. We saw people directly message each other by raising the context menu on a media element and invoking Microsoft Messenger on them (giving one-to-one communication with the person who posted the element). More often we saw people communicate within the NC through *Sticky Notes*. These typically began with the other person's name e.g., 'Hey Mike...'. While not designed as a chat tool, people would communicate to each other in real time by modifying their own note and by looking at changes to others.

Conversations over *Sticky Notes* differed from those over Microsoft Messenger. Since all could see the *Sticky Note* contents, the conversation could be overheard. This became an opportunity for casual interaction [3] where others would join the conversation. These others would sometimes just say hello, or would join in any bantering, or would contribute to the conversation when they felt they had something to add.

Seeing incoming *Sticky Notes* also meant that people in the laboratory could tell others about messages directed to them. This happened when the addressee did not notice the note, or when he/she was a room visitor.

We also saw *Sticky Notes* used for purely broadcast communication. People used them to inform the group about current or upcoming events, to annotate other media elements, or to elicit group comments. *Stickies* also served as a way to make general queries or requests which could be answered by anyone e.g., 'Does anyone know...'.

Video as conversation and opportunity. We saw people use *Sticky Notes* and *Video* elements in tandem. They would sometimes wave to re-enforce a greeting, and would accentuate a note's message by exaggerating their body language (laughter, thumbs up, looks of shock, making faces at one-another). They also used the video to show others physical things being talked about. One person, for example, used the video to display the covers of a large number of boxes of software they had just purchased.

Aside from knowing that a person was around, the group used other things they saw on the video as opportunities for conversation. For example, one conversation stemmed from seeing a particularly ugly hat a person was wearing, with quite a few people eventually joining into the teasing. Seeing 'visitors' in the video also led to many conversations. One telecommuter introduced his children (who were visible on the video) to other group members. In another case, a person working at home recognized a visitor to another person's office that he had not seen for years. They began to chat; and since the telecommuter's wife had also met this person several years back, she came up and joined the conversation.

Artifact display. People used the NC for displaying other artifacts to the group as different media elements. We saw one popular example where people would post digital photos to the NC via the *SlideShow* element for others to see. These included photos of personal vacations, families and friends, and group outings. People sometimes included *Sticky Notes* to explain the slide show.

People also used the NC to display occasional snapshots of their desktop, or pictures taken elsewhere and imported to the NC as a *single-element SlideShow*.

Privacy issues. We saw several privacy issues accompany NC use. First, NC does not guarantee reciprocity. One can use it without signaling their presence through video. Alternatively, a person can have the video capture client running without having the NC displayed. While people did usually enforce reciprocity through social habit, we saw inadvertent reciprocity breakdowns. One example stemmed from the power-save facility that turned off the Smart Board projector. We noticed telecommuters sending a message to a person captured by the Smart Board camera. Of course, that person did not see the message as the display was dark.

We sometimes saw people on the *Video* element having no idea that their image was being broadcast. For example, one telecommuter reported seeing the lights come on after hours in the laboratory, and watching a cleaning person (unaware that they were on video) going about their duties.

Telecommuters who used NC video from home reported other privacy concerns. One telecommuter's home office doubled as a guest bedroom. While he felt video was essential (and had it always on), his wife (who was not part of this NC community) did not like the idea: she received no benefit from having the video on and saw it as a possible intrusion. Similarly, he was also more aware about his appearance: while he previously worked with his shirt off on warm days, he no longer did so. He was also concerned about inadvertently broadcasting situations visible within the room e.g., family members dropping in various states of undress, or who used the room for other purposes. As a partial solution, he habitually rotated the camera to face out the window when leaving the room.

Distraction issues. When many items were on the NC, people found it more difficult to find information they felt important. While people could post many elements to the collage—slide shows, photos, videos—most felt video to be the most essential element. Although *Video* elements always rose to the surface of the collage on every update, it was still effortful to find them. Related to this, people sometimes wanted a way to ‘filter’ items from the display, especially if the NC was on their personal computer. For example, one person commented that he wanted to remove a *SlideShow* element from the NC because he found the current set of photos uninteresting and the cycling of images distracting. As a consequence, we added the option for people to ‘hide’ elements. We also saw people regularly move elements they felt important – particularly videos – to the right side of the NC so they would not be covered up.

DISCUSSION

We can distill several general points of NC use from these experiences.

1. NC became interesting only when the communication circle widened to people outside the immediate physical room. We had originally thought that NC would have been useful for even co-located people, as items could be left on it for others to see at a later time. This was not a strong enough impetus to warrant its use.
2. People’s first instinct was to create a visible presence for themselves: they wanted to see others, and others to see them.
3. People wanted direct as well as peripheral access to the NC. Having it on their personal workstation made it more accessible than just using the public display.
4. People running NC on their personal computer were concerned about the tradeoff between screen space vs the value of the information on the NC. Multiple monitors and transparency help.
5. Visitors and people not seated at their workstation used the public display as a convenient way to monitor and post information to the NC.
6. The public display acted as a way for telecommuters to reach people (including room visitors) visible from the its attached camera, and for those people to respond.
7. Making directed conversations visible to the group meant that anyone could monitor and join in, and that those inhabiting a public space can tell a person about a note addressed to them.
8. People exploited media elements for tandem communication (especially video), using each channel to augment the other.
9. There remain outstanding privacy concerns that must be dealt with, particularly on how video is captured and displayed, and how reciprocity is managed.
10. People would adjust the visibility of items to make them more salient i.e., by moving chosen elements to the right side of the NC so they would not be covered up.
11. The collage metaphor represents all media elements equally, yet some people felt some media elements (e.g., video) to be more important than others. The NC interface should be tuned to recognize this.

In essence, we saw that people treated the NC as a virtual room/bulletin board encouraging interaction. One person would post a media element, and others would become aware of it and selectively react to it. What typically ensued was a sometimes brief, sometimes lengthy, sometimes parallel interaction between many people on the board. People made faces at each other, chatted through the *Sticky Notes*, and often posted other media elements onto the NC that were relevant to the conversation. These experiences suggest that NC affords uses spanning several types of collaborative tools: awareness notifiers, instant messengers, media spaces, and MOOs.

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Related Publication. This workshop submission is a modified extract of a paper to appear in the proceedings of ACM CHI 2001 [1].

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