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# Community Bar: awareness, interaction and everything between

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## Abstract

Informal awareness and casual interaction tools are intended to help overcome some of the disadvantages that face distance separated knowledge workers by providing some of the subtle awareness cues and opportunities for casual interaction that are present in co-located settings. The design for such tools is usually bottom up, based on required feature lists. This paper takes a top-down approach. We start with a comprehensive sociological theory, the Locales Framework, and add a theoretical model of awareness for some extra detail. The theory, along with the Notification Collage and Sideshow systems, is used to generate a design for an informal awareness and casual interaction tool. An initial prototype called Community Bar is described, as well as plans for its next iteration.

**CR Categories:** J4 [Social and Behavioural Sciences]—Sociology.

**Keywords:** HCI, design, informal awareness, casual interaction.

## 1. Introduction

Informal awareness and casual interaction applications are intended to help overcome the disadvantages that distributed teams suffer in comparison to co-located teams. They provide awareness cues and opportunities for informal interaction that are not normally available to distributed groups. However, deconstructing awareness and interaction to arrive at design principles for these tools is a difficult problem.

Co-located teams, such as a project team inhabiting a common office space, have a tremendous collaborative advantage over distributed teams. Just by being in the same environment, members of the co-located team are aware of each other's activities and work. As the individuals use the physical environment and artifacts around them, they provide cues that communicate important information about their work to other members of the team. For example phone calls and informal meetings can be overheard, and whiteboard notes and calendars can be observed. They constantly engage in short, informal communication. More importantly, they are aware, in a very lightweight way, of when others are free to engage in such communication. By staying aware of what others are doing, with little effort or interruption to their own work, they can easily determine when opportunities for collaboration arise, and, because they are familiar with each other, engaging in collaboration is easier [Kraut, Egido and Galegher 1990].

In general, distributed groups miss out on these awareness cues. As a result, when members of distributed groups wish to converse they expend a relatively large amount of effort in explicit coordination of interaction that would have been comparatively spontaneous and lightweight if they had been collocated. This

changes the tone of the conversation to a more formal style that is poor at supporting knowledge-based work in dynamic environments [Kraut et. al. 1988]. Even very small separation between group members, as little as 5m, has this effect.

Awareness systems are made to overcome the collaborative limitations of physical distance. By placing people within closer virtual proximity they attempt to compensate for the physical separation and allow informal, casual, and serendipitous encounters.

All awareness systems attempt to foster casual interactions and help to relieve the problem of distance between collaborators. However, each has been successful in different ways, exhibiting different strengths and weaknesses. Deconstructing their successes to extract design principles is difficult and sometimes contradictory. For example, consider a principle that describes how much screen space should be devoted to these systems. Because Tickertape [Parsowith et al 1998] is extremely small and has minimal impact on screen space, people are willing to leave it on their display. Conversely, Portholes [Dourish and Bly 1992] and the Notification Collage [Rounding and Greenberg 2001] show video windows and thus use a lot of screen space, yet people are also willing to leave them up because of their information richness (although they do sometimes get buried under other windows or relegated to a secondary monitor). While it is possible to make a trade between this and other properties, *there is no guidance as to how the trade-off should be made and what is gained and lost in a particular decision.*

The design of informal awareness and casual interaction tools can follow two basic approaches. The first is task-based: basing the design on analysis of low-level actions and processes that people engage in when interacting. Tasks are usually extracted from empirical observations and generalizations of what people do in real world and virtual settings. The second approach is theory-based: basing design on a theoretical framework of how people interact and work in a broader context. Most informal awareness and casual interaction tools are products of the task-based approach. This paper explores a theory-driven design method.

This paper firstly discusses previous work that provides a theoretical backdrop for designing an informal awareness and casual interaction tool. It begins with a broad theory, called the Locales Framework [Fitzpatrick 2003], which places the application design on a sociological theory of how people interact, collaborate and perform work in a complex social environment. It is one of the few technology-focused theoretical models that exist in the field of CSCW. Our discussion includes how the Locales Framework affects the design of informal awareness and casual interaction tools. As an inclusive model, the Locales Framework provides an excellent big picture of collaboration. Yet it is short on some of the details on the particulars of awareness. Consequently, we also cover Rodden's [1996] Focus and Nimbus

model of awareness and how it fits into the Locales Framework. To make these theories concrete, we use them to briefly analyze an example system called the Notification Collage. In the subsequent section, we narrow the coverage of the theory to focus on three aspects particular to the design of informal awareness and interaction systems. We then operationalize these design aspects by describing how Community Bar, our prototype system, addresses them. The paper is concluded with a discussion of our next steps.

## 2. Previous Work

This section describes two theories we will use to drive the design of an informal awareness and casual interaction systems. First the Locales Framework [Fitzpatrick 2003] provides a vocabulary and structure for discussing group work issues. Second, Rodden's [1996] Focus and Nimbus model of awareness fills in some of the details of how awareness and interaction will be modeled.

### 2.1. The Locales Framework

We provide an overview of the Locales Framework. For a detailed treatment that does justice to the framework see Fitzpatrick [2003].

The Locales Framework describes how people and groups interact and work together. It provides a general structure for thinking about and analysing a collaborative situation. The framework is intended as a conceptual language to foster communication between sociologists (interested in analysis and explanation), and computer scientists (interested primarily in design). As such it provides a very high level of description, rather than a low-level prescription for how to design CSCW systems.

The framework is important for design because it indicates the areas that need to be analysed in the social setting, and in providing context for how each aspect of the work environment relates to the whole. It is important to note that the framework is not a design method in itself; it describes the larger social context and dynamics of people and groups without prescribing any particular design guidelines for systems.

#### 2.1.1. Centres and Peripheries

A unifying concept in the Locales Framework is the metaphor of centres and peripheries. The centre-periphery metaphor for boundaries provides a much richer understanding of work practices than the more common boundary as container metaphor [Fitzpatrick 2003].

Computer science usually defines boundaries as strictly defined containers. A common example within Groupware is the use of the rooms metaphor, for example [Dourish and Bly 1992, Gaver et al 1992, Roseman and Greenberg 1996, Rounding and Greenberg 2000]. The rooms metaphor ties group membership and activities to a simplified metaphor of a physical room. People are either in or out of the group (room), and all of the group activity is solely contained within that area.

In the physical world however, even rooms are "leaky"; people can stand in doorways and be part of two rooms, and noises can be heard outside the room, giving those in adjoining rooms some low-level sense of participation in the room activities.

The centre-periphery metaphor is much closer conceptually to the notion of fields in the physical sciences. There is an object at the centre that exerts a field on the surrounding space that is attenuated by distance. Interaction with other objects is determined by field strength, the object's susceptibility to that type of field, and the distance between them. Using centres instead of rooms extends that idea to view the social universe.

Within the Locales Framework, group membership is not simply viewed as a binary function, but as a complex relationship between the abstract group entity and each person. Boundaries can be established by creating cut-off conditions in relation to the centre; similar to the way in which we would discount the gravitational effect of a single person when calculating the orbit of Jupiter. For example, rather than just saying Amy and Charles are members of a group and Bob is not; we might say Amy is part of the core group, involved in organising and running its activities, Charles is a peripheral member, only participating sometimes, and Bob is further on the periphery, outside the group membership boundary. The statements mean the same thing but the second encapsulates added richness and makes explicit that if Bob's connection to the group were to increase then he may cross that boundary.

Relationships to centres are also multi-dimensional. Social interactions and connections are complex, interrelated things. To properly characterise the relationship of a person to the group it may be necessary to take into account their commitment to the group, their participation in group activities, the communication means available between them and the group, and other factors.

Previously the argument was made that informal awareness/casual interaction system design needed to be done with a larger theoretical basis. Later subsections will make major use of the richness of the centre and periphery metaphor.

#### 2.1.2. Locale Foundations

Locale Foundations are the pre-requisites for any analysis of a collaborative setting. It is necessary to identify and characterise the group or social world of interest, and the locales - the places and objects that the social world uses to achieve their work.

A social world is defined as a group of people with a common purpose or goal. The purpose of the group can be formal or informal, explicit or implicit, static or dynamic. Other properties that define the group are membership, duration, structure, roles, culture, and tasks.

The common purpose or goal of the social world is considered its centre. Membership of the social world is then defined in relationship to the centre. Some groups, such as a sport club, may have a very formal boundary definition for membership, while a social group that goes for drinks on a Friday afternoon has a very informal definition. Importantly though, both groups can consider different levels of membership within and around the boundary definitions.

A locale is the site and means that a social world uses in its pursuit of the shared purpose. Sites are places that the social world uses to do its activities, and the means are the objects within the sites used to support the activities. Examples of locales are: meeting rooms, where the site is the room itself and the means include whiteboards, pens, individual notebooks, chairs, tables,

etc. inside the room; or a shared network file system, where the site is virtual and the means include the “soft” electronic documents stored in the file system.

The starting point for any locales-based analysis of a collaborative setting is to characterise the primary social world and the locales that are used to support the social world.

*Implications.* An informal awareness and casual interaction application is not intended to contain a complete representation of the social world and its primary locale. The application is a tool that the social world makes use of in certain situations; it is a part of the means. The main requirement is that it fits into the site and supports the social structure of the world.

In a community of close collaborators, fitting into the site means that the application is available within people’s private work areas; usually including a desk and a desktop computer, or sometimes large screen displays in public areas [Huang and Mynatt 2003] are more appropriate.

In these communities, membership (of the whole community anyway) is usually fairly static, long lived, and somewhat restricted. Adding and removing members is ideally a lightweight process but is not frequent and should require social permission from the group. Levels of membership are usually not explicit but people should be able to engage as much as they want.

### **2.1.3.Civic Structure**

No social world operates in isolation. Members are involved in multiple worlds at once, social worlds exist within broader organisational structures, and sometimes smaller sub-worlds are contained within the social world. An analysis of the Civic Structures describes the relevant outside influences on the social world.

For example, the social world of the Interactions Laboratory (iLab) is influenced by social worlds that it overlaps with, such as the classes that members teach, the social worlds that contain it (such as the Department of Computer Science), and social worlds that it contains, such as the group of members researching aspects of Single Display Groupware. Each of these other structures has a large influence on how the members do their work within the iLab social world.

People also require mechanisms for navigating between social worlds and locales. They often desire to find other social worlds of interest, or discover relationships between social worlds.

Social worlds around, containing, and within the social world of interest often have a strong influence and hence need to be taken into account when investigating the activity of the social world. The difficulty is in determining which influences are of interest and how they affect the activity.

*Implications.* The main implication for an informal awareness and casual interaction tool is that it should accommodate multiple, possibly overlapping or contained, groups. Individuals need to have concurrent views (views of individuals are discussed more in the next section) of all their groups. While an individual should not be seeing all groups all the time, they should be able to discover new groups of interest.

### **2.1.4.Individual Views**

Individuals are involved in multiple different social worlds at one time, and within each social world they maintain a different level of engagement. The Individual Views concept takes these two factors into account.

As an individual engages in work, he/she is rarely involved in a single task to the exclusion of all others [Fitzpatrick 2003]. They will engage in multiple different tasks, across different social worlds, simultaneously. Each of the tasks is engaged in with more or less interest and focus at each time.

People personalise their viewset, arranging the tasks according to current focus. They also personalise their views onto individual tasks; arranging the tools and artefacts for that task according to current level of engagement.

There are two important aspects to be considered; a view on a social world, and an individual’s viewset across multiple social worlds. A view is how an individual sees a single social world (the people and the locales) dependent on the level of engagement with the centre of that world. A viewset incorporates the individual’s views of all the social worlds that they are engaged with. Awareness tools can be considered as both tasks in their own right and as windows onto multiple social worlds.

*Implications.* To effectively support collaboration, it is sometimes important for group members to all have the same view of a workspace. However, when this requirement is not critical, the work is better supported by personal views that vary according to the individual’s engagement and role in the group.

There is no strict requirement for group members to see exactly the same view. This suggests that: (1) the level of engagement with an awareness tool as a whole should be tailorable; and (2) the level of engagement with people and groups within the tool should also be tailorable.

### **2.1.5.Interaction Trajectory**

Interaction trajectories describe the highly dynamic nature of social worlds. Social worlds engage in actions towards their goals as well as the possible changes to any of the properties of the social world; members, goals, locales, structure, etc. Social worlds have phases (e.g. setup, full operation, finalising), and there are routines and rhythms [Tang and Rua 1994]. They have pasts, presents, and futures. Awareness of past actions and outcomes, present situations, and visions for the future are important for plans and strategies.

Every person, object, task, social world, and locale describes a trajectory. A document is created, changes as it is worked on by different people, is perhaps printed (if it’s virtual), and may be destroyed if it is no longer needed.

Trajectories are also important in relation to each other. The trajectories of people and objects can cross and move together as they are involved in the same task. The example document’s trajectory becomes intertwined with that of the person working on it. If there are several people working on it together then their trajectories are closely related as well. This is also known as “work coupling”, referring to the degree with which people are working together.

Another highly dynamic aspect is the level of engagement of people and objects with the centre of the social world. Each member of the social world changes their level of engagement with the social world continually. Hence their view (and entire viewset) continually changes during their interaction with the social world.

*Implications.* Looking at the dynamic aspects of the community leads to a description of the kinds of actions that need to be lightweight within the application. Within an awareness tool in the setting of a collaborating community, the community membership changes slowly, subgroups of the community change much faster, and the views and viewsets of the individuals change most quickly of all. Hence the application can require some setup for a new member, but needs to be reasonably lightweight in the creation and termination of groups. Individual users need to be able to change their level of engagement with different people and groups with a minimum of effort and time as their level of work coupling changes.

### 2.1.6. Mutuality

Mutuality is concerned directly with the aspects that were discussed in Section 1.2. Mutuality of people, spaces and resources is vital for collaboration within the social world [Fitzpatrick 2003]. However, Fitzpatrick further teases apart the definition of mutuality into provision and reception of the awareness information. Members of the social world make information about themselves and their activities available to others. Others then perceive the information and become aware. The separation is important as not all provided information is always received. Awareness of others is an interaction of provision of information by a person and another's reception of that information.

For analysing the social world and its structure, it is important to know the mechanisms for awareness. The mechanisms are the means for provision and reception of the awareness information. Mechanisms are specified by medium (e.g. sound waves through air, text chat), temporal coupling (e.g. synchronous/asynchronous), spatial coupling (e.g. collocated/distributed, layout), and work coupling (discussed in Interaction Trajectory).

Informal awareness and casual interaction are clearly placed within the mutuality aspect of the framework. The reason given for using the term 'mutuality' rather than 'awareness' is that 'awareness' has been used so often to describe so many things that the meaning is no longer clear. This paper will henceforth make use of the term 'mutuality'.

*Implications.* While all the other aspects of the framework have indicated aspects of how the mutuality tool relates to the work environment, discussion of mutuality has a more direct relationship. *The purpose of such a tool is to augment and extend the mutuality of the group.* The design of the tool therefore must allow each person to both provide and perceive mutuality information. The mutuality is therefore the result of an interaction and negotiation between people.

The Locales Framework, while providing an important starting point for analysis and design implications, is quite high level. While it provides guidance, it leaves details undeveloped for the design of specific mutuality tools. The focus/nimbus model of

mutuality, discussed in the next subsection, fills in some of the details.

## 2.2. Focus, Nimbus, and Mutuality

Applying the Locales Framework to the problem of affording informal mutuality and casual interaction suggests that mutuality is a continuum of states. The problem is that the Locales Framework is presented at too high a level to assist much in understanding how mutuality is composed and how it varies across the continuum. Understanding mutuality at a lower level is necessary to design tools that support it.

Mutuality is complex. The complexity can be seen even through the relatively simple example of an instant messaging (IM) system. At the lowest level there is the distinction between people that are known and unknown. Amongst the known people there is mutuality of online and offline status. Online people also display availability information, such as "busy" or "idle", giving a different type of mutuality. IM clients also have other states, such as "be right back" or "out to lunch", that provide information about future availability. Many clients allow the users to change all or part of their display names as well. The text names are often used to indicate where the user is, what they are doing, when they expect to be online, what their state of mind is, and much other abstract mutuality information. At much higher levels of mutuality when people are interacting, people predominantly communicate through text chat tools. Sometimes they are also able to display static images that provide some extra mutuality of the other person. Clients sometimes also allow video images and desktop sharing for extra context mutuality during the conversation and collaborative tasks. Even a simple IM client provides mutuality at many levels and in many dimensions.

Also clearly seen in the IM example is that mutuality is not dependent on a single person. The final mutuality is the result of an interaction and negotiation between two people. As one person can control how they are represented in the tool by altering their online/offline status, changing their display name, requesting conversation, etc; the viewer also has control over their own client by removing and adding contacts, collapsing groups of contacts, and accepting and rejecting interaction queries from other users.

Due to the multidimensional complexity of mutuality, it is difficult to directly derive tractable design principles for systems that support mutuality. Rather than trying to deconstruct the complexity of mutuality here, a formidable and involved task, it is better to appeal to an established theory. Using a pre-existing theory not only saves reinvention but, with the time and resources that the creators have dedicated to this one specific issue, is also likely to be more complete than anything that could be derived as just one part of this work. One such theory that deconstructs the complexity of mutuality for cooperative applications is the focus/nimbus model [Rodden 1996].

As we will see, the focus/nimbus model integrates well with the Locales Framework. The work is complementary, taking up the discussion of mutuality where the framework leaves off and providing more detail. Mutuality in the Locales Framework is described in terms of the interaction between provision and reception of mutuality information. In this model, mutuality is defined as the interaction of an entity's nimbus, the information provided, and another entity's focus, its ability to receive information. Also, the model defines mutuality as a continuous

variable; a definition that fits well with the centres and peripheries concept in the Locales Framework.

The next section describes the theory and relates it to informal mutuality and casual interaction tools.

### **2.2.1. Mutuality from Focus and Nimbus**

Mutuality exists within an environment. The environment contains objects which give off some kind of stimulus. Some of the objects have sensory abilities allowing them to observe other objects. Sensing objects will be referred to as observers, though of course they can potentially be observed as well. Objects can control, to some degree, the stimuli that they produce. Observers generally have some control over what they sense and, in some cases, how they sense it. The environment has rules that define how the stimuli are propagated and the capabilities of the sensory equipment.

Nimbus refers to a field of a single type of stimuli produced by an object. Focus refers to a field of a single type of sense used by the observer. Hence, the object may have multiple nimbi and the observer may have multiple foci.

Mutuality is the overlap of all the foci of the observer with all the object's nimbuses. The mutuality can be zero when there is no overlap, minimal when few of the foci overlap with the nimbuses or there is only a small overlap, to a maximal value when the observer can sense all of the object's stimuli.

The values of the theory are: (1) mutuality is defined by both the observer and the object; and (2) mutuality is a continuous function, reflecting the integrated nature of the task.

In a collocated setting the environment is the four-dimensional physical world that we all inhabit. Objects (including people) have stimuli that propagate into the environment; for example they reflect and absorb light, have temperature, and different textures and firmness, and make noises, amongst many other properties. Observers have sensory abilities that can perceive some of these stimuli; observers see, hear, smell, taste, and touch objects around them. The environment defines how the stimuli propagate; for example objects can be seen from a distance but only felt when in direct contact. People can control how they appear to others by the way they dress, style their hair, etc. and also by where they place themselves in the environment; using private and public spaces, walls, cubicles, etc.

In an IM system the environment is virtual and operates very differently from the physical world. Objects are representations of

There is less Focus control provided by the NC. There are two mechanisms available for controlling the Focus. The first is the arrangement of the items (placement of items is local to the client and makes no impact on other users). When new items are posted, they are placed randomly on the board in the area to the left of the central line. Placing items on the right of the line means that they are never obscured, promoting the focus on those items. The NC also allows items to be placed over the top of each other so focus can be managed to some extent by overlap. The second is the control available over the display of the items. Each item can occupy one of three states: visible, just the title bar, and hidden. The control is not extensive and informal surveys suggest that

people. Stimuli from people include status, display names, text chat, files, video, pictures, and sometimes collaborative desktop sharing. Observers perceive these stimuli but in a personalised way. The observer decides how people are organised into groups in their view – a lot more control over perception than is afforded in the physical environment. Observers have a lot of control over how they perceive these stimuli; people can be removed from view completely; offline people can be made invisible; alerts (when others come online or want to converse) can be turned on or off. The environment controls how these stimuli propagate and the control of the senses that each person has.

### **2.3. Example: The Notification Collage**

To illustrate the type of analysis that arises from these theories, we use them to briefly explain the Notification Collage (NC) [Rounding and Greenberg 2000] and how the system addresses the issues of social worlds, viewset control, view control, focus, nimbus, and transition from mutuality to interaction. A full evaluation is beyond the scope of this paper.

The NC (Figure 1) is a groupware application developed within our own Interaction Laboratory here at the University of Calgary. It is based on a notice board metaphor, where members may post multimedia items, including video, post-it like notes, picture slide shows, and web pages.

The NC supports a single social world, a community of intimate collaborators. All communication through the NC is broadcast to the entire group. The communication is also broadcast at an equal strength, regardless of who posts it or who perceives it. The view control and final awareness are equal for all members of the community. The only control that the members have is how the application is positioned in their viewset – the NC window can be placed out of sight or behind other windows.

Nimbus on the NC is expressed firstly by the names of participants displayed in the bottom left of the application window, and secondly by the items that are posted by the individual. The NC allows users to control their nimbus through posting multimedia items that provide information about them. Posting a video item, for example, provides a snapshot onto the coarse elements of their current activity. Some items also provide mechanisms for controlling the fidelity of the information provided, giving finer grained control over the nimbus presented. The video item has controls on it for altering the refresh rate and blurring the image. Increasing the blur or decreasing the refresh rate weakens the nimbus, though without altering its range.

anything other than the visible state is rarely used as it is impossible to be aware of any change to the item state.

The NC supports transition to casual interaction reasonably well though it uses only a few discrete points along the transition. The sticky note and chat items provide easy methods for explicit communication. Communication of some other types media is done easily through use of the web page and picture slide show items, and sometimes through holding items up to the web camera.

The NC provides coverage of a limited, but useful, section of the mutuality spectrum. It provides a high level of mutuality, through video items, and low levels of interaction, through text items.

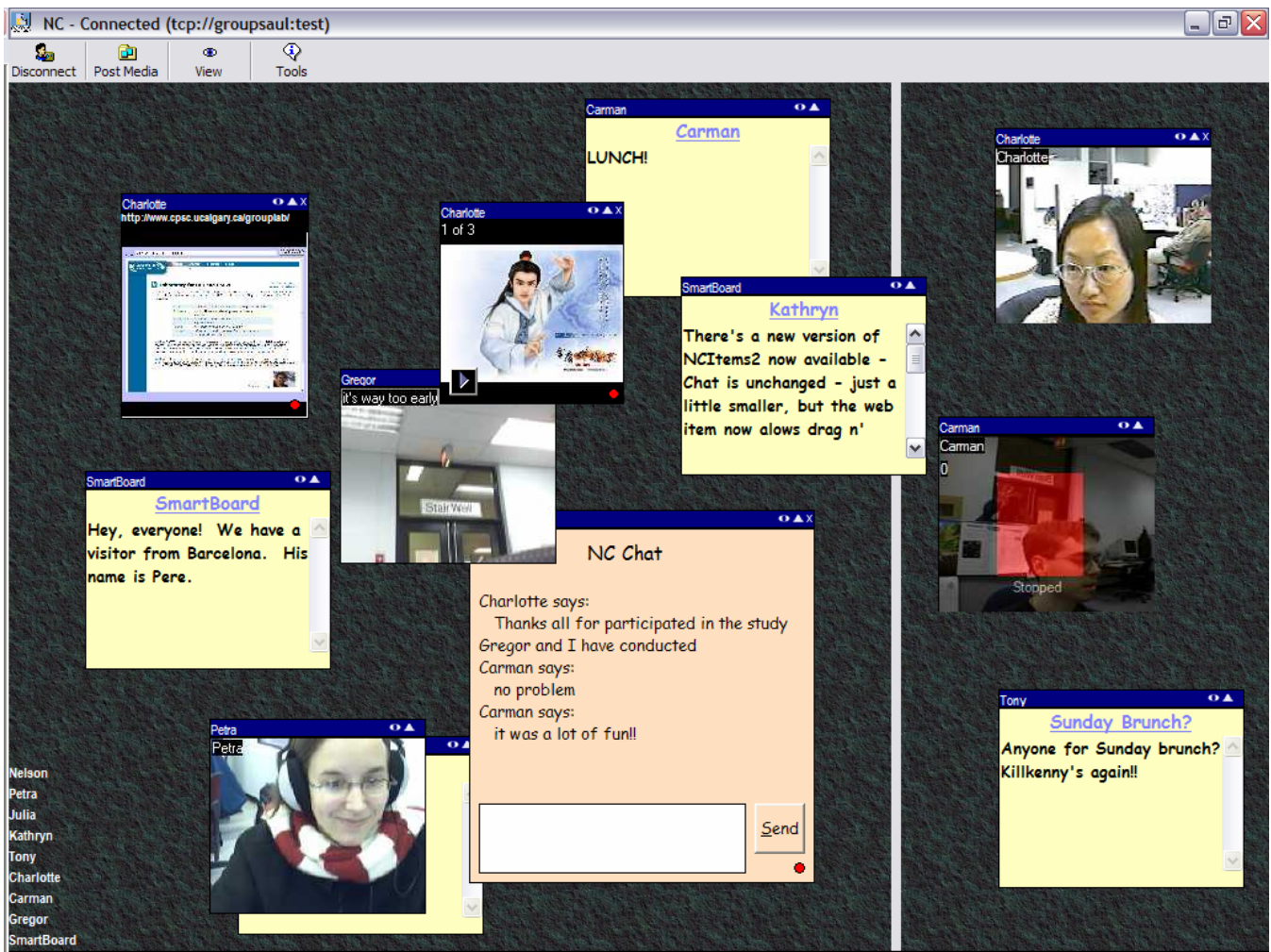


Figure 1: A snapshot of the Notification Collage in use

### 3. Design Principles

So far, a theoretical basis for discussing group activity has been explained, with a particular focus on mutuality. The theory provides a descriptive framework for informal mutuality and casual interaction. However, the goal is design rather than theoretical description. This section narrows the theory and takes the next step towards a design.

The approach taken is to restrict the problem space and then identify design solutions that can be justified by the theory. The theoretical framework describes everything about group interaction, so in the interests of tackling a manageable task this space must be reduced. As the theory is descriptive rather than prescriptive, it is not possible to use the theory to generate designs. Hence design principles and ideas are explained first and then related to the theory.

There are three topics that I will address:

1. Notification based peripheral mutuality;
2. Transitioning from mutuality to interaction;
3. Design for social worlds.

#### 3.1. Notification-Based Peripheral Mutuality

Mutuality of other people is provided by notifications of changes in the information about the person. The changes vary in style, content, and fidelity depending on the information and the context. For example, video is continuously changing visual information but the change notifications (i.e. frames) may only be every 5 seconds. On the other hand, text change notifications could be sent per-character or per-message.

There are two systems that provide good design principles for notification based awareness. The earlier mentioned Notification Collage provides notification-based change mutuality of others. Another system called Sideshow [Cadiz et al 2001], developed at Microsoft Research, is a peripheral display of changing information. Both of these examples provide important lessons that can be used in the design of a mutuality system.

There are three primary principles in the design of the NC (quoted from [Rounding 2004]):

1. The NC board should allow people to rapidly connect and use a public space that incorporates both basic presence information of other connected people and a collage of media items.



2. People should be able to add and manipulate media items directly using a single user interface.
3. The NC board should include a stock set of media items designed to support informal mutuality leading to casual interaction and / or information sharing in a group of intimate collaborators, as well as the means to incorporate items.

The NC is an established and tested notification-based change mutuality application and these design principles form the basis for the design of the new system.

In contrast to the NC, Sideshow displays personal information items arranged in a bar on the side of the user's screen. The personal information items display information that is pertinent to the user such as email inbox status, weather reports, stock information, etc. These items show only high level summaries of the information, for example the email inbox item displays only the number of unread and total messages. However, mouse-over on the items displays a large tooltip that provides further information; for example, in the case of the inbox item, the email subject lines are shown. Clicking on the tooltip opens the application, e.g. the email client.

Sideshow's interface design is supported by the theory. The peripheral nature of the display, with a small screen area to the side of the screen and minimal motion from the items, seems well suited to a user integrating an mutuality display into their viewset. The application is always visible, supporting mutuality. The quick drill-down allows users control over their focus within the application, a part of controlling their individual view.

### 3.2. Transitioning from mutuality to interaction

This design point relates to the centres and perspectives aspect of the Locales Theory. More specifically, it also relates to the principle that mutuality is a continuum which is a principle in the mutuality component of the Locales Framework and has been further explored in the Focus and Nimbus model of mutuality.

Users need to transition through the mutuality scale as they configure and personalise their views on the application and fit it into their viewset. The quick drill-down and escape principle in the Sideshow design matches well to this principle. It also seems that some variation on the appearance of the items in the bar would allow the user more control in configuring the application.

### 3.3. Design for Social Worlds

The purpose of the system being designed is to provide mutuality and capabilities to interact with other members of a work group. The Notification Collage provides these capabilities for a single group; the primary community of intimate collaborators. However, the Locales Framework makes it clear that containing groups, overlapping groups, and contained groups are vital to the activities of the people involved. A major part of this design is to support these group structures.

The purpose of the application is to provide mutuality within groups. It follows that a primary unit of interest is the group. Each individual belongs to multiple groups, with different commitments to each group. These commitments change over time with the tasks that the user performs.

Groups have different lifetimes. Some groups are long-lived, surviving longer than any one particular membership. Some groups have a more ad hoc nature, lasting as long as it takes to organise a lunch meeting for example.

Groups are related to each other. As discussed in the Civic Structures subsection in the previous chapter, social worlds are contained within each other and sometimes overlapping. Members of the social worlds are influenced by these structures while engaged in their work. Even social worlds not related by this direct kind of connection are of interest sometimes.

The next section applies the design discussion from this section and applies these principles to arrive at a first prototype.

## 4. Community Bar

Community Bar is an initial prototype that attempts to draw together all the points that have been brought up in the previous discussion to design an informal mutuality and casual interaction tool.

The bar itself, as is most likely apparent from the previous discussion, takes much of its inspiration from the Sideshow system. The profile of the application is a bar that resides on the side of the screen. The bar displays a vertical list of media items similar to the Notification Collage media items. Figure 2 shows a screenshot of the bar with some video media items displayed. One of the items is being focused on to view extra detail.

Managing multiples social worlds were not implemented in the current version of the prototype illustrated in figures 2 and 3 but will be implemented in the next version. However, I briefly will discuss the multiple social world design will as this next version is close to completion. The primary unit that the item displays is a group. Each group consists of a label identifying the group and a container for the individual media items. The bar shows all the groups that contain the user in their member lists. To create a new

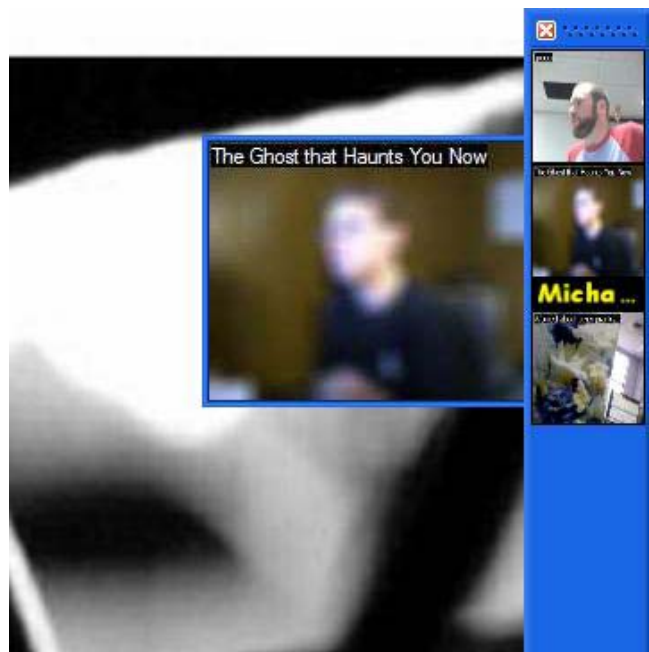


Figure 1: Community Bar screenshot

group, the user can simply enter a group name in a text box always visible at the bottom of the bar and hit the “create” button. To leave a group, the user clicks the “X” in the corner of every group on the bar. Inviting someone to a group is done with a context sensitive right-click menu on the group label. By making these operations simple to perform, they are more likely to be performed often and so short-lived, ad-hoc groups become part of the normal practice of using the application. The groups and items are competing for a limited amount of display space on the bar. Items, and the groups that contain them, are kept at the largest size possible but are shrunk to make room for new items. When a user focuses on an item, by placing their mouse over the item, the item grows again slowly up to its maximum size. Other items are shrunk further to make room for the growth. In this way, the items that receive more attention are the bigger ones on the display.

These controls over focus on the items allow the user to configure their view within the application while fitting the application as a whole constantly visible yet fitting into a complete viewset.

#### 4.1. Media Items

The media item designs are heavily influenced by the Notification Collage items. The main difference is that there is a range of different representations for each item. Each item must have a “tile” representation, for the view in the bar, a “tooltip” representation, for the popout window on mouse over, and an “interactive” representation, for when the tooltip is selected to move to full interaction.

The tile view also changes size as the user’s focus on that item varies. The item representation should also vary to give the most appropriate view for the size that it has available. The tooltip view should show more detail than the tile view with some possibilities for limited interaction (if appropriate). The interactive view is separate from the bar application, either in its own stand-alone form, or by starting up an independent application.

The initial prototype of Community Bar will have two items: the video item; and the text item. These two item types are shown by informal studies to be the two items most often used on the NC, so they are a good basis from which to start building a stock set of media items.

Currently only the video item is implemented in the prototype. Figure 3 shows three representations of the video media item: the small tile in the bar itself; the medium size tooltip; and the large separate view. Not apparent in the diagram is that, as the representation increases in size, the frame rate and resolution of the image also increases – increasing focus on the item not only increases the size but truly provides more details. The large separate form also allows the user to establish an audio link for conversation.

#### 5. Conclusions and Future Work

The design of Community Bar appears to address the design problems that were selected and relates well to the theoretical description. However, there is no verification that the design does in fact address the needs of the users. There is still a large amount of work to do in finishing the prototype, deploying to a small test group, revising the design and the implementation, and then deploying to a larger community for continuous use.

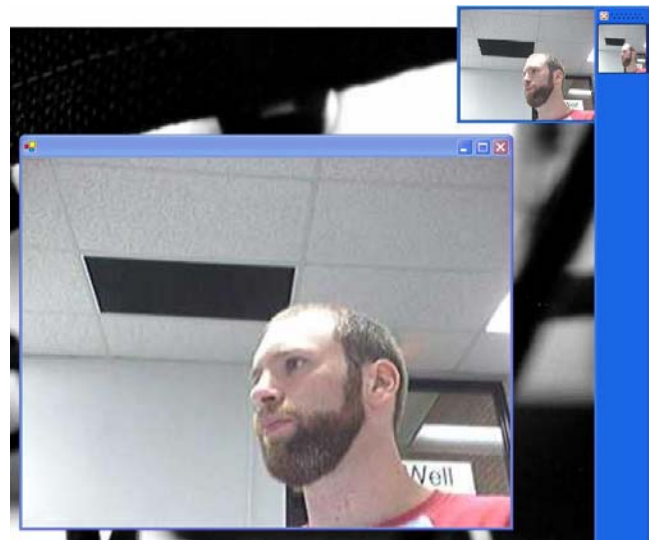


Figure 2: Video media item modes

The prototype currently under development requires completion of the group management and the text-based media item. The Notification Collage experience also indicates that there needs to be a simple way for programmers to extend the capabilities by implementing their own media items.

Initial deployment to a test group will show up the more obvious usability design errors. There will also be the opportunity to gather some feedback about the use of the theoretical ideas. Deeper evaluation of the theory application will be shown through extended use of the system by a community.

Exploration of the theoretical framework through implementing its ideas and principles will lead to better understanding of the theory and its relationship to the work practices of knowledge based communities.

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