Rules of Engagement:
design attributes for social interactions

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We present a taxonomy for the design of workplace "break" spaces. The taxonomy can be used to identify aspects of current spaces that are either successful or problematic. From this analysis, we demonstrate how the taxonomy can be used to identify opportunities for computer mediated augmentation of spaces, and how such designs can be validated against this taxonomy.

Keywords: Taxonomy, communal spaces, design review, social interaction, social space, engagement

1. INTRODUCTION

In this paper, we consider the design attributes necessary for computer-mediated support of effective social-presence interactions between work activities. This interest has been motivated by a fire which destroyed our School's coffee room, a key social space for over 300[1] academics, support staff, postgraduate students and researchers who used it daily. The coffee room was a well-used place for a variety of social interactions, from impromptu meetings with colleagues from different groups, to simply seeing who is about while getting a coffee. Because of this loss, we have had a unique opportunity to look comparatively at the specific attributes for effective socialisation in spaces designated to support these activities. Since the coffee room burnt down, our entrance foyer, recently refurbished, has been used as one substitute, but has not been nearly as successful as a social space. Likewise, hallway kitchenettes have been utilised by many people, but mostly for quickly grabbing a coffee, not for taking breaks with others. The goal of our work has been two-fold: first, to investigate the specific differences between these three places to understand why one worked well (many people participated) and the others less well (many people who used the old space do not use the new spaces; nor have they invented alternative/replacement practices), and second, since we cannot in the near term generate new physical space, to see how these differences may be addressed by digital rather than physical solutions. Our approach is informed by Dix's Christmas Crackers work [1], in which he "deconstructs" both the physical and affective properties of Christmas crackers in order to see how these attributes might be translated from a physical to a digital experience. By carrying out such an analysis of the coffee room, in combination with ethnographic studies of the alternative spaces, we developed a taxonomy of practical and affective attributes such spaces seem to need to support to be successful. We then use this taxonomy to propose three candidate digital artefacts: KitchenSync, tableTOP and EC-Chess, to reintroduce some of the practical and affective affordances that have been lost.

2. RELATED WORK

Herbsleb *et al.* examine the role of contextual awareness [2], informal communication [3] and tools such as instant messaging (IM) [4] for distributed work. Their analysis shows that co-location is critical to teamwork. Informal communications are thought to be highly effective in the work environment, yet tools such as IM tend to be rejected [4]: many workers associate typing at a computer, for communication or other purposes, with work, yet perceive informal face-to-face communications as desirable. Indeed, it has been suggested that 25% - 70% of people's work time is spent in face-to-face interaction (variations due to job type) [5]. It has also been suggested that chance meetings trigger useful conversation [6]: other works have tried to simulate this over a distance [7, 8].

A number of systems with the purpose of indicating presence are proposed by Hindus *et al.*, including *InTouch*, and the *Intentional Presence Lamp* [9]. These systems use combinations of light, sound and imagery to indicate one user's presence to another. Other systems [10] have used different indicators, such as avatars, names, or photos. Greenberg and Rounding present *The Notification Collage* [11], supporting conversation through the use of "Sticky Notes". The universal visibility of these notes on communal displays encourages new users to join in, after

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[1] http://www.ecs.soton.ac.uk/news/fast-facts.php

"overhearing" publicly visible conversations. The notes' persistence allows asynchronous conversations to take place between users. However, as the collage elements are universally accessible, it was possible for them to be moved or hidden entirely by new elements, causing users to "miss" their messages. Privacy issues were also uncovered with the system's video capture functionality, where users could potentially be filmed against their knowledge. Although some interesting work has been done in supporting social interactions [12], less work has been done on supporting the social engagement between work activities, such as during coffee breaks. One approach, using video for co-presence across group kitchens [13], was largely a failure due to privacy concerns. Privacy was also a concern in Fish *et al*.'s *VideoWindow* system [14] and the *Montage* system [15] by Tang *et al*.

3. METHODOLOGY

With the aim of comparing and contrasting the coffee room and substitute spaces, we set out to identify, in each space, the activities and use of the space, and how they are afforded. We undertook this elicitation by conducting a series of observations of the foyer and interviews about all three spaces.

3.1 Observations
Based on local knowledge and preliminary observations, we identified the main stakeholders for the coffee room: lecturers, researchers, postgraduates, staff, and undergraduates. We focused our observations on how and when these groups made use of the foyer. Three investigators observed the foyer at various times over the course of several weeks, totalling 14 half-hour observation periods. To determine times for observation, we made use of existing presence data. This presence information correlated with knowledge of designated activities that were scheduled during the week, such as student interview times, seminars and transitions between classes.

3.2 Interviews
We conducted twenty-four structured interviews across stakeholder groups. The consensus was that, to those that used it, the coffee room was missed. The reasons varied depending on the stakeholders' use of the space: lecturers missed the opportunity to socialise with postgraduates and researchers; postgraduates missed the change of atmosphere afforded by a dedicated coffee space; undergraduates, who previously used the space for project meetings, missed the availability of such a venue. All parties except undergraduates, possibly due to their less frequent use of the space, felt that chance meetings and awareness of other department members were important activities that had been lost. In addition to what was missed from the coffee room, negative opinions of the foyer were also highlighted: the coffee available from the foyer was unanimously derided and senior stakeholders - particularly lecturers - felt that the foyer was not a private enough space to discuss certain topics.

4. ANALYSIS OF RESULTS

From analysis of the interviews and observations, we derived seven categories that recurred across participant communities. In Table 1, we present a preliminary taxonomy of (1) the values, and (2) three examples of how these values map to the three physical spaces: the original coffee room, the foyer and hallway kitchenettes. By mapping these spaces to the taxonomy, the table demonstrates how these values may enable a way to interpret why one physical design works better than another, and also highlight design opportunities for where virtual intervention may be able to address reduced values. Values are grouped into two categories: artefact and activity. Artefacts are attributes of the space itself, while activities are interactions supported by the space. The degree to which the space supports these values is represented in the colour coding: strong (green), mediocre (yellow) or poor (red).

4.1 Description of values
Artefact values. A **lure** can be a compound artefact such as the presence of both *good* coffee and colleagues. **Environment** is the design of the break space. **Awareness of others** is a boundary value between an artefact and an activity: while presence is a mental rather than physical artefact, to determine presence, one has to act.
Activity values. The activity of **breaking away from work**, which means changing location and task, was a recurrent value that emerged in interviews. **Serendipitous meetings, semi-planned meetings** and **socialising** were all seen as critical activities to be supported for effective coffee break interactions.

5. DESIGN METHOD

In the following section we present three examples of using our taxonomy with Dix's Christmas Cracker design method [1] to map affective attributes and physical affordances of an actual artefact to its virtual counterpart. In our case, rather than design a replacement artefact, we present supplemental ones to address missing physical values with virtual artefacts designed to add these values to the space.

5.1 KitchenSync – Values addressed: awareness, engagement, lure

An interactive screen is placed in each kitchenette, which shows who is currently using, and who has used the kitchenette in the last ten minutes. People can monitor this activity from their office, or from other kitchenettes. Presence may potentially be detected by attaching cheap RFID tags to a mug, which also allows people to opt in or out of the system by their choice of mug.

	Value	Affordance		
		Coffee room	Foyer	Kitchenette
Artefact	**Lure (enticing factor)**	Good coffee and contact with colleagues, proximity	Poor quality coffee	Good coffee, microwave, proximity
	Environment	Enclosed, purpose designed, social space, windows, multiple tables	Clinical, waiting room feel. Office work (reception) nearby. Transient.	Small, no windows, just a place to make coffee
Activity	**Awareness of others, presence**	Achieved by looking round space, or asking who has been here	Good awareness, but too transient	Too small to socialise in, can't walk through it
	Taking a break (change of location & activity)	Away from offices, different setup	Too professional, feels like still in work	Limited space; standing room only
	Engagement (unplanned)	Forced to walk past tables to coffee, through-traffic	People pass through, but often coming to/leaving work	Too small to socialise in, no through-traffic
	Semi-planned meetings	Table arrangement provides focus. Cannot book the room.	Area is often empty, perceived space for only one group	Limited space for meetings
	Socialising	Many tables, suitable for different groups to meet	Perceived space for only one group	Limited space for socialising

TABLE 1: Mapping values against affordances of social spaces

Awareness - The system provides lightweight, non-intrusive awareness of others' presence. *Semi-planned meetings* are afforded by the ability to choose to respond to people's presence by physically going to the kitchenette to meet. *Serendipitous engagement* is enabled by persons noticing the presence of a colleague in another kitchenette, and signalling their interest in meeting the colleague through a lightweight mechanism such as touching the colleague's avatar on the screen. This last feature might only be available to kitchenette users. By offering this asynchronous communication, initiated virtually, the system facilitates the kind of chance physical meetings previously valued.

5.2 tableTOP (tableToOccupyPeople) / EC-Chess –
Values addressed: awareness, engagement, environment, break, socialising, lure
An interactive table-top system is proposed for the foyer, offering virtual awareness from the KitchenSync system, as well as virtual postcards for others to read, perhaps leaving their topics of discussion for viewing or for adding their own comments. The table also provides games such as chess, sudoku, or Go.
Awareness. Due to the transient nature of the foyer space, people are rarely present for very long, making it unlikely that they will remember others who were previously in the space. By recording this information in the table and relaying it back, the levels of awareness afforded by the more social situation in the coffee room is recaptured.
Engagement. A person can leave postcards for others, which are shown automatically when this person's presence is detected (possibly by their RFID mug). The recipient can leave subsequent messages in reply, providing an opportunity for asynchronous conversation, or use the notes to share information with anyone who sits at the table. The games can be offered in an 'open' style, where anyone present can take the next move, regardless of whose game turn it is. By detecting who takes each move, a play history can be displayed, encouraging users to ask

others why the moves were made, or offer suggestions for alternative future strategies, aiming to recapture the *serendipitous conversations* found in the coffee room. The system could also be used to record private games. The number of wins and losses could be recorded, pairing up users of similar skill in future matches. Again, this could encourage spontaneous conversation between people, re-affording the kind of spontaneous engagement currently missing from the building's interim recreational space.

Environment / Break from work. Our application of the taxonomy shows the foyer is an unwelcoming space. We postulate that by providing awareness, engagement by messages and games we will improve the environment (*socialising* it by introducing ludic [16] qualities), but also potentially improving the *lure*, where the system itself becomes a reason to go to the foyer and hang out.

5.3 Generalisation
We have shown that the values in the taxonomy are useful both for understanding the strengths and weaknesses of a space, and for designing solutions to address the weaknesses and enhance the strengths. Our application of the taxonomy demonstrates its generalisability for assessing coffee break spaces.

6. CONCLUSIONS AND FUTURE WORK

By comparing and contrasting the loss of an effective social space with substitutes we have developed a taxonomy of seven key values for break spaces. The taxonomy provides a framework for the analysis of physical spaces in terms of their affordances for social interaction. This analysis highlights strengths and weaknesses which can be used to inform design requirements. We have demonstrated how this assessment can be used in the design of digital systems to augment these spaces to better support the rich social activities that occur during coffee breaks.

We are currently prototyping the design ideas presented. We are interested in looking at how many identified weaknesses need to be addressed, or strengths augmented, in order for a proposed virtual system to improve human engagement in a break space. We are also interested in testing how the taxonomy may translate, or need to be extended, to support analysis and design of other spaces for social interaction, from pubs to parks.

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