Interaction design as understanding and transforming place

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Abstract

Space becomes place through a rich interplay of actors, actions and associations, and techniques drawn from performance, gaming and architecture are well adapted to helping us understand and design for complex environments. Our experience working with masters-level interaction design students in the ATELIER project has demonstrated that these "cross dressing" techniques can create a climate of awareness in which inspirational learning and innovative design can occur.

Embodiment and interaction

Mechatronics, sensors and tags inhabit new environments built upon networks of semi-autonomous objects, in which information can be spatially configured. Ubiquitous computing is perhaps the most common names for this state of affairs. It is a great challenge, however, to integrate new technologies into complex, convergent systems. It is clear that new interfaces call for an understanding beyond the purely technical. Augmenting spaces and artifacts is also a process of supporting shared understanding of the social activities taking place in different contexts. These environments are not limited to workspaces, but also include public and domestic spaces. The Central Station in Malmö is one example of a place that has emergent qualities, that is more than the sum of its different communities. A challenge for ubiquitous computing is to integrate computation with existing artifacts, physical space and the social meaning-making taking place within the environment.

While abstraction is one of the strengths of computation and digital media, it is obvious that users are more than just information processing systems. The relationship between information and knowledge is one example of how meaning is not inherent in information, but rather made meaningful by direct participation in the world. Dourish introduces the notion of embodied interaction: "the creation, manipulation, and sharing of meaning through engaged interaction with artefacts"[i] A shift towards embodied interaction is called for by the recognition that incorporating human skills requires moving computation "out of the box" and "into our environments". Digital artefacts are not primarily representations, but participate actively in the world.

The HCI tradition has developed various methods for evaluating qualities of use. Centered upon efficiency, ease of use and learning, these methods fail to adequately incorporate aesthetic experience and socially meaningful activity into the design process. In many cases qualities of use are different from those imagined by the designer. Hallnäs and Redström define this shift of perspective as being one from use to presence. Presence is something different from just being physically present. It addresses the way we let artifacts inhabit our life-worlds on a more existential level. Clearly there is a distinction between describing a table as something "inherited by my grandfather" and "a piece of furniture that can bear X kg"[ii]. The difference is essential, but also difficult to evaluate in scientific terms. That difficulty is one of the reasons that methods directed at the imagination are often seen as belonging to informal structures, and not usable within formal systems design processes.

Knowing the user and context of use is a widely accepted principle in the field interaction design. It's a question of negotiating meaning, as well as grasping the network of actors, objects and tools that exist within an environment. This work produces a huge amount of material in different formats, both digital and physical. Designers must forge and maintain connections between materials and places. These connections may be of varying nature and quality: focused on activity or technology, narrative, or driven by different motives and perspectives. What matters for design is only rarely descriptions of space in a physical sense. The spatial layout of a site is of course of importance, but even more so are the activities taking place there. What constitutes place is a complex totality of social engagement with other people, use of artifacts, information and lived experience that is hard to pinpoint. Design is a process of both recognizing and transforming place. But place is a qualitative phenomena more than quantitative. The phenomenological tradition gives us some tools to approach everyday life by returning to concrete things and occurrences rather than abstractions describing them. Bread on a table is not a meal – it's also the hands weary from a full day's work dropping the knife, the children telling stories from school, the remembrance of youth in the taste of a familiar dish. This richness is hard to generalize in descriptive language. Our everyday life-world

consists of this concreteness that falls between the pure objects of science. Understanding place calls for collecting and cherishing the paradoxes and complexity of life-worlds, rather than unifying them in abstractions.

Research context

Over the past several years we have been exploring the way in which space becomes place through the E.U.-funded ATELIER project, in collaboration with masters students in Interaction design at Malmö University's School of Arts and Communication. ATELIER aims to make a contribution to our understanding of inspirational forms of learning and the creation of augmented educational environments for architecture and interaction design studies. Further, ATELIER provides a technological infrastructure that allows for the fluid capture and manipulation of media and design representations, with the goal of supporting innovative design conceptualization and learning. Our partner institution, the

ATELIER researchers have participated in two extended projects with the graduate students: *Augmenting spaces* (fall 2002), and *Semi-public places* (fall/spring 2003-'04). In the former, students developed proposed interactive artefacts and services for four different host companies/agencies; in the latter students prototyped spatial augmentations for Malmö's Central railway station.[iii]

Besides engaging the masters students in concrete design activities in connection with real-world clients and contexts, both projects were conceived of as providing them with a "toolbox" of different interaction design methodologies. Several of these methods were drawn from practices coming from outside of traditional digital systems development, specifically exploratory games, performance and illumination, and mixed-object architectural models.

Methods

1. Exploratory games

In Malmö we have (even before ATELIER) used card games as a participatory design technique to explore what's happening in a place. The cards were augmented with RFID tags that maintained links to videos and images collected in field studies. A goal for the games is to set up imaginary situations that complement reflective understanding of practice. While the media attached to the cards were from the project at hand, the player is free to interpret them in any way they want.

In the first round of one possible game, all cards are placed on the RFID tag reader, and the digital content is thus displayed [Fig. 1]. The first player places a card on the table and gives a tentative title to the story that is to be built. The second player will also play one card and continue to develop the story. A player can also pass, just as in poker, if they feel uncomfortable with the story or if their cards do not match. After the second player the third continues and so on. The game is played until there is a story on the table that the group feels is valid and a consensual narrative has been formed [Fig. 2].

2. Performance and illumination

In both *Semi-public places* and *Augmenting spaces* we ran an improvisational design workshop, combining ethnographic practice and performance, with the goal of encouraging the students to engage in a directly physical, felt way with the life of people potentially affected by their designs (a means of "getting practice under your skin"). In this practice (which was based upon a workshop run by Brenda Laurel at Art Center College of Design in the summer of 2000[iv]) students set out with video cameras to capture footage of an inhabitant of their design context engaged in a work practice. The resulting material was then back-projected upon a large screen in the studio, and the students rehearsed "playing back" the gestures and movements by memory through their own bodies [Figs. 3&4]. Improvisational design (or "body mimicking," as we called it) has the potential to generate critique of existing work environments and sequences, as well to suggest new opportunities.

Another technique we worked with in the *Augmenting spaces* project was to explore the potential for illumination to inflect use qualities. In this exercise, students analyzed the illumination qualities present in their host context. The group working with the emergency room unit at the Malmö General Hospital, for example, identified soft, flat lighting coming from above (mostly fluorescent tubes) as the predominate light in their use context. They then recreated as closely as possible in the studio the opposite illumination qualities (hard, directional light coming from below, in the case of the emergency room students, not unlike a disco or stage set). Their existing physical prototype was then videotaped under these conditions, as a means of exploring the way in which their sense of the prototype was changed by the new illumination conditions.

3. Mixed-media objects

Within the ATELIER project we believe that Mixed-media objects can work as a powerful design resource for illustrating and sharing project-relevant knowledge and for supporting collaborative work. A mixed media object is a tangible object augmented by a digital representation. The linkage between the two is provided by an RFID tag or barcode, and the representation exists as a image, sound or video file in a hypermedia database. Inspired by how architecture students work with scale models, we thought a 'Mixed-media model' could be an interesting way for the interaction design students to get an overview of Malmö Central Station in the *Semi-public places* project.

As a tool for initial dialogue and informal sharing of insights and reflections it worked quite well, as everyone seemed to relate to the place in very concrete ways. It also highlighted all the places and information that were still undiscovered, and thus worked as a tool for deciding what to do next, and how to divide the space and future studies among the students. The combination of spatial overview and specific representations of visual or aural characteristics of the space also made the textural contrasts between different zones of the station immediately apparent [Fig. 5].

A further use of the model was through projected mappings. 'Mappings' are inspired by architecture and city planning, and the method was introduced to the interaction design students in the very beginning of the *Semi-public places* project as a means of annotating observations in the context of their study - in this case at Malmö Central station. They were told to choose a variety of perspectives for their observations such as 'means of transportation inside and outside the station', 'private – semi-public – public places/zones within the station', etc [Fig. 6].

Before going on the fieldtrip they gathered a 2D top-view plan of the site, some sheets of semi-transparent paper and a selection of coloured pencils used to add annotations and indicate different perspectives on the papers. Annotations were done on the fly, and then they were further refined and analysed back in the studio, by overlaying different types of mappings, and by digitalising them and projection them onto the Mixed-media model.

Conclusions and lessons learned

We have integrated these methods into educational projects over the past two years with some successes. More importantly, we have gained insights into how the techniques can be more effectively deployed in the design education process. One limitation in our capacity to evaluate the usefulness of these techniques is the fact that they are presented in the context of a foundational course, in which a "toolkit" of diverse design methodologies are introduced as part of a larger design project. Although the game, performance and architectural techniques have thus not been individually linked to design outcomes, we have conducted debriefings of the students following the projects, and have acquired anecdotal evidence confirming the usefulness of the methods.

It is clear to us that techniques coming from outside of traditional design and systems development help create a climate of awareness in which more innovative work can be done. As an example, although the "body mimicking" exercise did not always have discernable impact upon the development of design concepts, students did testify to a new awareness of the importance of body rhythms in understanding the use qualities of designed objects. The students went on to suggest ways in which the perception of work rhythms in the body mimicking exercise could be enhanced through the use of music as complement or counterpoint to the unique beat established by different sequences of movements and gestures. A similar response emerged when we asked students to reflect upon the illumination exercise.

One area in which we need to work further is in the timing of these different techniques within a design process. We occasionally experienced difficulty establishing the correct focus upon the Mixed-media model; it remained more of an object to be finished than a tool with which to think and conduct analysis. This partly resulted from the fact that the model was constructed early in the design process, as a foundational research exercise before teambuilding and concept development began. We have also acquired a fair amount of experience with card games as a means of reflecting upon design process in debriefing sessions, but have worked less with the technique as a generative method within the ATELIER projects.

However, our experience with these "cross dressing" techniques has generally been positive, and we look forward to the development of an enhanced design ethos, in which designers will intuitively be able to shift fluidly from technique to technique as appropriate, just as they would match their wardrobe to the plans for the evening.

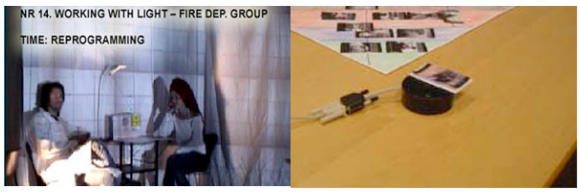

Figure 1. To the left a plastic card. To the right the card is placed on the tag reader which then plays the digital media in a large projection that can be viewed by everyone.

Figure 2. To the left cards laid out which eventually forms a commented story such as illustrated to the right.

Figure 3. Fredrick plays back the actions of a counterworker by memory.

Figure 4. Fredrick plays back the actions of a counterworker by memory.

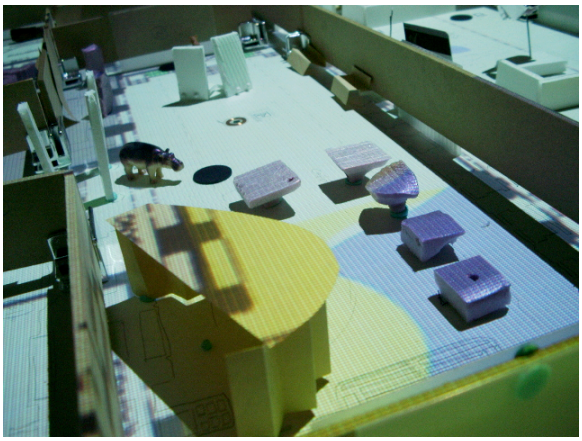

Figure 5. Zones of the Malmö Central Station projected onto the mixed-media model.

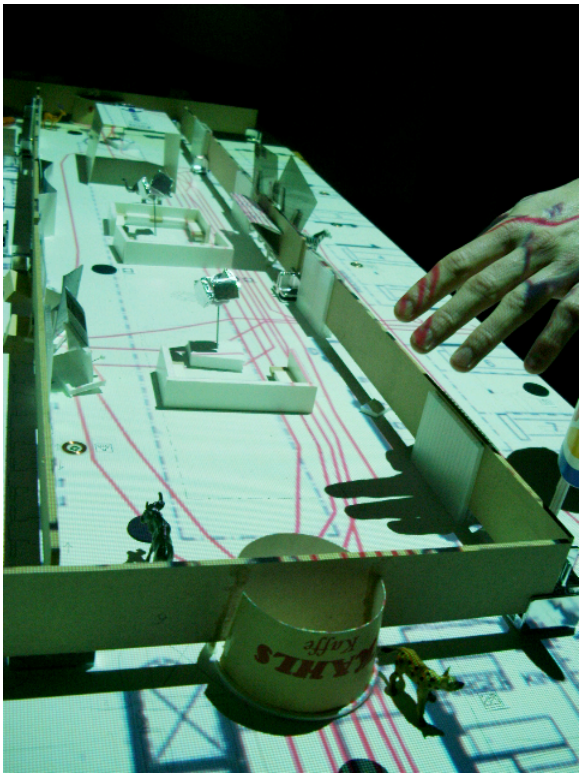

Figure 6. Mappings of flow patterns projected onto the mixed-media model.

[i] Dourish, P., Where the action is-The Foundations of Embodied Interaction , The MIT Press, London, 2001.

[ii] Hallnäs, L and Redström, J , From Use to Presence: On the Expressions and Aesthetics of Everyday Computational Things, *A C M Transactions on Computer-Human Interaction*, **Vol. 9**, No. 2, June 2002.

[iii] Here is the introduction for *Semi-public places*:

The Malmö Central train station is in a state of change. The opening of the bridge to Denmark in 2000 transformed the station from a destination of primarily domestic travel to a new international gateway and an important hub for commuting to and from Copenhagen. Conversely, the inauguration of the Malmö tunnel project in 2010--with the introduction of intermediate stops between Copenhagen and the Central station—promises to alter the patterns of usage of the station, as people embark and disembark from metro stops nearer their homes.

But the character of the station has never been fully defined just by the brief passage of harried commuters. The Central station has also historically served as a destination in itself and a place of significance for private lives. In Henning Mankell's thriller "Mördare utan ansikte" (Murderers without faces), for example, the protagonist and his estranged wife chose to meet at the station for a drink, and play out a scene of great emotional vulnerability. Every day, in fact, the station is the site of intense experiences of separation and reunion. The station can thus be said to be a quintessential example of a semi-public place.

As an SPP, the Central station functions as a locus of commerce, travel, administration, and entertainment activities, populated by a diverse group of commuters, travellers, merchants, government officials, and inhabitants of the surrounding community. It also serves as a transitional space, through which people move—and gradually adapt—from their home environments to the public sphere of work, taking on new roles and behaviours.

Previous design projects directed towards public facilities such as train stations and airports have tended to focus upon the experience of travel as a means of proposing spatial augmentations and new digital services, but we believe that this approach is too limited to benefit the Central station. One strength of interaction design practice is the capacity to extract meaningful information from the experience of individual users, and thus build up a nuanced picture of a complex environment.

[iv] And is documented in Brenda Laurel (ed.), Design Research: Methods and Perspectives (Cambridge, MIT Press, 2003), pp. 49-54.