

Culture Vultures: Considering Culture and Communication in Virtual Environments

Elizabeth Churchill

FX Palo Alto Laboratory Inc.
3400 Hillview Avenue
Palo Alto, CA 94304
churchill@pal.xerox.com

Sara Bly

Sara Bly Consulting
24511 NW Moreland Road
North Plains, OR 97133, USA
sara_bly@acm.org

cul-ture (klchr) n.

1. a. The totality of socially transmitted behavior patterns, arts, beliefs, institutions, and all other products of human work and thought; b. These patterns, traits, and products considered as the expression of a particular period, class, community, or population: Edwardian culture; Japanese culture; the culture of poverty; c. These patterns, traits, and products considered with respect to a particular category, such as a field, subject, or mode of expression: religious culture in the Middle Ages; musical culture; oral culture.
2. Intellectual and artistic activity, and the works produced by it;
3. a. Development of the intellect through training or education; b. Enlightenment resulting from such training or education;
4. A high degree of taste and refinement formed by aesthetic and intellectual training
5. Special training and development: voice culture for singers and actors;
6. The cultivation of soil; tillage;
7. The breeding of animals or growing of plants, especially to produce improved stock;
8. Biology. a. The growing of microorganisms, tissue cells, or other living matter in a specially prepared nutrient medium. B .Such a growth or colony, as of bacteria.

Websters on-line dictionary, <http://www.dictionary.com/>

"The concept of culture I espouse ... is essentially a semiotic one. Believing with Max Weber that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning. It is explication I am after, construing social expressions in their surface engimatical."

Geertz, 1973, page 5.

1. Introduction: Online Culture

Recent years have seen vast improvements in telecommunications. More than 170 countries now have internet access. These improvements, along with greater access to computing equipment, have resulted in an increase in the number of 'virtual' communities – communities that are made up of individuals who are geographically dispersed but who are 'networked' and online [3].

As technologies and telecommunications infrastructures continue to improve, the prediction is that we will see more of these communities emerge. Indeed, technologically determinist, utopian visionaries imagine a virtual world of constant connection and endless collaboration possibilities; an on-line, virtual "melting pot" of different cultures. On the other hand, dystopian visions paint a picture of creeping heterogeneity, and focus on the politics of inclusion within and (more importantly) exclusion from these communities [17]. This view believes the most powerful social, economic and political groups exercise and maintain their power through the inter-linked systems of electronic spaces and urban places [11], creating a form of "information apartheid" [6].

Many of these determinist visions are either entirely positive or entirely negative, and many have been criticized for being concepts "without much social content" [14]. Culture is discussed in terms of diversity (good) or homogeneity

(bad). Little focus is given to what it means to belong to or represent a culture, or to the day-to-day expression of culture in people's actions and interactions.

We believe it is at this level that culture becomes an interesting area of discussion for design – the level of action, interaction, collaboration and cooperation, with a focus on conversations and on communicative practices. In line with this, much recent research has focused on studying virtual communities that currently exist, considering the details of individual's differences and similarities within and without the online space. This work details human communication, action, interaction and reaction in computer-mediated communities in trying to gain a deeper understanding of the development and maintenance of communities [1,16]. This research makes it clear that meaningful relationships are being forged in the absence of physical presence and, contrary to many computer mediated communication theories which foreground and problematise the lack of (visual) social cues, some observers suggest that online behaviour can be even more social and normative than face-to-face interaction.

Our work follows this general approach, and in the next sections we outline some factors we have observed as contributing to creation of “chemistry” or engagement in on-line relationships. In this short position paper we consider methodologies for investigating and understanding instances of the success and failure of virtual spaces that support communications between people from different cultures. Some questions we have posed are: What makes these spaces work and how can we design to encourage more to work? What causes the failure of such environments? How can we begin to understand how these spaces may be used and what design and usage issues will surface as salient in particular contexts? What are appropriate design metaphors for such virtual environments – offices, gardens, workspaces, pages? How do the cultures of the material world intersect with cultures of the virtual world? How do on-line cultures evolve? How are they maintained?

Before continuing, it is worth noting explicitly that we define culture in the broadest sense, to be a set of understandings that are shared with others. The Webster's dictionary definition above illustrates the fluidity and breadth of the word “culture”. Like the first item in the list of definitions, we consider culture to be observable and manifested in transmitted (observable) behavior patterns, in artifacts that are produced and in the actions that are taken upon and with those artifacts in relation to others. Our approach therefore, in accord with Geertz is to take an interpretive stance to observed actions and interactions, over some period of time. In this short position paper, we offer a brief introduction to concerns about the development and maintenance of virtual communities, some observations from our work and work of our colleagues and then reflect briefly on methodologies for the design and evaluation of emerging online cultures and communities.

2. Using Virtual Environments to Support Working Relationships

MUDding to stay in touch

In our work on text-based virtual environments, we have been looking at a MUD that has been in use in the Math and Computer Science Division at Argonne National Labs (ANL) (for more details see [2, 3, 3]). Our observations are based on in-depth interviews (2 interview visits, 8 people interviewed each time) and email questionnaires (23 respondents).

The Argonne MUD is not an official division tool, but its use in the organisation is not contested. It has been used by approximately 290 people in the last 5+ years. The predominant use of the MUD is to support collaborations between researchers and their colleagues (who may be on-site or located in other institutions), between researchers and systems administrators and between the systems administrators themselves.

Barring server crashes, the MUD is always up and available, leading to the possibility for the continuous availability of colleagues; most people reported having at least one MUD window continuously available on their desktops; sometimes there are multiple windows, each one open to a different MUD room, and a different group of collaborators. MUD windows are checked on a fairly regular basis for explicit messages and for opportunities for unplanned interactions with others. The MUD is very flexible in how it can be used, as it imposes no structure on interactions or work groupings. The MUDders define for themselves how the MUD can be incorporated into their work, and how they choose to structure the interpersonal communications that the technology supports. Interactions take little effort to be initiated; once a MUD window is open on one's desktop, communicating is simply a matter of typing. Communications tend to be informal; they are typically unscheduled, relatively unstructured (that is aren't agreed upon in terms of agenda), and occur in many different virtual locations (sometimes several conversations occurring simultaneously in different rooms). All conversations, activities and events in the MUD are recorded or logged. Because such logging is possible, the MUD supports both synchronous and asynchronous communications – the possibility for asynchronous communications enables messages to be left irrespective of current availability and time zone changes. Most of the MUDders are physically located in the US, but a number are in Europe. Although

most people have met face-to-face, a number of people reported never having met their MUD colleagues “in the flesh”.

People reported a strong feeling of co-presence with others. Three central features contribute to this: (1) people expected others to be in the MUD (knowing where to find you or where you will leave messages and trails of your presence makes you more available); (2) the speed of response during synchronous exchanges led to a strong sense of connection and “being there”, i.e. being engaged in exchanges with others; and (3) sufficient shared understanding of each others’ work practices enables a rhythm of expected interaction to develop.

The last point above (point 3) is the one we wish to raise in the context of considering shared culture and its impact on the quality of virtual interactions. The MUDders, although based in many different locations world-wide, have a shared culture of work – a set of common understandings about what their work involves, and about what kinds of things their working lives tend to be about. Although each person may identify with a set of identities based on nationality, gender, age, race and so on, points of intersection exist in the virtual world which oil their virtual interactions and are the fabric of the virtual community – these points of intersection provide common ground and establish rapport or “chemistry”.

This sense of shared culture spans organizational boundaries; we saw many instances of collaborations in the MUD between people from different organizations, and observed that such interactions were seamlessly integrated with the communications with one’s local collaborators. This “occupational community” – made up of people who are bound by a shared set of interests and overlapping working practices despite differing physical locations [24] – is as real as the (organizationally and geographically) local community. Evidence for this assertion came from one of our interviewees at Argonne who uses a *different* MUD for interactions with *his* main collaborators. He stated: “... since I don’t really work with those people [our other interviewees], there didn’t seem to be a reason for me to connect in [to the Argonne MUD]. I mean, I don’t know most of the people on there, or if I know them, I don’t know them very well.” So he logged on to the virtual environment wherein he found his colleagues.

Using 2D graphical MUDs for long distance collaboration: the FXPalace

In related work carried out by our colleagues at FX Palo Alto Laboratory, a 2D graphical MUD was used to support communication between members of Fuji Xerox in Japan and members of FXPAL [22]. The authors describe the use of the Palace [23], a 2D graphical MUD to support structured meetings, presentations and informal chat sessions.

Due to time zone differences most meetings took place towards the end of the work day in California – the beginning of the work day in Japan. All meetings were conducted in English.

The authors mention a number of “capability barriers” to effective communication. The authors state “in addition to not sharing a common first language and being separated by sixteen time zones, members of the group also had widely varying typing skills.” These inequities meant that conversations were dominated by native English speakers with fast typing skills. They cite one of the meeting participants who stated he was not used to “thinking in English”. More general knowledge about using the software was flagged as an issue. During some of the meetings, the Japanese colleagues had to join in via a telephone connection – this was a significant barrier to informal conversations, and at this time conversations were infrequent and formal, having to be carefully prearranged. Scheduling these formal meetings brought its own problems: because Friday in California is Saturday in Japan and Sunday in California is Monday in Japan, the work week during which meetings could take place was effectively shortened. In later meetings more informal gatherings were possible owing to improvements in network services and the provision of direct TCP access. At this time, colleagues could meet on the basis of availability and participation became more a matter of personal choice as conversations could be more fluid.

A final issue concerned the intersection of cultural preferences/norms and the technological capabilities. Many of the meetings, in particular the formal ones, involved presentation of images. Here, it was found that not all workstations presented the images adequately due to resolution variations. These resolution differences favored presentation slide styles more predominant in the US over the Japanese style that tends to be more detailed and contain more text.

3. Things we learnt and questions posed

From these experiences we have raised a number of issues for explicit consideration in addressing any cross-cultural technology for interaction.

A subculture of shared interests

The success stories that Nardi and O’Day discuss offer our starting point: successful on-line communities are “information ecologies” – they are “local environments with personal meaning and real human connection” (Nardi and O’Day, page 206). The shared understandings that underpin these human connections are the “webs of

significance” that Geertz mentions in the quote above. Thus, even though I may have never met you, if we work in a related area you are likely to know people I know, and I am likely to have some working practices in common with you. We already have considerable common ground from which to base negotiations and discussions.

So when do problems arise? Some potential problems arise from differences in (1) technologies, (2) time differences which affect rhythms of interaction, and (3) language and national culture. The extent to which each of these has an effect will depend on the nature of the relationships being fostered. We briefly consider each of these in turn.

(1) Technology cultures

Clearly, the technology to which one has access affects the ability to communicate effectively. At the most extreme, there is simply whether one has the technology or not. Nardi and O’Day offer a story that illustrates this point. They report a success story concerning the use of the internet by a low income family – in this study, technology and internet access was provided for a long period of time. However, when the study ended, the technology was to be returned to the research group. The family had to face the possibility of losing access to the virtual communities of which they were now a part. For them, once the technology was provided, interacting with other internet users and engaging in virtual communities and contributing to internet subcultures became a part of their lives.

Even when people have access to technologies and are connected, we make incorrect assumptions about the kinds of technology that are available to others. We often assume others have access to the *same* technologies as we do, and that their level of connectivity is also the same. The example of differential image resolution above illustrates this point.

There are also infrastructural reasons why people may not be available to partake fully in inter-cultural communities. These issues come down to issues like the fact that many countries have a different way of charging for internet access that prohibits being constantly on-line – or even being on-line at peak times for social activity. The example offered above illustrated the difference between being able to connect into a virtual environment via a TCP line and having to dial in from Japan to the States. In the latter case, informal, chance encounters were less likely as people did not “hang out” in the virtual space.

As we design for cross cultural applications we need to consider what technological infrastructure is in place and consider the consequences for involvement. How can we understand not just what technologies are available, what the impact of connectivity is and what technological expertise exists, but also what understandings there are of the use of and place of technologies in our lives?

There are also instances of different cultures wherein the understandings about how technology is to be used differ. Technologies are not simply there. Technologies themselves and their usage have different meanings in different cultures. Wilhelmsen and Mauseth in their recent workshop position paper talk of the different understandings users of technology have of their systems [25]. In our culture we are identified as being almost represented by our machines – my laptop is my personal mail box, it is my filing cabinet, it holds lists of my favourite URLs, and all these things are essentially private. Wilhelmsen and Mauseth talk of a different set of assumptions about computers that lead to the subversion of practices around passwords. The password is something that preserves privacy – they describe a setting where there is no need for a personal, private machine and where passwords, as soon as they are issued, are shared amongst the group.

There are also skills which one must have to use the technologies for communication effectively. Often these skills become another form of background, invisible work.

(2) Cultures of time and geography

Whilst geographic separation is a problem, a greater problem is that of time zone changes as illustrated by the example cited by Toomey et al which we noted above [22]. Such time differences can be overcome if expectations are set over time. As our MUD data have demonstrated a set of shared expectations about where to leave messages and available times for interaction created a sense of co-presence between people who in fact spent very little time together on-line. There are broader cross-cultural sets of meanings around time and how time should be spent which affect our ideas of appropriate availability. Holidays often do not overlap internationally. Often notions of private versus public time often do not cross cultural boundaries easily.

(3) Language and communication

Considering language, as the example above noted, non-native English speakers, even those who are proficient at speaking a language, get tired and find “thinking in English” hard to achieve. Even for proficient speakers of second languages, the inability to use familiar words and expressions can lead to a fracture in the flow of communication. Over time this can lead to a sense of alienation. Speaking of living in a foreign land, one author described the

problem to be “that the signifier has become severed from the signified. The words I learn now don't stand for things in the same unquestioned way they did in my native tongue.”[12]

Gestures and codes interact with spoken or written words to create a sense of meaning; in text-based environments, use of emoticons illustrates this. With increased focus on visual virtual environments we need to consider how our avatars will gesture and how we will present ourselves. It is clear that the development of certain social cues and etiquette takes time, as in the development of context-adding cues in email like 'smileys'. Being unaware of appropriate cues and established protocols exacerbates problems like those discussed. Such lack of awareness can lead to a concern that one is not “behaving appropriately” within the MUD. As one of our interviewees in our MUD work said, “I think there’s a certain sociology - what’s the word, etiquette - that I do or don’t quite know enough of” [1].

4. A question or two to consider

Given these kinds of issues arise, how do people cope with them and overcome the difficulties? It seems that if there is a compelling reason to be in touch, people will continue to use even the most arcane technologies, and overcome many barriers. We have observed this in our work, and Cherny notes a conversation where someone persuades a friend to join into a technically less sophisticated virtual environment because of there are more “cool” people hanging out there [1]. So it seems that, given some baseline communication technology, communication is the draw, the “killer app”. Cherny amongst others have also noted, however, that such environments can be very cliquey and that etiquette transgressions can be dealt with severely. Newcomers can feel alienated.

So for us, the questions remain - how do we as designers establish what are sufficient technical conditions for successful communication and how do we help to develop socially compelling virtual spaces when it is so clear that designing such communication spaces will involve not purely technical but also social solutions.

When considering such questions about the methodologies for designing virtual environments, two basic phases can be identified: (1) gaining an understanding of existing environments, and (2) using observations as guidelines for the design of new environments and spaces. These will be briefly considered in turn:

(1) Methodologies for observing online life

So what are the *appropriate methodologies for gaining a deeper understanding* of the lifecycle and daily life of on-line cultures? What analyses can we carry out to get at the development and maintenance of Geertz’s shared “webs of significance” in on-line cultures? How can we begin to understand issues that arise in multi-cultural on-line worlds and what mechanisms there are for negotiation and discussion? How can we begin to understand where online cultures intersect with the cultures of the material world(s) in which individuals live their daily, material lives? What are methods for unpacking those social understandings both on-line and off-line? How do we gain an understanding of the intersecting cultural influences on an individual and on groups if we do not have access to the totality of their material and virtual worlds? In the context of virtual environments, what does it mean to design from the interaction out? How can we achieve meaningful descriptions that consider people’s intersecting identities and desires, on-line and off-line?

If we are, as Geertz suggests to gain deeper understandings, we need “thick descriptions” in these virtual environments. How can this be achieved? How can we begin to understand the dynamic and slow evolution of virtual cultures and climates?

Considerable work on virtual communities has used interviews and surveys as a means of establishing who is talking to whom, for how long and about what. Much of this work has been carried out on intra-organizational networks looking at logs and messages [20], and in virtual worlds like lambdaMOO [e.g., 19]. This work has done much to lay the foundation for questions that are now being posed and for the move towards a more detailed analysis of symbolic and cultural dimensions. This recent thrust has foregrounded the situated perspective associated with social constructionism (for a brief discussion of this see 17).

Davis and Brewer [5] and Cherny [1] amongst others have taken a linguistic approach to analyzing single online communities in fine detail. Evidence suggests people are creative in establishing new norms and codes for making visible cues that in face-to-face situations would be transferred through visible non-verbal cues [1,2, 5]. For Davis and Brewer, there is a focus on the conversational devices students used in an online discussion forum. Their in-depth linguistic analysis draws on work on the ethnography of communication as well as historical linguistics, and interactional and variationist sociolinguistics, and reveals much about the ways in which the student writers “in the absence of certain overt features of face-to-face conversation or dialogue, move to the dialogic and manipulate multiple variable in written text” (Davis and Brewer, page 155). Similarly, Cherny focuses on “discourse” or “speech” communities, literally using language patterns as evidence of community. She looks at the common turns

of phrase, the genres and registers, and rhetorical devices, stating that “since all speech occurs in a social context, even the strategies for efficient communication must depend on social conventions being established” (Cherny, page 30). In her work she offers some comparisons to other communities, but all of them are of the same technology genre, MUDs. She does make the point that many of the individuals who interact in one MUD may appear as core members of new MUDs – thus, the community can move into new virtual spaces and retain some of its own integrity. This raises a clear question about research on cultures and communities: are we to see online cultures as being made up of people who interact regularly with each other using multiple forms of communication technology (e.g., instant messengers, virtual worlds, email, etc.) with the focus on the people, or are we tacitly or explicitly concerned with having a technology focus whereupon we concentrate our efforts on the interactions that take place within one genre of technology?

Luciano Paccagnella [17], drawing on Durkheim and Weber, argues for comparative studies and a case-based approach. He states we should use a “longitudinal strategy of research which systematically compares specific aspects of virtual communities over different periods of time and in different socio geographical contexts.” He suggests the development of understandings that are based on a “conceptual reconstruction of meaning achieved little by little by the systematic analysis of texts and documents”.

Whilst different researchers have focused on alternative methods for getting at the patterns of use of virtual environments, the specifics of the situation in which a virtual world is used are clearly of relevance. Whilst, as Paccagnella says, the on-line world has its “own dignity”, the material world of the inhabitants in many of cases dramatically affects the nature and quality of their relationships and the culture of the world. Our MUD data tells us this clearly. This leads us to blur the boundaries between online and offline which appear more clearly demarcated when considering purely online relationships. An interesting example to consider here is the Senior Net virtual community, where on-line relationships are supplemented on occasion with developing physical world relationships.

So where does this leave us currently in terms of our thinking about methodologies for studying the world of intersecting and emerging cultures that is an online virtual forum? In accord with Rossman and Wilson [18] we argue for a “shameless eclecticism” in approaches, involving online and offline ethnographic descriptions, semi-structured interviews, surveys and questionnaires and qualitative and quantitative analysis of logs. We are driven in terms of selecting our research methods by current questions the context of use of the virtual environment, so at any one point a different focus and a different activity may be called for.

(2) Putting it all together

Secondly, what happens when we wish to go beyond observations and begin to design to facilitate and encourage the meeting of multiple cultures in an on-line environment? What are *appropriate methodologies for designing multi-cultural collaborative virtual environments*? How can we design to encourage social interactions and design to allow negotiation when the points of fracture occur? How can we comprehend different cultures and then co-develop as a foregrounding negotiation across culturally diverse community members? How do we coach people to participate more effectively in cross-cultural virtual worlds? How can we determine what are appropriate design metaphors for the worlds we create? How can we be sensitive to the various political issues that arise in designing any virtual environment design?

These questions do not have clear answers. By being critically reflective on what we have observed and by foregrounding people’s desire to be in touch and to share content and context as well as chat, we believe compelling environments can be designed. A couple of high-level guidelines are below:

- Keep the focus on the conversations and not on the technology.
- Keep the use of the environment easy and the learning curve gentle.
- Provide good integration of artifacts and conversations.
- Provide easy means for creation of new groups and for movement between different group conversations.
- Allow integration with other technologies, but do not require it.
- Design for different technological capabilities.
- Design for synchronous and asynchronous messages.
- Keep environments tailorable – allow people to develop their environments.

- Design to enable permanent artifacts and places– people begin to feel like places really exist when there is some sense of permanence of the rooms and artifacts. Relationships build around the existence of those places and those things.

Summary

In this short paper we have considered a number of issues relating to the design of virtual places and spaces. We have taken a broad definition of culture in thinking about the ways in which such environments may support fostering of online relationships between people from different cultures.

REFERENCES

1. Cherny, L. *Conversation and Community. Chat in a Virtual World*. California, USA: CSLI Publications, 1999
2. Churchill, E.F. and Bly, S. Virtual Environments at Work: ongoing use of MUDs in the Workplace. *Proceedings of WACC'99*, San Francisco, CA, USA. ACM Press, 1999.
3. Churchill, E.F. and Bly, S. It's all in the words: Supporting work activities with lightweight tools. Paper to appear in *Proceedings of Group'99*, Phoenix, AZ, USA, ACM Press, 1999.
4. Churchill, E.F. and Bly, S. Ubiquitous access to others: maintaining co-presence through MUD locales. *Workshop position paper, Workshop on Ubiquitous Virtual Environments, ECSCW'99*, September 13th, Copenhagen, DK, 1999. FX Palo Alto Lab. Technical Report FXPAL-TR-99-024.
5. David B.H. and Brewer, J.P. *Electronic Discourse. Linguistic Individuals in Virtual Space*. NY, USA: SUNY Press, 1997.
6. Davis, M. Who killed LA? A political autopsy. *New Left Review* 199, 29-54.
7. Geertz, C. *The Interpretation of Cultures*. BasicBooks, 1973.
8. Graham, S. and Marvin, S. *Telecommunications and the City*. London: Routledge. 1996.
9. Harasim, L. *Global Networks: Computers and International Communication*, MIT Press, Cambridge Mass, 1993.
10. Harrison, S. and Dourish, P. Re-Place-ing Space: The Roles of Place and Space in Collaborative Systems. In *Proceedings of CSCW'96* (Cambridge MA, 1996) ACM Press, 67-76.
11. Harvey, B. From space to place and back again: reflections on the condition of post-modernity. In J. Bird, B. Curtis, T. Putnam, G. Robertson and L. Tickner. *Mapping the Futures: Local Cultures, Global Change*. London: Routledge, 3-29. 1993.
12. Hoffman, E. *Lost in Translation: Life in a New Language*. London: Minerva, 1991.
13. Mantovani, G. *New Communication Environments: From Everyday to Virtual*. London: Taylor Francis, 1996.
14. Massey, D. Power geometry and a progressive sense of place. In J. Bird, B. Curtis, T. Putnam, G. Robertson and L. Tickner. *Mapping the Futures: Local Cultures, Global Change*. London: Routledge, 59-69. 1993.
15. Mynatt, E. D., Adler, A., Ito, M., Linde, C. and O'Day, V.L. The Network Communities of SeniorNet. In *Proceedings of ECSCW'99*, London: Kluwer Academic Publishers, 1999.
16. Nardi, B. O'Day, V.L. *Information Ecologies*. Cambridge, Mass : MIT Press, 1999.
17. Paccagnella, L. "Getting the Seats of Your Pants Dirty: Strategies for Ethnographic Research on Virtual Communities" in *Journal of Computer Mediated Communication*, vol 3, issue 1, 1997.
18. Rossman, G. and Wilson, B. Number and words revisited: being shamelessly eclectic. *Quality and Quantity*, 28, 315-327, 1994.
19. Schiano, D. Convergent Methodologies in cyber psychology: A case study. *Behavior Research Instruments, Methods and Computers*, 29(2), 1997.
20. Sproull, L. and Kiesler, S. *Connections: New Ways of Working in the Networked Organization*. Cambridge: MIT Press, 1991.
21. Swynegdouw, E. The heart of the place: the resurrection of locality in the age of hyperspace. *Geografiska Annaler* 71 (B), 31-42, 1989.

22. Toomey, L., Smoliar, S.W. and Adams, L. Trans-Pacific Meetings in a Virtual Space. FX Palo Alto Labs Technical Report, FXPAL-TR98-049, 1998.
23. The Palace – [http: www.thepalace.com](http://www.thepalace.com)
24. Van Maanen, John, and Barley, S.R. Occupational Communities: Culture and Control in Organizations. *Research in Organizational Behavior*. 6:287-365, 1984.
25. Wilhelmsen, F. and Mauseth, K. If you nail things down they will not move. Position paper for ECSCE'99 Workshop on Ubiquitous Virtual Environments, September 13th 1999, Copenhagen, DK. 1999.