

# **Thinking about Remote Presence and Ubiquitous Objects**

## **1. Introduction**

As we move into a time where communication networks are building bridges between almost anyone on the planet, those bridges are also being widened to allow for new rich forms of communication to emerge. Virtual environments, high-definition videoconferencing, and collaborative music spaces all promise to give us communicative experiences like never before. In the periphery of these new media-centric opportunities is the theorizing and development of new types of information interfaces. These interfaces will take advantage of the large widespread networks that are being developed for rich-media, and will facilitate what hopes to be a more common and ambient form of personal communication. Remote Presence is a field that is investigating the communication between multiple individuals by mapping some sort of common physical gesture to an ambient display. These displays can be sculptural, visual or aural.

Ubiquitous Computing takes the notion of creating these ambient displays, and attempts to place them in the periphery of everyday use. A good example of a ubiquitous object would be your houseplant, or toaster, or some other object that you don't normally associate with communication, yet yields possibilities for interaction and the display of information. A toaster could burn different object into your morning toast to show information (Robin Southgate, [http://www.culturelab-uk.com/site/templates/archive\\_print\\_view.asp?ID=96](http://www.culturelab-uk.com/site/templates/archive_print_view.asp?ID=96)), or your plant could transmit information about how well it's being taken care of to a geographically distant relative. This plant then becomes a 'surrogate' object of care between the two family members.

These new objects will not only enable new methods of creating and maintaining personal relationships, but also indicates a possibility to change the way that we interact with each other face to face. If ambient communication can convey basic information, such as the proximity of a friend or loved one to a networked object, then emphasis on personal verbal communication could result in stronger relationships. Of course, this is all theory, but it is a theory that several researchers are placing a lot of interest in. It has been a long-term goal of artists and researchers to find ways in which technology can be used to instigate and strengthen human-to-human interaction, and the omnipotence of computers networks are providing the paths toward that goal.

Through the proposal of a concept, I will be looking at currents interests and projects involving remote presence and ubiquitous computing in search of techniques or considerations for research and design. As well, I will discuss development directions in these respective fields, and attach notes that pertain to the development of my concept.

## **2. Concept**

In a fully-networked and digital culture synchronous and continuous communication between individuals will not only be a reality, but a given. Even in today's culture, preteens enjoy the constant synchronous communication between school friends via instant messaging, either on personal computers or their mobile phones. In tomorrow's generation this concept of communication will be assumed as average during the developmental process from infant to preteen. During this developmental period one particular human relationship is most important to the child, that to the parent or primary caregiver (guardian). In most cases, this relationship is broken during the day by the necessity for the parent to work away from home, or travel. My goal is to create objects that provide a constant synchronous communication between the parent and child, while instituting in the child the notion of creating relationships with others through these communication devices. In essence, teaching the child how to communicate abstractly

(non-verbal, non-textual). These objects will hopefully strengthen the parent-child relationship during these periods of geographic separation.

### **3. Approach**

Upon doing my research on this concept I have come across several artists and researcher who have been formulating an approach to researching and designing a ubiquitous networked object. It is difficult to separate the two, since they aren't done consecutively but rather concurrently towards the goal of a final project. The research feeds the design, which in turn feeds the research and on and on until completion. Observation and Invention, a method originally developed by IDEO and is mentioned by Konrad Tollmar in his "Virtually Living Together", uses the feedback between research and prototyping to develop scenarios and metaphors, and has proven quite successful in the creation of many smart interfaces and interactions. However I will attempt to do my best at separating the two elements of development and then relate them to my concept.

#### **Research Considerations**

What do we want to create? The object that we want to create is a communication device. Beginning with this understanding, we can build a library of relationships that people have with pre-existing communication technologies. How have these devices changed their communication habits? How have these new habit changed the relationships with the people they're communicating with? One problem of modern communication technologies is that it has left us devoid of the "sensual and the emotional response". Is this a goal, and how can these devices contribute this sensation of presence? It is important to understand the nature of communication and how it has affected the relationship between people before beginning to focus research on more specific issues.

With a library of interactions to investigate, we can begin to make our action more concrete. Where is it taking place? Who will the users be? What will be the relationship between those users? Let the library be a guide to understand what technologies succeed in achieving the type of interaction your device would enlist. Once an understanding of the environment and interaction has been developed, scenarios for user testing can be devised. One technique applied in “Virtually Living Together” was the use of rapid ethnography to build models of technology usage in a home. Surveying the way in which technology is absorbed into the household, how those members use communication technology in their daily routines, and the location of these devices in the home will inform the scenarios, and recommend changes in the action or environment associated with the object.

Doing real world user testing of such a type of devices provides several challenges. It can be argued that the effects of a communication technology on a relationship can't be quantified in a matter of weeks, rather months to show any sort of development. A key factor of this is assuring that the technology attempts to be truly ubiquitous in the subject's daily routines, so that the routine does not get disturbed. As Tollmar has shown in his '6<sup>th</sup> Sense' project, observations can be made in a short period of time of the immediate effects that the new technology has had. By reading excerpts from his subject's comments, the majority of the affects were positive but it only hints that the new device will sustain that positive result. Again, by researching the long term effects of new communication technology such as instant messaging, we will be able to make a better hypothesis of long term results.

Other research questions: When do people feel the object will interfere with their private life? Will the ambiguity of the ambient device leave one with the longing for practical discussion, or will it make people feel more contented, and less needing of practical interaction?

**Notes on research considerations specific to my cause:**

- Determining the levels of cognition of the child. Will they be able to recognize the object as a surrogate for the parent? Or will it just be an object. What will have to take place in order to develop that understanding. See ‘6<sup>th</sup> Sense’ by Tollmar, giving instructions and an initialization routine that serves a double purpose of a) technically familiarizing the user to the object, b) directing an action and initializing the forming of a relationship.
- Is the parent at play when at work? How can you map non-direct gestures of the parent to the device? The reading/checking of email, the use of a stapler, getting up from or returning to a desk.

## **Design Considerations**

When designing an interaction one does traditionally consider an industrial approach. Research and scenario building are usually the key factors. Yet, Tollmar indicates that it was the industrial approach of building successive prototypes that yielded the most positive results. These stages of prototyping are described as:

- a) Concept prototypes, that make it possible to demonstrate an idea in shape, color and weight.
- b) Demonstrational prototypes which are normally constructed for specific purposes and work best as exhibitions
- c) Functional prototypes thus make it possible to test and evaluate certain aspects of the design solutions
- d) Evaluation prototypes, final, make it possible to carry out field tests.

While Tollmar’s group was pre-informed by months of scenario-based research, this method was probably most effective because it allowed for the designers to make more intuitive design decisions, which quickly led to user feedback, which would inform the next revision. This also allows style to evolve out of the environment, users and type of

interaction of the previous prototypes. A quick, natural evolution. This isn't meant to detract from the value of research, since it is the research that will inform the non-physical elements of the object such as the human relationships that are mediated through it.

Brenda Laurel suggests the opposite, that one should "focus on designing the action. The design of objects, environments, and characters is all subsidiary to this central goal". In the case of these 'telematic emotional communication' devices, we aren't just designing the action, but the emotion as well. These elements will indicate choices in environment and user, considering that these aren't predetermined by the concept as is my case, which then allows for a footprint for mapping the physical features of the object to the function. The key features for mapping are sound, shape, color, movement, texture and size and these should relate to the gesture and emotion associated with the object.

One of the informative implications put forth by Tollmar, is the objects eventual loss of novelty. How do we design an object so that it retains its place in the household even after the action associated with it no longer takes place. How can it hold onto the memory of the relationship that it mediated? Or if that isn't the case, then could it have an alternate functionality? I believe that size, style and quality are major proponents of this, which strengthens the idea of an industrial design approach.

Other design questions: Dealing with intrusion, can the object be turned off if or when the user feels uncomfortable of its presence?

#### **Notes of design considerations specific to my cause:**

- What materials can I use that are non-toxic and child safe?
- What shapes will be the most pleasing to the eye. How can I direct the child's attention towards the responsive elements of the controller?
- Will this be a tool for monitoring?

- Is the focus the connection between the toy and the token? Or the toy as an exploration of shape, color and sound via light and music? It will have to succeed at that in order to be successful. Investigate the current toys that are available that will that quotient.
- How will the design affect the relationship with the toy... 2 things must be understood, that a) the toy is a surrogate, b) the toy is for musical exploration. Hence the sound and the stimulation must come from within the object.
- A jingle being associated with the parent. Developing a musical language that will symbolize identity. Be with the child and play a musical phrase, then reenact that phrase remotely. The phrase could serve as your identity.
- Use of color to distinguish modes of interaction. Warm when the parent is communicating through it and cooler when the child is manipulating it.

## 4. Conclusion

After a project has been realized, there is still the question: will this work? Tireless research, and endless redesigns can put your object on the right path but there will always be unpredictable results based on the way that the object is used in its initial days of use, and how it will be used in the long term. In his papers, Tollmar employs one method for beginning the interaction with the new communication device, and hints at a design consideration for embedding longevity in the types of communication.

During his ‘6<sup>th</sup> Sense’ research, he was faced with the problem of helping the users relate to the new communication device. One aid was to provide a story that related the object to an old fable where villages would use lamps to indicate one’s presence to indicate the state of the home. The second aid was what Tollmar refers to as a ‘ritual’ during the installation of the lamps where the users are lead though instructions to ‘call’ or initiate the communication process with each other. Although this is guised as a ‘simple function test’, it forces the two users to simultaneously communicate via the

surrogate in a direct manner. This immediately shows them the types of responses they will get from the object, and establishes the beginning of a communication language to refer to when the interaction becomes more ambient (and less directed).

Towards the end of “Virtually Living Together”, Tollmar makes some comments on future media mappings where he states his hypothesis is ‘that adaptively is the core key’. During his research he noted that some families had created ‘personal code languages’ to communicating through beepers. This was made possible because the flexible use of the beeper allowed personalized codes to be created by a community of users. Tollmar runs with the idea saying:

“Our idea is to provide a basic language that is very easy to understand, and at the same time make possible to develop a new shared language that is based on touch, gestures, light, heat and sound. Using this approach we might start to understand how to enable emotional communication in new telepresence media.”

This idea would allow ‘telematic emotional communication’ to evolve out of years of real-life use, and would enable communities to develop their own forms of emotional communication that is pertinent to their relationships. Attempting to embody a freedom of language in a future device might increase its longevity and relevance in the future of these fields.

What I have attempted to create is a summary of techniques and considerations from the point of view of someone who is contemplating a ubiquitous communication project. While the work of Konrad Tollmar dominates this paper, I feel that his work is by far the most influential and pertinent to the beginning of what is a new art form, a new industry, and a new academia. I believe that these fields are the emergence of media in an enlightened form, and look forward to expanding my knowledge of the participants to this pursuit.

## **5. References**

Laurel B. Computers as Theatre. Addison-Wesley. 1991.

Tollmar K., Junestrond S. & Togny O., Virtually Living Together – A Design Framework for New Communication Media, In Proc. Of DIS ‘2000 : Designing interactive systems, processes, practices, methods, and techniques, ACM Press 2000.

Tollmar K. & Persson J. Understanding Remote Presence.

Tollmar K., Demirdjian D. & Darrell T. Gesture + Play.

Weinberg G. The Musical Playpen – An Immersive Digital Musical Instrument.

Weinberg G., Fletcher R & Gan S. The Baby Sense Environment – Enriching and Monitoring Infants’ Experiences and Communication.

Bentley F. Remote Presence in Intelligent Environments.

Greenberg S. & Kuzuoka H. Using Digital but Physical Surrogates to Mediate Awareness, Communication and Privacy in Media Spaces.

Brown J.S. & Weiser M. The Coming Age of Calm Technology.