
From the Inside Out

"Body-Mind Centering merges the conceptual and experiential, shifting between observing and embodying. From this union arises an understanding, from the inside out of how an individual is doing or being anything."

Bonnie Bainbridge Cohen¹

"Workshop is the active research phase of the performance process... Probably the most prevalent kind of workshop is used to "open people up" to new experiences, helping them recognize and develop their own possibilities."

Richard Schechner²

"To workshop something is to produce a prototype or experimental model."

Richard Schechner³

5.1 Introduction

Bonnie Bainbridge Cohen describes embodied experiential practices as merging the conceptual with the experiential: shifting between observing and embodying. This concept follows the design process of *whisper*: a wearable interactive art installation based on co-experience of body-state data. The interaction and concept design for *whisper* came about as a result of a series of five 'experience discovery' workshops in which participants shifted between observing and embodying, exploring first-person observation through their senses, their body-state and their shared experience.

This chapter characterizes the design and enactment of these workshops describing the embodied processes that were employed in their development. It provides context for the workshops in two ways: 1) by describing the *whisper* installation developed from the workshops, including its exhibition and its design timeline, and 2) by

¹ Cohen, B.B. (1993), op. cit., p. vii.

² Schechner, R. (2002). *Performance Studies*. London, UK: Routledge, p. 199.

³ Ibid.

presenting a background of prior research in performance and body-based explorations applicable to the design processes presented here.

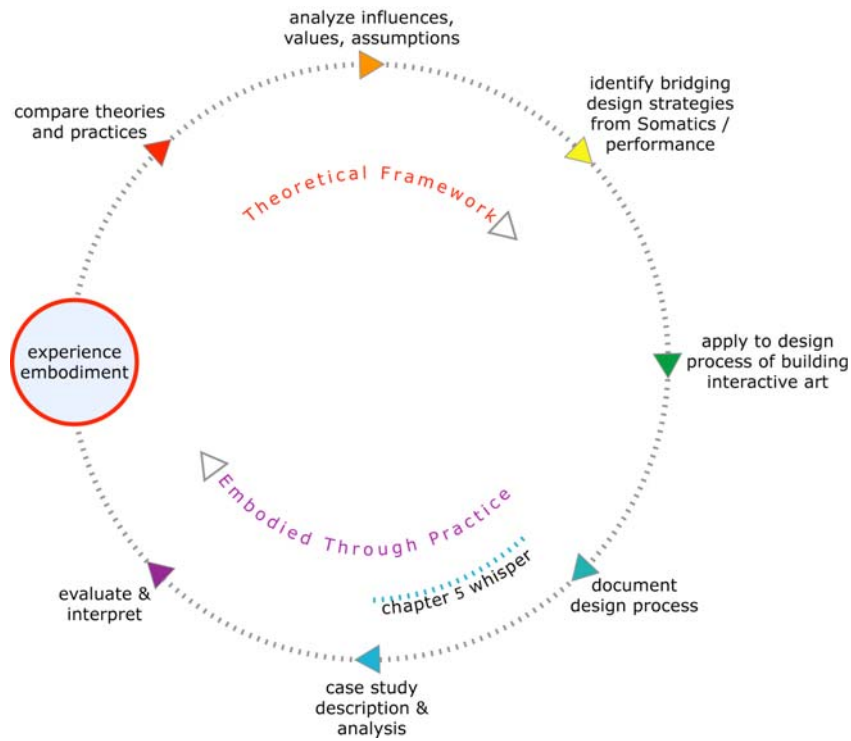


Figure 24. Focuses on Somatic Processes in the Design of whisper

Following contextual and background materials, this chapter describes the five exploratory workshops and their results, summarizing the somatics techniques, values and experiences elicited through participants.

To conclude, it highlights the outcomes of the workshop process. The outcomes illustrate the application and instrumental value of the embodied techniques that were employed in the design of technology. These include: an interaction model, a description of gestural interaction that enabled design of affordances for 'connectivity' and 'communication', the wearable garment design and the wearable art installation.

The interactive artwork *whisper*, like each artistic and creative endeavor has moved through a full design-creative-implementation cycle; this chapter focuses specifically on processes of ideation and exploration that occurred at the beginning of its lifecycle.

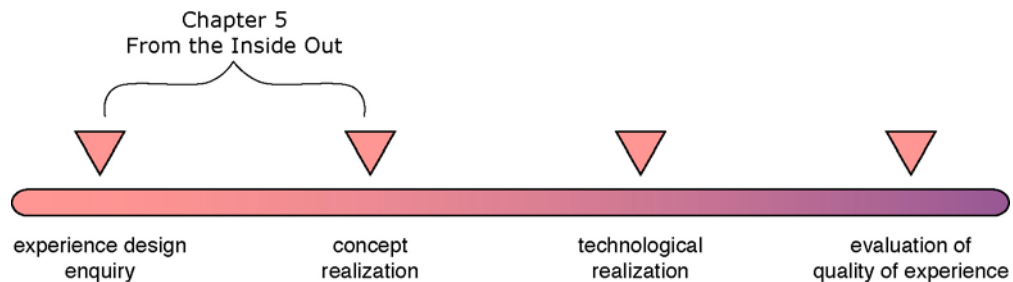


Figure 25. Focuses on Experience Discovery for Exploratory Concept Design

5.2 Artistic Context and Background

One of the major themes of *whisper* is the notion of 'paying attention' to one's self, and using this sense of self or body-state to connect and exchange with another. This requires an *experience* of 'inner' space or intimacy with oneself and an ability to recognize and transfer this 'sense of self' to another person. These types of experiential descriptions are qualitative and uniquely expressive: interactions that afford intimacy, choice, privacy, affect and connection. How can a *system* create a willingness, a trust, the 'suspension of disbelief' required to enter into an exchange of information that is otherwise private and 'unknown'? To explore these questions of experience we turned to performance and somatics methodologies. For example, techniques for extending our bodily awareness through attention to breath and movement are common to performance methodologies found in theatre, dance and body-based disciplines. The techniques within these domains build both intra-body and inter-body experience and knowledge through technical exercises that focus on our *perception* of our own physical data. This includes having access to, and agency over our own breathing, our own heartbeat, our own thoughts, and our own body state. In the *whisper* installation this is accomplished by measuring physiological data such as

heart rate and respiration. This body-data, not normally within our awareness, is mapped as a representation of our self. *whisper* allows us to bring attention to our own body-state and to effect how our body data is displayed, exchanged, and shared.

5.2.1 *whisper* is a Wearable Public Art Installation

whisper is a real-time interactive public art installation based on small wearable physiological sensors, micro-controllers, and wireless network transmission, embedded in evocative and playful kimono like jacket-garments worn by the participants. *whisper* is an acronym for [**w**earable, **h**andheld, **i**ntimate, **s**ensory, **p**hysiological, **e**xpressive, **r**esponse **s**ystem]. Focusing on body state represented through participants' breath and heart rate, *whisper* aims to monitor physical data patterns of the body, mapping heart and breath physiological data onto linked and networked devices worn within a specially designed garment. *whisper* collects breath and heart rate data from the bodies of participants, and through visualisation and sonification techniques, enables participants to interact, interconnect, and interpret their own and other participants internal data in playful and responsive ways.



Figure 26. *whisper* Garment (left) and Gestural Interaction (right) DEAF Festival

The wearable installation is the outcome and testing ground for an experience modeling methodology described in this Chapter. *whisper* has been exhibited at

DEAF03, the Dutch Electronic Arts Festival, in the public lobby of the Schouwburg Theatre, Rotterdam, in February and March 2003, at Future Physical's Respond festival, in Cambridge, UK in March and April 2003, and at the e-culture fair at the Amsterdam Paradiso in October 2003. Up to six participants are able to listen to and affect their own body-state represented by their physiological data (breath and heart rate). They are also able to connect to and exchange their physiological data with other participants in the interaction space through gestures, which enable connecting, listening and exchanging.

5.2.2 *whisper* Design Process Timeline

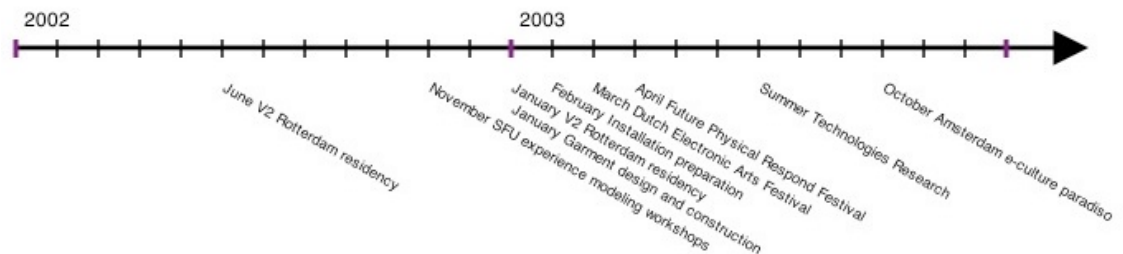


Figure 27. Design Timeline for *whisper* installation (workshops Nov 2002)

The *whisper* design process timeline is illustrated above. The *whisper* project was developed in collaboration with V2_Lab in Rotterdam during 2002 and 2003. As the principle investigator and artistic director of the project, I worked collaboratively with a rich interdisciplinary team of artist-engineer-designers in the design and development of the artwork⁴. The workshops presented within this case study were held in November 2002 in Vancouver at Simon Fraser University. The outcomes of the workshops included an interaction model and technology design.

⁴ *whisper* credits for collaborators and funding support can be found online at <http://www.sfu.ca/~tschiph/html/artDesign.html> scroll down to 'whisper: wearable body architectures'.

5.2.3 Prior Research in Performance, Theatre and Workshop Processes

Chapter Three illustrated the rich interdisciplinary range of experiential qualities that are contained and explored within the HCI literature. In partnership with design for experiential qualities, Human Computer Interaction has engaged a range of practices in performance, theatre and dance. Movement and physical techniques such as body-storming, role-play (Rodríguez, Diehl & Christiaans, 2006), and the imaginative world of open-ended play, fun,⁵ game-design,⁶ props (Strom, 2002), personas and scenarios (Shyba & Tam, 2005) intersects with a number of performance techniques and strategies. Brenda Laurel's *Computers as Theatre* was an early acknowledgment of the place of Theatre in the world of computer technology⁷. A recent issue of *Interacting with Computers* published a special issue on the emerging roles of performance within HCI and interaction design (Macaulay, Jacucci, O'Neill, Kankainen & Simpson, 2006) in which the editors acknowledged the impact of performance practices on user experience, participatory design and the role of embodied interaction. Continuing with the theme of embodiment, Moen (2005) has explored dance as a basis of kinaesthetic interaction as have others (Ebenreuter, 2006; Kjölberg, 2004; Larssen, 2004; Loke, Larssen, Robertson & Edwards, 2007). Improvisation as a tool for interaction has been explored in Hayes-Roth (1995), theatre as a research tool by Morgan & Newell (2007), and forum theatre as used in requirements gathering and usability (Newell, Carmichael, Morgan & Dickinson 2006; Rice, Newell & Morgan, 2007).

Previous research in the use of exploring experience / performance methods within the HCI community has occurred in the domain of Forlizzi and Ford's exploration of user-centered and participatory design (Forlizzi & Ford, 2000). Also included are Buchenau

⁵ Blythe, M.A., Monk, A.F., Overbeeke, K., & Wright, P.C. (eds.) (2003). *Funology: From Usability to Enjoyment*. The Netherlands: Kluwer Academic Publishers.

⁶ Wardrip-Fruin, N., & Harrigan, P. (2006). *First Person: New Media as Story, Performance, and Game*. Cambridge, Massachusetts: MIT Press.

⁷ Laurel, B. (1992). *Computers as Theatre*. Cambridge, Massachusetts: MIT Press.

and Suri (2000) exploration of *experience prototyping* that fosters an “empathetic” and “embodiment” approach to user-centered and scenario-based design. At Interval Research, Burns, Dishman and Verplank (1994) explored *informance*: informative performance and *bodystorming*: physically situated brainstorming, *repping*: re-enacting everyday people’s performances, and explorations of how low-tech solutions can create a design environment that focuses on the design question rather than the tools and techniques. Scaife, Rogers, Aldrich, and Davies (1997) also developed the concept of Informance Design. Salvador and Howells (1998) shifted the focus group methods to something they called Focus Troupe: a method of using drama to create common context for new product concept end-user evaluations. Simsarian (2003) has explored the use of role-play in extending the richness of the design process. In the *Faraway* project, Andersen, Jacobs, and Polazzi (2003) explored ‘suspension of disbelief’ within a context of play.

Theoretical foundations for designing experiential systems including phenomenology and reception aesthetics (Dourish, 2001; Davis, 2003); the introduction of technology as experience that takes into account the emotional, intellectual and sensual aspects of technology (McCarthy & Wright, 2004); a framework for user experience as it applies to the design of interactive systems (Forlizzi & Battarbee, 2004); and the designer’s role in co-constructing meaningful experiences (Höök, 2004). The turn to experience includes recognition of the bodily matters in the context of technology design. Understanding the value of the body within embodied interaction has been explored in: bodily aspects in CSCW (Knörig, 2007); design themes illustrating how bodies matter (Klemmer, Hartmann & Takayama, 2006); teaching embodied interaction design (Klemmer, Verplank & Ju, 2005); and responding to a user’s internal body state (Tsukahara & Ward, 2001). Weiser’s (1994) definition of invisible

computing includes a return to the 'whole person' focusing on experience⁸.

Contributions to the discourse of embodiment in technology include the body in everyday life (Nettleton & Watson, 1998). As technology extends its ubiquity, embedding itself more deeply beneath the surfaces of our environment and the surfaces of our skin, it remains material (Hallnäs, Melin & Redström, 2002).

5.3 *whisper* Experience Workshops: Practicing the Self

The *whisper* experience workshops were born from the desire to explore how people engage in the act of 'paying attention' to themselves: their senses, their inner state⁹ and their 'world'. The initial intention was to explore whether such an activity could be meaningful: could it have instrumental value in an interactive technologically mediated 'experience'? Based on the act of self-observation that exists simply for its own sake, would people willingly engage and connect in a meaningful way with themselves and with others? In many ways this proposition is extraordinarily simple. Although self-observation, reflection and mindful attention are highly active and purposeful activities, their association with instrumental and purposeful activity in relationship to technological exploration for experience is not well understood. Yet, as we have seen in Chapter Two and Three these questions are central to the comprehension and instrumentality of embodiment within performance and somatics practice. The existence and knowledge of these practices underscored this research and enabled access to a rich, technical, and rigorous set of practices that could be applied to the exploration of experience, with the goal of *Practicing the Self*.

⁸ Mark Weiser (Xerox Parc, Palo Alto) is recognized as coining the term *Invisible Computing*, and in his UIST'94 invited talk, he describes the "humanist" origins of Invisible Computing in post-modern thought.

⁹ Neuroscientist, Antonio Damasio defines body state as a constellation of interconnected feeling, thinking and thought propensities (which he terms as thoughts of certain themes). Damasio links body state to a 'feeling configuration'. He posits "a feeling is the perception of a certain state of the body along with the perception of a certain mode of thinking and of thoughts with certain themes". Somatics techniques are based on a similar instrumental regard for the somatosensing basis of body state. See Damasio, A. (2003). *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain*, New York: Harcourt Books, p. 86.

5.3.1 Workshop as a method of Experience Discovery

Within performance processes, workshops have a specific set of functions, which include methods of exploration and discovery that are directed toward the development of new material, or bringing new life to repertory. Richard Schechner, a performance studies practitioner and scholar has written:

A workshop is the active research phase of the performance process... Probably the most prevalent kind of workshop is used to “open people up” to new experiences, helping them recognize and develop their own possibilities.¹⁰

In the context of this research, workshops were designed as a formal, scripted experience in which specific physical and experiential concepts are explored, tested and documented for the purpose of developing a set of legible experiences. The workshop material was applied to the design of an interaction model for an interactive wearable art installation. The term workshop is borrowed from its performance context, where a script or form is ‘acted out’ and ‘acted through’: it is explored with the intention of testing, developing and iterating a performance or theatrical model.

To workshop something is to produce a prototype or experimental model.¹¹

In the case of *whisper*, the theatrical model also becomes the interaction model and technological model: it includes a set of experience concepts such as intention, gesture, direction of attention, relationship, rhythm, body-state, and attitude to space. This model creates a formal container for experience that includes a physical as well as technological description, and is a process that enables an evaluation, assessment and analysis of the formal relational elements that operate successfully or unsuccessfully in the construction of that experience.

¹⁰ Schechner, R. (2002). *Performance Studies*. London, UK: Routledge, p. 199.

¹¹ Ibid.

5.3.2 Experience Through Attention and Movement

The workshops focused on exploring experience through attention and movement.

Activities were modeled using a broad range of performance techniques such as improvisation, props, phantom partners, prosthetic devices, ritual space, and placebo objects. **Attention** was used actively and incorporated listening, directing attention and tactile awareness; imagining and visualizing; focus on somatic attributes such as breath, heartbeat, stillness, slow motion movement; journaling as hand-writing and drawing; social navigation using gesture and touch to express permission, trust, exchange, and feeling; and costumes and props to express physical extension, connection and group identity.

The goal of the workshops was to model **experience** that could be re-enacted, and re-played in the context of a public art installation using wearable computing technology. The design goal of the public art space was that it could be simultaneously intimate, playful, and social, while enabling the development of a level of awareness of 'our selves'.

The **movement** processes were improvised and re-enacted by observing participants' interaction in various contexts. As an aspect of active movement, 'gestural protocols' were created and imagined by the workshop participants during playful engagement. This playful movement became the basis for *gestural protocols* which supported the design of the body to body network protocol and the wearable garment, including the design of connection points, placement of wearable computers, sensors, wiring paths, and visual display systems. Movement exploration was used to codify interactions that represented acts of intention and data sharing used in the public art installation.

Workshop activity engaged the sense of self or *body-state* to connect and exchange with another. This formed the basis for enabling the development of an interaction model. This required participants' *experience* of an 'inner' space or intimacy with oneself and an ability to recognize and transfer this 'sense of self' to another person in social and playful ways.



Figure 28. Workshop Participants illustrating *connection* and *extension*

5.4 *whisper* Workshop Design: First Come First Play

The interaction-model and concept design for *whisper* was developed as a result of the series of five 'experience discovery' workshops in which participants explored first-person observation through their senses, their body-state and their co-experience with others in a shared space.

The workshops were designed in the following manner: Each workshop had up to 12 participants with a maximum duration of about 45 minutes. Participants were students and employees at Simon Fraser University and participation in the workshops was assigned on a *first come first play* basis. Invitations were e-mailed to the University School community each week, with a simple subject line such as “invitation to listen”, where <listen> is the title of the workshop. The recipient list included faculty, graduate students and university staff. Invitations gave a specific time and location, and expected duration (less than an hour). Technical information was purposefully left out of the e-mail exchange and workshop formats, creating an affective, metaphoric, poetic and open-ended framework for the invitations. The workshops took place once a week over 5 weeks. Each workshop was divided into two components or exercises that encompassed an overall theme represented by the name of the workshop. Each exercise was based on clearly stated tasks represented by the theme. For example, the exercises in the first <listen> workshop were called: *listen inside* and *listen outside*. The theme of *inside* and *outside* was repeated during the workshop series, and referred to an *inward* attention, and an *outward* attention.

The facilitation of the workshop followed a script, and attention was paid to using everyday non-specialized language. The five themes/names of the workshops were *listen*, *between*, *mutate*, *extend* and *phase*. After each segment (first half or second half) of a workshop the participant was asked to write their experiences on a single card, which included two to three simple open ended questions. Participants were given time to write, note or draw their experiences in long-hand written “journaling” form. The workshops were conducted in an open circular space delineated with ‘theater black’ curtains. The workshops were videotaped and photographed throughout.

"listen inside"

what did you hear? the swallowing my saliva, breathing, scratching my skin, liquid rolling down inside of my organs

how did you hear? through the vibration going along my skin, organs, and reaching to my ears.

what did it feel like? I felt self-conscious about all the sound that my body makes. It wasn't sound. It was movement, vibration. I could hear the movement of my body.

...whisper

Figure 29. Participant Response card example from "listen inside"



Figure 30. Participant Completing Response Card

5.4.1 *whisper* workshop <listen>

In each of the following workshops, I describe a selection of workshop experiences extracted from the overall experiences of the group. Examples are extracted to illustrate and provide analysis for the influences that participant experiences had on the design of the later *whisper* installation. Participant experiences influenced interaction design, garment design, network design, media design and system integration.

<listen> themes: listening | awareness | body-data | self to self

As we have seen, one of the major themes of *whisper* is the notion of 'paying attention' to one's self. The *whisper* installation centers on accessing body-data as a representation of one's own self: data that most people are not aware of in day-to-day life. The first series of experiences relate to how we perceive and act upon shifting attention to our own state: having access to and agency over our own heart rhythm, our own breathing, our own thoughts and our own body.



Figure 31. Workshop <listen> materials for '*listen inside*'

The experience of paying attention to our own body-state was prototyped in the <listen> workshop. Participants were asked to walk around until they found a place for themselves in the space. They were asked not to speak. A facilitator gave each participant a pair of earplugs and they were then left alone with themselves with no further instructions for about 15 minutes. At the end of that time the earplugs were collected and each participant was handed a card. The card asked the questions: What did you hear? How did you hear? What did it feel like?



Figure 32. Workshop <listen> participant '*listens inside*'

In the space of experience, this is the simplest of experiments. By depriving the body of its external hearing we become aware of the internal sound that is otherwise drowned out by the louder external sounds. We are removed from our own ears, but not from our hearing.

In performance practice, artists like Pauline Oliveros and Augusto Boal have created practices such as "deep listening"¹², and "listening to what we hear"¹³, which probe and access these very same questions of experience.

¹² Pauline Oliveros describes *deep listening* as "listening in every possible way to everything possible no matter what you are doing. Such intense listening includes the sounds of daily life, of nature, or one's own

The responses to the question on the cards: What did you hear? focus on this deep relationship to listening. Responses indicated the participants' discovery of the internal soundscape.

Heartbeat; earplugs as they settle, breath, slapping sounds from others in the room; humming noise; myself; contact with my own body

This process of listening seems to trigger varied feelings and emotions ranging from slight unease or discomfort to feelings of elation and discovery in the answers to the question: What did it feel like?

I felt self-consciousness about all the sound that the body makes; it wasn't sound; it was movement, vibration. I could hear the movement of my body

Normal, I'm alive; invigorating - breath going in and out with "normal" rhythm, and changing properties

Some workshop participants were able to shift their internal awareness to recognize that listening occurs not only through the ears, but also through the bones, the resonant cavities of vibration in the body, that the body is a metaphor for listening, and that, what is heard is not only sound: but movement, vibration, feeling, and sensation.

thoughts as well as musical sounds. Deep Listening represents a heightened state of awareness and connects to all that there is. As a composer I make my music through Deep Listening." See <<http://www.deeplistening.org/pauline/>>.

¹³ Augusto Boal has developed an entire 'arsenal' of exercises for retraining the senses and de- and re-sensitizing the body so that it can dehabituate patterns to enable greater freedom of action and expression, included in these are "listening to what we hear", see Boal, A. (1992), op. cit., p. 88-105.



Figure 33. Workshop <listen> participants '*listen outside*'

The second portion of the <listen> workshop was named *listen outside*. After removing the earplugs from the previous exercise, participants were given blindfolds, asked to 'not speak' and were asked again to simply listen. This exercise was given a 15 minute duration. The removal of the earplugs and the direction of attention to the physical sounds, and to the room itself, created a slow outward movement in many of the participants. Rather than standing or sitting very still, as was the norm in the previous exercise, many crawled along the floor or along the edge of the curtained space, tapping, whistling, coughing or giggling. Some participants sought each other out, reaching and touching, moving slowly and intently.



Figure 34. Workshop materials including blind-folds '*listen outside*'

Exercises which are designed to *exclude* one of our senses, in order to enhance another sense, are a part of the rich material and techniques of many performance, theatre, and body-based disciplines. For example, Augusto Boal's *Arsenal of the Theatre of the Oppressed* includes a set of exercises named *the blind series*.

In these exercises we voluntarily deny ourselves the sense of sight in order to enhance the other senses and their capacity for perception of the outside world.¹⁴

Elsa Gindler also uses this approach to shift attention from the monopoly and habitual dependence upon sight:

In most instances, and especially during the beginning sessions, we work blindfolded so that each person is trying, by himself, to determine [his or her own information] ... Suddenly, each student is working in his own fashion. That means each one in the class works differently, with a pervading concentration and quiet that would be the envy in many lecture halls.¹⁵

Listen Outside enabled participants to work with themselves, *from the inside out*, in order to gather impressions, perceptions and information about the world. These kinds of experiences can often bring out the embodied nature of imagination, of sweetness, and of poetic simplicity. This is exemplified by the participant's response in the card illustrated below... **what did you hear?**

birds (trying to sound like shoes) ...

¹⁴ Boal, A. (1992), op. cit., p. 106-116.

¹⁵ Gindler, E. (1995), op. cit., p. 7.

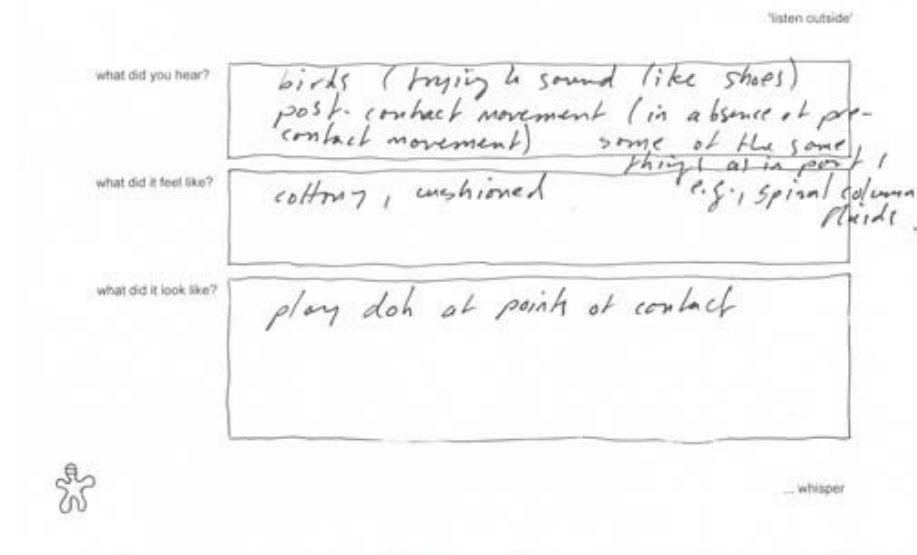


Figure 35. Workshop <listen> Response Card: "birds trying to sound like shoes"

5.4.2 *whisper* workshop <between>

Each workshop followed upon the next and was designed based upon the nature of experience and understanding that emerged from the previous workshop session. In this sense, the workshop planning followed Philip Agre's (1997) and Suchman's (1987) alternative and improvisational form of planning, countering a hierarchical view of process.

Before and beneath any use of plans is a continual process of moment-to-moment improvisation. "Improvisation", as I employ the term, might involve ideas about the future and it might employ plans, but it is always a matter of deciding what to do *now*. Indeed the use of plans is a relatively peripheral phenomenon and not a principle focus here.¹⁶

The workshops were seeded with the intention to explore attention, self and experience, and followed one upon the other by observing, participating in and re-considering the material that arose from each workshop process. In this way the workshops themselves were also a form of reflection-in-action¹⁷.

¹⁶ Agre, P.E. (1997), op. cit., p. 8.

¹⁷ Schön, D.A. (1983), op. cit.

<between> themes: awareness | attention | sending - receiving | self 2 other

The first workshop focused on the 'self-to-self' relationship of body-state and body-data. The *whisper* installation would also enable co-experience and connection with other participants. Therefore the ability to transfer data to another person and the willingness to enter into an exchange of information that is otherwise private and 'unknown' was another primary theme for the *whisper* workshops. In order for such a transfer to be negotiated, the participant needs to engage and invite trust not only to the other, but also to the 'listening' self. Following from this the workshop <between> investigated the 'invisible' transfer of personal data, and trust of the self and of other.

At the beginning of the workshop, the participants were asked to find a space for themselves and begin to move in slow motion, as slowly as possible. They were left to move very slowly for a period of 10 minutes without speaking.



Figure 36. Slow Motion Walking workshop <between>

As introduced in Chapter Two, slow motion walking is utilized in movement practices such as Butoh; this technique is utilized to enable the body to shift its attention to an immersive state in relation to its environment, what Csikszentmihalyi (1990) would term 'flow', where attention is intensified, and sensory details are sharpened.

The workshop participants were then asked to pair up, with one person selecting the role of *the sender*, and the other selecting the role of *the receiver*. The sender was asked to silently create an image for two minutes, and then 'send' the image to the receiver, while the receiver was asked to simply pay attention to 'listen' for what image 'came to mind'. At the end each participant was handed a card with the questions: What did you send? What did you receive?


What did you send? "A stick cat!"

What did you receive? "Not sure, could be a small dog"

A


'sending between'

what did you send?



A STICK-CAT!

anything else?



... whisper

A

'sending between'


what did you receive?

Not Sure
could be a small dog.

anything else?

my thoughts also may influence images made

- barbie
- martial combat figure
- super market
- ...



... whisper

Figure 37. Response Cards workshop <between> "a stick cat, not sure a small dog!"

5.4.3 *whisper workshop* <extend>

The previous workshop engaged communication and exchange between partners in a quiet and inner way. By reflecting upon the results of this previous workshop, the need emerged to *extend* the exploration of exchange and communication into a more open physical and social connection. The next workshop was named <extend>. We wanted to support the transference of private, internal and personal data to another person, exploring how gesture and object or prop could support the negotiation of willingness to enter into a private exchange of information.

<extend> themes: transfer | sharing | play | self to other

In a public space of exchange the participant needs to invite trust with the other, and also engage in a level of agency as to whom, and where, this exchange takes place. We wanted to continue to investigate these issues of privacy and trust using physical objects that could mediate the interaction through physical gesture. We created a workshop experience we called <extend>, which augmented the invisible data with a “non-digital amplification device”, in the form of a stethoscope. Participants were given ordinary medical stethoscopes and a small booklet with ten identical blank pages.



Figure 38. Stethoscopes used to exchange and <extend> self & shared body data

On each page there was space to write or draw and each page had the questions:

Where are you listening? What did you hear?

I felt like I was inside myself the pounding amplified my perception of myself, yet my breathing made me feel close

My friend stood up and tried to hear my heart, it was hard, I heard my heart; I heard low voices.

Overall – rather than feeling strong & secure I felt shaky, unsure – when the stethoscope came back I was instantly feeling secure again.



Figure 39. Response Cards workshop <extend> sharing body data

By introducing the stethoscopes we gave access to another type of body data. More importantly, we introduced the possibility of sharing this data with someone else. The design of the stethoscope with a 'listening' end and a 'probing' end allows for the data to be shared by either *probing* someone in order to investigate their data, or giving someone the earpiece to *offer* them a particular sound.

This was an important discovery, that an object or device could be inverted and it's meaning would be substantially shifted. The gesture of *offering* inverts the interaction model of *probing* or surveillance. The act of *offering* is also an act of self-agency. The act constructs a *meaning* of invitation. Invitation is not a demand, nor is it a probe; it affords intimacy, trust, and peer connection. Another discovery was the coupling between intimacy, safety and the possession of object itself: holding the object could create a sense of safety and security. This is evidenced in the card response above.

5.4.4 *whisper workshop* <mutate>

The previous workshop illustrated meaning and affordances created by sharing, agency and connection. By introducing the possibilities for sharing we immediately encounter interaction concepts of permission, surveillance and thresholds of privacy. The <mutate> workshop was designed to further develop these concepts, and experiences in a social interactive space.

<mutate> themes: permission | control | exchange | touch | connection

While the previous workshop used stethoscopes to share heart data, the <mutate> workshop introduced Galvanic Skin Response [GSR] data, and investigated thresholds of boundary, agency, and control. In addition, during the first portion the participants were given 'costumes' in order to explore 'wearing' as interaction and 'garment' as interactive device.

In the first exercise of the workshop the participants were given oversized white men's shirts that were attached to one another like 'Siamese Twins' by simple sewing [basting] at various locations such as along the seam of the sleeves, along the back

shoulder seam, and along the seam at the cuffs. Each shirt pair had a unique contact seam; no two pairs were connected identically.



Figure 40. Workshop <mutate> Exploring Transfer | Play | self to other

The participants were instructed to put on the shirts and button them up. This is a difficult task that requires the participant pairs to cooperate and coordinate, both physically and socially, and it also necessitates close proximity between the participants. A series of movement related tasks followed. One of the tasks presented was to hand out small Velcro sticky squares, and invite participants to 'stick' them onto locations on their shirts or bodies. Following this, participants were asked to 'connect' with each other using the sticky Velcro locations. As in each workshop experience, the participants were given cards to fill out following the exercise.



Figure 41. Workshop <mutate> Using Velcro to create connections & greater whole

An example of the challenges in allowing this physical proximity is present in an answer to the question: How did you change?

'I wouldn't have gotten that close/intimate under normal circumstances'

'Became more receptive to others; going from a closed network to a network constantly in change.'

'My forms in relationship to others changed. I was more able to focus on points of connection rather than on social relationships. In other words, because the connection was available, it was like an invitation. It became safe to touch the person at that location.'

In the second half of the workshop the participants were grouped again in pairs and given primitive boards that measured GSR. The boards were constructed in such a way that one of the participants was wearing the sensors [simple metal points of two fingers] and the other had the output [a red LED] pinned on the shirt and connected to the board with a long wire. As the GSR values shifted the red light brightened or dimmed.



Figure 42. Workshop <mutate> Using GSR as connection sharing affective data

The participants were also given small booklets asking the question: What did you feel?

'As an observer, a recorder, an instigator, responsible'

Here we see an example of one type of response to this particular sharing situation. The first responder classifies him/her self as the passive observer of the other, but since the output of the GSR is closely related to emotional excitement, this observer also feels involved and responsible. By taking the responsibility of the data output a participant also takes responsibility for the one that is observed.

A new set of experiences and behaviors began to emerge in this workshop with the addition of GSR, a 'technical' tool of observation. Participants began to 'distance' themselves from their partners, or to 'protect' themselves from being seen, witnessed or monitored. They seemed to associate the technology itself with a 'third-person' view.

'I do not know, Dennis is not showing me my output, I will attempt to limit my input to nil, to avoid detection'

This is an example of another group of responses. The observed party feels exposed by the observer not allowing access to the output data and as a consequence the observed participant will deliberately try and influence the result. In this way the observed party changes the rules of engagement, hiding from the probe, and continuing to negotiate a site for agency within the system. This is an example of behaviour which positions the interactions of 'emotional probing' within a 'game-like' structure.

5.4.5 *whisper workshop* <phase>

The previous workshop highlighted the intensity of connection that can occur through connection and clothing. By creating objects or costumes that allow certain movement for connection 'gestural protocols' that facilitate sharing and exchange bring about a potential blurring of the boundaries between the participants as well as between what is inside and what is outside.

<phase> themes: extension | body image | creating one larger body

The next exercise is investigating this blur, as we modified the men's shirts by sewing an 'extra' long piece in each arm so that the shirts became 'clown-like' with arms that extended almost to the floor. We asked participants to put on the men's shirts again. The participants were then encouraged to experiment with moving and improvising with the 'shirt object' alone and with one another. Free form exploration and improvisation was encouraged. We asked 'how many ways' can you move within this shirt? We observed various possibilities for movement and control.



Figure 43. Workshop <phase> Exploring Movement as Connected Whole

The cards asked the questions: How did you extend yourself? How did you move?

How did you move?: *'Held hands with someone other than my husband; became silly; enjoyed the unusual and unknown; became aware of another's movement'*

How did you move?: *'I found myself thinking of our 'body' as a complete unit - it just had this other piece I wasn't controlling; the attached arm felt very unusual once I got complete control back'*

How did you move?: *'I was no longer just myself, I had to extend myself to become a part of a whole; as a whole we had to work together; when we failed it was almost disappointing because we were apart'*

Here we see several examples of body extension. Participants became very 'attached' to the connections with one another, and were able to view themselves as a 'larger body'. It is interesting to see the apparent disappointment when the appropriated body becomes separated or the combined body fails to complete a movement task. The offering and sharing of emotional connection, when given by choice from an interaction perspective of personal agency, created meaning and intent, as well as feelings of loss as well as pleasure. The participant responses point to the presence of agency, movement, and attention within experience, and its potential for full, rich and meaningful interaction.

5.5 *whisper* Workshop Outcomes: From Experience to Interaction

We opened this chapter by describing embodied experiential practices as merging the conceptual with the experiential: shifting between observing and embodying. This concept has followed the design process of *whisper*: a wearable interactive art installation based in co-experience of body-state data. The interaction and concept design for *whisper* came about as a result of the series of five 'experience discovery'

workshops presented here. Participants explored first-person observation through their senses, their body-state and their shared movement experience.

The *whisper* workshops were intended to illuminate and validate how we could use first-person attention, and self-observation as a basis from which to extend and connect to others. The concepts explored were applied metaphorically, physically and structurally to the exposition of the *whisper* interactive art design¹⁸, implementation and exhibition.

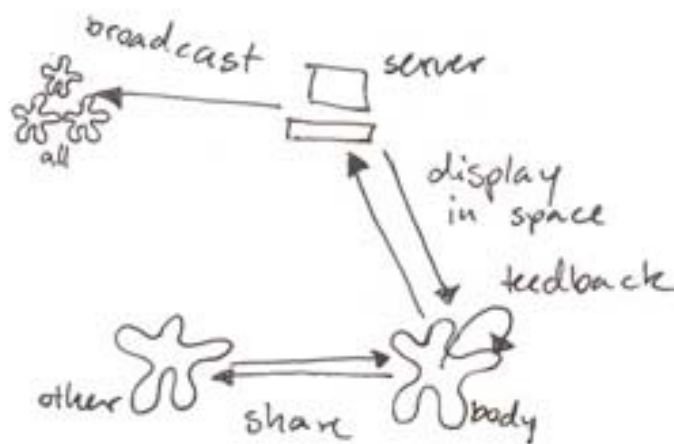


Figure 44. Example of Interaction Model -- State Spaces: Self to Self | Self to Other

Specific outcomes of the workshop process include: 1) an interaction model, 2) the wearable garment design 3) the wearable body area network implementation and 4) the space and media design of the installation. The garment enabled interaction modes of self-to-self, self-to-other and self-to-group within a wearable body area network.

¹⁸ Interaction Design concepts were introduced by the author in collaboration with Kristina Andersen, in Schiphorst, T., & Andersen, K. (2004). *Between Bodies: using Experience Modeling to Create Gestural Protocols for Physiological Data Transfer*, *Proc. CHI 2004 Fringe*, New York: ACM Press, also refer to Appendix C full documentation of Interaction Model and Workshop Design Process.

The table below summarizes the Design Techniques that were applied within the *whisper* experience workshops.

Summary of Design Techniques within whisper experience workshops
<ul style="list-style-type: none">• Attention was incorporated as listening, ‘sending’ invisible messages, movement and touch to connect to one’s self and to another.• Focus on somatic attributes such as breath, stillness, and slow motion movement supported development of attention skills.• Movement was utilized as an expressive indicator of intentionality, body state, extension of body image, permission, control, exchange and play• Imagining and visualizing were used to explore movement vocabulary.• The workshops were modeled using a broad range of performance techniques.• Improvisation was used in each workshop, improvising movement and stillness, engagement and privacy• Props such as Stethoscopes, earplugs, blindfolds, heart monitors, GSR sensors were used to create relationship and enable expressivity.• Men’s oversize white shirts became phantom partners, prosthetic devices and placebo objects.• The simple ‘black box’ curtained circle became a ritual space.• Journaling through handwritten comments and drawing was used as a method of documenting, archiving and expressing.

Table 6. Summary of Design Techniques used within whisper workshops

The workshop ‘experience discovery’ process results propelled us to design for experience within the installation. We continually came back to the main theme of the workshops, and the artistic aim of the installation: ‘paying attention’ to one’s self enables greater access to optimal experience. The workshop responses illustrated that the body can become a metaphor for ‘listening to the self’, and that what is heard

extends beyond sound, to movement, vibration, feeling, sensation, and our inner processes.



Figure 45. Gestural Interaction in the Installation

Listening became a kind of 'attending to' in which participants could shift their internal awareness to extend beyond listening ears, through to the bones and the resonant cavities of vibration in the body, and to body-state, sensation and action. The workshops met their goal of modeling experience that could be replicated, re-enacted, and re-played in the context of a public art installation using wearable computing technology, where the public art space was simultaneously intimate, playful, and social.



Figure 46. *whisper* Garment Combines Movement with Embedded Connectivity

The *whisper* workshops explored numerous somatics and performance values and techniques, which are summarized in the table below.

	Chapter 5 From the Inside Out whisper
VALUE	
Self	Body-state Self-Observation Physiological data
Attention	Sensory listening Inner - Outer Kinaesthesia Proprioception Movement
Experience Qualities	Inner World Rhythm of "life" Joy - Melancholy Expansion - Contraction
Inter-Connection	Body-Data <ul style="list-style-type: none"> • Within self • Between other • Choice to share • Create extended body
Somatics & performance Systems & Techniques Applied	Eastern and Contemplative Practice <ul style="list-style-type: none"> • Slow motion walking Kinetic Awareness (Gindler) <ul style="list-style-type: none"> • Directed Attention to self • Heightening sensory awareness, blindfolding, earplugs Arsenal of Theatre – (Augusto Boal) <ul style="list-style-type: none"> • De-specialization • Sensing self • Listening to what we hear • Internal Rhythms • Moving self • Placebo Objects, props • Clothing/Costume as extension of self Movement Improvisation (Blom & Chaplin) <ul style="list-style-type: none"> • Speaking Body - Body Parts • Building Trust and Sensitivity • Movement Quality • Silence • Group Work – Multibody movement Contact Improvisation – Attentive Movement Practices <ul style="list-style-type: none"> • Weight, Flow, Trust, Awareness • Gestural Affordance Rupert Sheldrake <ul style="list-style-type: none"> • Seven Experiments That Could Change the World

Table 7. Summary of Somatics Values and Techniques used in *whisper*

5.5.1 Interaction Design: from Workshop to Installation

The workshops were the basis of the concept design and interaction model resulting in the development and implementation of the *whisper* installation. The workshops made it possible to probe and investigate the underlying interaction issues during the hardware and software development process. Table 8 summarizes how workshop outcomes were transferred and applied to the design process of the *whisper* interactive installation.

One of the examples from the workshop outcomes cited in Table 8 below is the importance for each body to have agency over its interaction with itself and with others. This was represented through physical control and access to a body's privacy of their own data and state. It was also represented through the ability to choose, select and allow shared play and exchange of their own body data. When applied to the *whisper* garment design this enabled: self-to-self communication, self-to-other sharing and exchange and self-to-group connection for multiple participants. These connection points were perceived through 'tactile feeling' rather than visual symbol or natural language interface, and are described below as one specific example of workshop outcomes applied to installation design.

Work shop		Installation	
Self to Self			
Ear-plugs Blindfold	Directing attention to inner state – body data	Introductory Guide Process Participant Listens to their own body data	Installation was ‘staged’ in 3 stages: 1) preparation, 2) self, and 3) others. During Stage 1 a <i>Guide</i> assists participant with putting on garment and describes its function and use. This is intimate and one on one. Duration is about 5 minutes.
	Identity	Garment Design: Each participant has Individual LED pattern on sleeve Space Design: Individual Pattern is projected onto floor. Each participant has their own visualization ‘pool’	Stage 1: a participant ‘recognizes who they are’ and can visually identify themselves on their garment through an animated LED pattern. The same ‘identity icon’ represents themselves in the system, and this icon is animated with changes in their body-state: changes in their heart-rate and breath within the system
Slow motion walking	Stillness Intimacy Preparation	Participant tests garment paying attention to their own body data on sleeve, and visualized in space moving slowly at first to understand experience	Stage 2 – participant explores their own data and experiments with their heart rate and breath testing connecting points. Each participant begins with their ‘own visualization pool’ and can witness and explore direct effects of their own data through visualization and sonification thereby understanding and identifying themselves IN the system
Self to Other			
Velcro Sticky Patches	Extension Connecting to other body	Garment design ‘snaps’ and ‘islands’	Stage 3 – Participant ‘connects’ to other person’s data. Participants ‘effect’ upon one another can be witnessed and altered through visualization and Sonification change
Stethoscope	Permission Agency Privacy Exchange	Giving and Receiving, Offering and Sharing, Choice	Garment ‘snap-islands’ created with different background textures to enable choice and navigation through ‘tactile feeling’
GSR	Permission Agency Privacy Control	Design for ‘taking data back to self’ with snaps	Participant could ‘detach’ self from other’s data by connecting snaps to self-locations on garment. This would enable Participant to view only their own data in their visualization pool.
Self to Group			
Creating Larger Group	Play Connect and become a part of a Larger Group Body	Design for enabling multiple participants to playfully connect ‘snap to’ one another creating a single data body	Design of ‘gesture’ protocols for connecting so that participant could ‘wrap arm around’ self in order to connect to self, and ‘open arms to other’ in a ‘dance partner style’ to connect to an other, and ‘improvise’ in a ‘twister’ like game format for larger numbers inviting playful movement
Broadcast			
		Design for Server Communication	Server Data is Broadcast back into space into 1) visualization pools, and 2) Sonification pools

Table 8: Summary of Workshop Outcomes Applied to *whisper* Installation



Figure 47. *whisper* Garment Interaction During Installation

5.5.2 Garment Design: Tactile interface for connecting

A tactile 'snap' interface was designed within the kimono style wearable jacket as a direct consequence of the workshop explorations in control, agency, and intimacy. The interface consists of a set of wired clothing snaps attached to the right hand fingers of the participant and a series of tactile 'islands' placed in various positions on the wearable device. These islands are small identification chips wired up to matching sets of snaps. By touching the snaps of an island with the finger-snaps the participant can choose and mix between the different sets of body data coming from his or her own body.



Figure 48. Garment Design | Snaps | Connection

The islands are made from materials of different textures, such as terry-towel, suede and soft white leather to allow the participants to select and navigate shared data through ‘the feel of touch’.

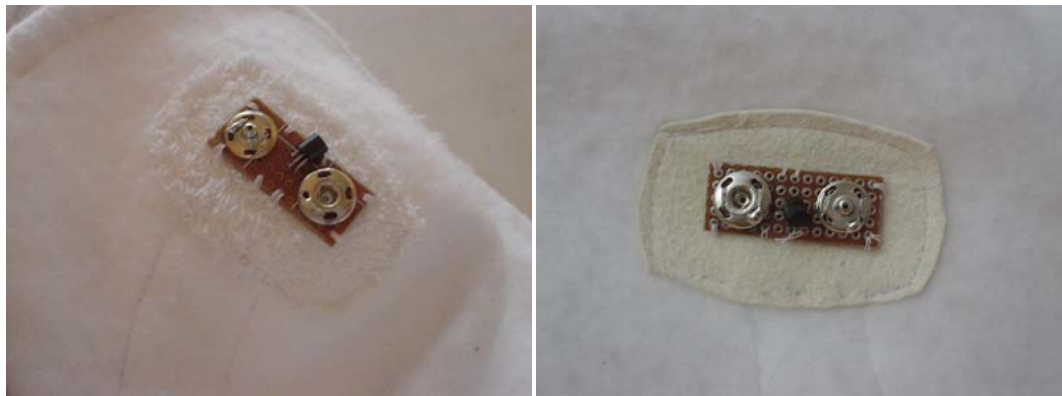


Figure 49. Snap Islands ‘Textural’ Recognition

This is one of a number of examples cited in Table 8 that supports and validates the instrumentality of the workshop processes. This chapter has explored embodied interaction as a reflective process that is simultaneously inter-body and intra-body. The *whisper* case study has focused on experience discovery for exploratory concept design¹⁹. The experience with the installation has shown that participants can learn to

¹⁹ Additional material that describes the whisper project can be found in Appendix C, in the accompanying DVD, and also in extensive online website documentation. Appendix C contains design documents, whisper interaction model, workshop data, and workshop transcriptions. The accompanying DVD contains two whisper videos: the first illustrates how the workshop material effected and seeded the installation and

shift their own threshold of attention, awareness and body-state through the interaction. They participate in “becoming expert” users of their own physiological data. As such the installation is also its own experience workshop, and is a starting point to continue to explore methodologies of experience modelling.

follows the structure of this Chapter, and the second video illustrates the whisper installation in its exhibition in Cambridge, UK during the Respond Festival. The web documentation is contained on following web pages: <<http://www.sfu.ca/~tschiphoh/html/artDesign.html>>, <<http://www.sfu.ca/~tschiphoh/whispers/index.html>> and <<http://whisper.iat.sfu.ca/process.html>>.