From the Inside Out: Design Methodologies of the Self

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ABSTRACT
This workshop position paper proposes an approach to design that is based in models of lived experience found in the domain of performance practice (as exemplified in dance, theatre and somatics). It is grounded on the premise that performance, as a practice-based domain, contains a longstanding history of constructing, iterating and validating experience models. In my research, I apply performance methodologies to the design of technologically mediated experiences and spaces centred in ambient and wearable technologies: technologies that live close to the body. My own research relies on a level of artistic inquiry where presence, meaning, aesthetics, analogy and metaphor, and ethical and social reflection are included as critical modes of creative process.

First person methodologies as defined within performance practice utilize a set of proven, rigorous and repeatable technical strategies. We can term these 'design methodologies of the self', methodologies that utilize the direction of attention in order to access or construct knowledge through the body. In recent years, HCI has adopted a range of experiential approaches to design that include embodied interaction, participatory design and the notion of first-person methodologies to name a few. Even so, the domains of HCI and Performance utilize *differing* frameworks with regard to constructing experience. It is of little surprise that underpinning these differing frameworks are differing sets of assumptions, philosophical histories and value-systems. A comparison and bridging of these varying frameworks reveals a rich, albeit under-theorized area of research and practice. A continued exploration of this common ground between performance and HCI has the potential to expand the rigour, knowledge and quality of research for design methodologies of embodiment, and ultimately the quality of human experience and of the technological systems that contain that experience.

Author Keywords
Performance, somatics, first-person methodologies, attention, movement analysis, Laban effort-shape, wearable technologies, art/design installation, play, social interaction, user experience, ambient environments, choreography of interaction, bodystorming.

ACM Classification Keywords
H5.2. User interfaces *User-Centered Design; Interaction Styles; Theory and Methods*

INTRODUCTION
There is a common ground that exists between the domains of HCI and performance practice: the need to model human experience. It is precisely the differing frames of reference between these domains that can reveal an under-theorized area of practice. The need to have models of interaction that are used to design the experience of the 'user' 'performer' 'enactor' is a shared starting point that is framed through differing methodological strategies. How is interaction conceived, constructed, integrated and tested within a design process? What are the underlying assumptions that differ between these domains?

Examples abound within both performance and HCI that illustrate frameworks of modeling user experience; I focus particularly on those that are based on the position of first-person methodologies, techniques and protocols that articulate models of experience that are constructed "from the inside out". I illustrate my own utilization of these models with 3 case studies that have resulted in prototype systems focused in wearable and ambient technologies.

Performance domains account for experience as a practice based function, one that accesses and constructs knowledge through the physical body. Within my own research I focus on the performance domains of dance, theatre and somatics. In the following pages I review some common views to modeling experience within HCI and Performance, and site examples within each field. I focus particularly on movement and gesture as an expressive indicator of experience.

MODELS FOR EMBODIED EXPERIENCE
Within the field of HCI, Dourish (2001) has argued for a foundation in HCI that validates the notion of an embodied interaction. The need to augment abstract reasoning and

objective meaning with practical action and everyday experience is central to this approach. Suchman's (1987) ethnographic research views activity as situated and embodied, and her interest in purposeful, intentional activity, alongside Nardi's (2001) work in constructing a "theory of practice" within HCI based on the development of activity theory and intimacy between human and machine provide strong bridging links to our work.

GESTURE AS AN ARTIFACT OF INTERACTION

Dance, Theatre and Somatics share a focus on understanding human movement as a means to construct experience. HCI has also begun to explore the use of movement within interaction frameworks. Although movement can be used as an expressive medium simply for its own sake, we can also understand our movement by its direct links to its interaction with artifacts. In Activity Theory, Nardi (2001) illustrates the notion of a "function organ" – a transforming bond with an artifact. A photograph depicts a child listening intently to the radio, the expression of intense concentration suggests the creation of a relation between body and object. In dance and theatre the gesture itself can also become a "function organ", an artifact that creates or enacts a transforming bond between the participant and their own movement. In some of my own explorations of design artifacts, I think of the gesture *itself* as a function organ: the gesture can become the artifact that creates affordances for interaction, that creates meaning for the exchange of data, and for the act of communication that occurs through the experience of this data exchange.

The design of specific gestures that can become enactors is a notion common to theatre and dance practice. Richard Schechner (1985) uses the term *Restoration of Behavior*, to describe gesture as "material". Restored Behavior is organized as sequences of events, scripted actions, or scored movements. He refers to these as strips of behavior, and states that a restored behavior, although "originating from a process, used in the process of rehearsal to make a new process, or performance, the strips of behavior are not themselves process but things, items, *material*". This concept of gesture as source 'material' for designing interaction models is central to our work explicated in this paper.

Augusto Boal (1992) in *Games for Actors and Non-Actors*, states that "bodily movement *is* a thought, and a thought expresses itself in corporeal form". Boal's *arsenal of theatre* can be used to re-enact, or re-materialize the body state that accesses or indexes that thought, or "thought-unity". Grotowski refers to an acting score as a script for designing *point of contact* or connection (Schechner and Hoffman, 1997). In Interaction Design this is the equivalent of interaction schemas, which are navigated in order to construct the instantiation of the interactive experience. Grotowski speaks to the necessity of scripting gestural sequences in order to construct connection schema: "what is an acting score? The acting score is the elements of contact. To take and give the reactions and impulses of contact. If you fix these, then you will have fixed all the context of your associations. Without a fixed score a work of mature art cannot exist" (Schechner and Hoffman, 1997). If we extrapolate from Nardi's example to suggest that gesture can become a "function organ", a mechanism that can assist in defining properties for a scripted interaction score. These gestural function organs have the goal of paralleling processes to move from Grotowski's concept of mature art: works to works of "mature interaction".

FROM EXPERIENCE TO EXPERIENCE MODELING

What do we mean by experience modeling? By bridging domains of performance practice with HCI, we are focusing on an area of enacted cognition: the *enactment* of descriptors, or schemas for movement.

Previous research in the use of exploring experience/ performance methods within the HCI community has occurred in the domain of user-centered and participatory design (Forlizzi and Ford 2000). This has included: *experience prototyping* that fosters an "empathetic" and "embodiment" approach to user-centered and scenario-based design (Buchenau and Suri, 2001; Burns, Dishman, Verplank, and Lassiter, 1994) Interval Research's exploration of *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 (Burns, Dishman, Verplank, and Lassiter, 1994; Scaife, Rogers, Aldrich, and Davies, 1997). 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 story telling and 'suspension of disbelief' within a context of game and play in a design context. In addition, exploring other subjective aspects of creative process, such as the use of creating ambiguity in design has been described by Gaver (Gaver, Beaver, and Benford 2003) in Ambiguity as a Resource for Design.

In the performance domain, Dance Analysis and Somatics specifically construct systematic articulated movement models directly from the *experience* of the moving body.

Somatics is defined as the *experience from within the lived body* and includes practices such as Feldenkrais and Alexander technique. From the Somatics perspective, knowledge is constructed *through* experience, (Hanna 1998; Johnson 1995) and requires that experience be directed or focused through *awareness*. Experience alone is not a pre-cursor to knowledge acquisition, since experience alone could result merely in conditioning, or in accessing conditioned responses. In Somatics this would be termed "somatic amnesia". However, when experience is

specifically directed through the focus of attention, knowledge acquisition takes place which can be referred to as "Somatic learning", an activity expanding the range of what Hanna (1988) terms volitional attention. While Csikszentmihaly (1990) suggests that human experience operates within a limited field of attention, other movement systems within Somatics consider attention to be a generative attribute of awareness that can be augmented, increased through a process of somatic learning (Hanna 1998). Rudolf Laban's movement analysis systems (Laban 1974; Newlove 1993), and the work of other researchers such as Bartenieff (1980) and Blom & Chaplin (1982), are examples of gestural typologies based in experiential practices of dance (Schiphorst 1997; Schiphorst, Calvert, Lee, Welman, Gaudet, 1990), that model a range of qualities and modes of movement. These typologies can be used for gestural mapping and modeling qualitative movement characteristics such as intentionality, interest, attention and body state. They present potential experience models for the classification of aspects of movement, and define a means to approach gestural and choreographic protocols. Participatory design, experience design, performance, theater, dance and somatics share a common focus in modeling or representing human experience.

CASE STUDIES: PROTOTYPING METHODOLOGIES

I present examples from three case studies: systems that have explored the methodological concepts discussed in this paper. They are: 1) whisper[s], the first iteration of a wearable public art installation that used a series of workshops to define the interaction model for connecting and sharing body data; 2) exhale, a wearable public art installation where networked breath is shared between participants in a public space; and 3) soft(n), an interaction prototype developed in conjunction with V2_lab in Rotterdam. *Soft(n)* proposes a scenario for social interaction and the notion of *social intimacy*. Interaction with sensory–enhanced, soft, pliable, tactile, throw-able soft objects afford new approaches to pleasure, movement and play.

Figure 10. whisper Garment Design | Snaps | Connection

Case Study 1: whisper[s]

whisper is a real-time interactive public art piece, based on small wearable physiological sensors, micro-controllers, and wireless network transmission, embedded in evocative and playful 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' combined heartrate and breath, 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. One of the major themes of the installation *whisper* is the notion of 'paying attention' to one's self, and using this sense of self to connect to, and exchange with another. How can a system create a willingness, a trust, the 'suspension of disbelief' needed to enter into an exchange of information that is otherwise private and 'unknown'? To explore these questions of access to experience we turned to performance methodologies. For example, techniques for extending our bodily awareness through attention to breath and movement are common to performance methodologies found in theatre and dance. Techniques in these domains build both intra-body and inter-body knowledge by focusing on our *perception* of our own physical data. This includes having access to, and agency over our own body state.

Case Study 2: exhale

exhale, continued some of the themes of whisper, refining movement interaction and exploring the sensory landscape of networked breath, and the aural and internal sensation that could be shared. *Exhale* incorporates physical actuators into the wearable garments, creating a more visceral and physical response directly on the body. In *exhale* networked group breath is used as an interface for interaction. This occurs through responses in the linings of skirts worn by the participants. Networked breath is used to create output patterns through a pattern of vibrators and speakers that are embedded in the lining of these sensually evocative skirts.

This response enables a hidden and "inner" one-to-one communication between bodies in the installation, so that one body's breathing can directly affect another body's skirt. At the same time, collective group-breath is made visible on the *exterior* layers of fabric on the skirts by using a specialized fabric printing technique that enables certain fibers to "light up" in a continuous cycle according to collective breath rhythm. Breath bands wrapped around the chest measure the ebb and flow of the breath cycle. As clothing and even costume, the skirts of *exhale* cross our gendered modes of 'wear-ability', and are able to 'contain' both inner and outer senses of self. *exhale* interaction enables an expression of collective group empathy through the use of breath. This artwork integrates somatics and gestural interaction with textiles and garment design, developing new communication metaphors for wearable technologies and wireless networks.

Case Study 3: soft(n) creating emerging behaviour through an ecology of networked soft objects

Soft(n) is an interaction prototype developed in conjunction with V2_lab in Rotterdam. *Soft(n)* proposes a scenario for social interaction and the notion of *social intimacy*. Interaction with sensory–enhanced, soft, pliable, tactile, throw-able soft objects afford new approaches to pleasure, movement and play. A *somatics* approach to *touch* and *kinaesthesia* provides an underlying design framework. The technology developed for *soft(n)* uses the surface of the cushion as an intelligent tactile interface. Making use of a movement analysis system called Laban Effort-Shape, we have developed a model that provides a high-level interpretation of varying qualities of touch and motion trajectory. We have applied the notion of *social intimacy*, through models using through techniques in somatics and performance practice.

CONCLUSION

Our work in designing and testing experience models has illustrated that we can augment experience design with first person performance methodologies found in Theatre, Dance and Somatics.. The experiences within these prototypes illustrate that participants can learn to shift their own threshold of attention, awareness and body-state through the interaction affordances created within the gestures and embedded within the garments and object. They participate in "becoming expert" users of their own physiological data, and in playfully engaging with an emerging co-operative and physically and emotionally negotiated body state and collective system state. Social navigation is created through the participants' perceived internal body data flow [through the fingers, or connection snaps] and represented through the actual data flow [through the server]. As such the installation is also its own experience workshop, and is a starting point to continue to explore methodologies of experience modelling.

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