The Lived Body in Design: Mapping the Terrain

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ABSTRACT
We briefly sketch an overview of emerging design research and practice, which values the lived body as a central theoretical foundation in the design of interactive technologies. Three main areas of research activity are presented: theoretical and philosophical perspectives on bodies and embodiment; concepts of the body; and design approaches and methods for working with the body and bodily literacy.

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H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION
A focus on the essential and defining role of the human body in the shaping of everyday activities is a major contribution of situated approaches within human-computer interaction (HCI) and related areas (Suchman, 1987). Within early Computer Supported Cooperative Work (CSCW), the need to design technology to enable people to work together over distance led to a recognition of the communicative resources of bodies acting within shared physical spaces (e.g., Gaver, 1992; Dourish and Bellotti, 1992; Heath, Luff and Sellen, 1995; Robertson, 1997). More recently, the advent of mobile and wearable sensor technologies has further heightened our attention to the role of our bodies in facilitating interaction with technologies as well as with other people (e.g., Jacucci et al., 2005; Höök, 2008). Gestures and the manipulation of tangible objects provide input into interactive technologies. Devices hosted by and around the body, or distributed in the environment, are able to read, measure, track and provide feedback on our location, proximity, gestures, movement patterns, pulse, breathing, emotional state, gaze and so on. What and how we carry or wear and how we move through space in our daily interactions have distinct influences on our experiences of the world and our agency to act in our everyday lives.

There is a shift among design researchers and practitioners to actively working with the body in the design of interactive technologies (e.g., Svanaes, 2000; Schiphorst and Andersen, 2004; Klooster and Overbeeke, 2005; Djajadiningrat et al., 2007; Hummels et al., 2007; Jensen, 2007; Larssen et al., 2007; Höök, 2008; Loke and Robertson, 2010; Wilde, 2010). This paper is intended to acquaint interested readers with the scope of this exciting area of emerging design research and practice. In it we introduce and briefly investigate three main areas of research activity that each contribute to our understandings of, firstly, how the body shapes our interactions both with interactive technologies and other people and secondly, how these understandings can be expressed in the design process and the resultant systems and products. The three areas are:

1. theoretical and philosophical perspectives on bodies and embodiment;
2. concepts of the body;
3. design approaches and methods for working with the body and bodily literacy.

THEORETICAL AND PHILOSOPHICAL PERSPECTIVES ON BODIES AND EMBODIMENT
The bodies of actual living people are active, interactive, visible, material, historical and always embodied in the physical world. That is to say, actual bodies are situated bodies (Suchman, 1987). Phenomenological, and to a lesser extent, pragmatist perspectives have been used by researchers seeking to work actively with the body. These perspectives privilege individual bodies as embodied subjects, the active initiators and interpreters of their own experiences. They offer alternatives to the traditional positivist/cognitivist approaches that privilege the observers’ view of bodies as objects and the observers’ interpretations of bodily action and allow, among other things, the reduction of people who use technology to disembodied information processors.

Dourish (2001) proposed embodied interaction as an approach to the design of interactive technology that recognized the embodied, situated nature of human experience and being in the world. He suggested the concept of embodiment, central to phenomenology, as the common foundation of both social and tangible computing that have been, and arguably still are, two largely independent research programmes. But he explained: “By embodiment, I don’t mean simply physical reality, but rather, the way that physical and social phenomena unfold in real time and real space as a part of the world in which we are situated, right alongside and around us” (Ibid p. xxx).

Others have focused more directly on bodies themselves as the initiators and ‘experiencers’ of interaction (e.g.,
Djaj

Robertson 1997, 2002; Svanes, 2000). Merleau-Ponty's phenomenology has been especially influential here as his work specifically focused on the lived experience of a perceiving, thinking and acting embodied subject. In particular his account of human perception is rooted in the ontological primacy of social actors over social systems and privileges the social agency of those acting in the world to shape that world rather than find their behaviour bound by the procedures and institutions that they find always already in it (Robertson, 2002).

Merleau-Ponty's account of human embodiment is an account of how the human body immerses itself, spatially and temporally, in its lived world. Bodies are not conceived as an object in the world but as our sole means of communication with it (Merleau-Ponty, 1962, p. 92).

The consideration of active embodied subjects necessarily implies a consideration of their agency in their activities and how this is produced in particular individuals. Perhaps unsurprisingly, women have been especially engaged in exploring the body and its capacity for sensing, feeling and intuiting. Feminists have critiqued the mind/body opposition since the early 1970's, uncovering the ways that the theorisation of the individual in terms of consciousness reinforces the positive valuation of the “mind” and the negative valuation of the “body”. They have showed how this carries over into the valuation of the opposing elements in other dualisms such as gender (masculine/feminine) and race (white/not-white), as well as those such as culture/nature, reason/passion, active/passive, conscious/unconscious, subject/object, public/private and many others (Cranny-Francis, 1995, p. 1). Cranny-Francis observed that for feminists “to challenge the mind/body dualism was and remains a political act” (1995, pp. 6-7).

In the contemporary world of ubiquitous computing, where digital technologies are embedded in virtually all aspects of life, the challenge to designers is to take seriously the valuation of the lived body and our capacity to act within designed systems and procedures. Digital technologies can now mediate our perceptions of our own physical and physiological processes. This mediation raises questions about our experience of our own bodies. What is the impact of these technologies on our sense of self and agency in these situations? How do they shape our (bodily) experience and what implications does this have for design?

CONCEPTS OF THE BODY

The body can be conceptualized for design in a myriad of different ways. The choice of concepts – be it conscious or not – has consequences for the design of interactive technologies and the resultant practices of users of these technologies. Often the conceptualization of the body is expressed through the type of interaction considered desirable. For example, a tangible interface requiring varying levels of physical skill and manipulation could be founded upon a concept of the body as skilful action (e.g., Djajadiningrat et al., 2007).

We present a set of concepts of the body, drawn from the literature and a range of disciplines (HCI, philosophy, cognitive science, anthropology, biology, dance, somatics, performance), that may be useful for designers in thinking through how the conceptualization of the body plays out in the design process, the resultant interactive systems and the practices of users. These are by no means exhaustive and each concept can be interpreted in multiple and overlapping ways beyond what we have described here. For each organizing concept, a tentative list of associated terms is given. Interesting directions and issues for the design and use of interactive technologies are briefly tabled.

Body as anatomy and physiology

Organic

The body is a set of interacting anatomical and physiological systems that gives rise to specific abilities and constrains what is physically possible. These systems include for example, the skeletal, muscular, respiratory, pulmonary, neurological, digestive, etc. Digital technologies can be connected to many of these body systems and in doing so, afford new behaviours and shape our everyday experience.

Physiological data can now be made visible, calling into question what is normally considered private, personal and invisible. Clothing that interprets our emotional state from our physiological data now publishes this to the world, intervening in the tacit forms of communication and interpretation between people and blurring the traditional acceptance of what is public and what is private (e.g., Schiphorst and Andersen, 2004).

Body as expression

Creative, Evolving, Legible, Process, Transformation

On one level the body is continually expressing our state of being and becoming. The body is visible and material, an expression of vitality, but also a mode of communication with the world. The discipline of dance emphasizes the aesthetic, expressive and transformative qualities of the body (Blom and Chaplin, 1988). In somatics, the body is conceived of as an open system, permeable to change and adaptation through consciously directed attention and awareness (Johnson, 1995). The sensory nervous system can be re-patterned in order to achieve improved physical functioning and relearning of habitual movements and postures. This adaptive ability underlies learning and creativity. A similar transformative process applies to new patterns of interaction and use with interactive technologies.

Body as knowledge

History, Memory, Thinking tool

The notion of thinking with or through the body is gaining traction in contemporary studies of cognition and in design practice. Knowledge and meaning can be constructed through experience of the body (Höök, 2008) and underpins studies of movement practices such as yoga, Pilates and Capoeira by Larssen et al. (2007) in understanding how people learn and come to know through bodily experience. Kirsch’s (2011) research into dance and creative cognition suggests that the body can
be used as a medium to think with – ideas and choreography can be explored through physical sketching. The thinking is not in words or propositions, but in visual, tactile and somato-sensory forms.

**Body as physical skill**
*Active, Energy, Physicality, Physical experience*

The physicality of the body and its capacity for skilful action is at the core of some recent approaches to designing interactive systems. For example, Djajadiningrat et al. (2007) develop systems that value and build physical skill. The physically active body is prevalent in interactive applications directed at increased physicality for entertainment, gaming, health and fitness (e.g., Mueller et al., 2010).

**Body as felt experience**
*Emotion, Kinaesthetic awareness, Perception, Sensory experience*

The body is an instrument of perception - both sensory perceptions of the external world and of the internal state of the body (Merleau-Ponty, 1962). Kinaesthetic awareness is a primary perception and self-awareness of the body in motion (Blom and Chaplin, 1988). Fugtmann et al. (2008) have developed a Kinesthetic Interaction framework that brings the kinaesthetic sense to the fore in the design of interactive technologies.

Merleau-Ponty (1962) distinguishes between the body-for-self and the body-for-others. The body-for-self is the subjective, sensing and feeling body; the experiential body known to oneself. Examples of interactive artistic works are appearing that treat felt, bodily experience as a primary subject for interaction and contemplation (Schiphorst and Andersen, 2004; Loke et al., 2011).

Höök (2008) draws on contemporary research in neurology, medicine, psychology and sociology, which suggests that “emotional processes are the basis for rational decision making, for being and surviving in the world”, and applies this to the design of learning technologies that exploit our corporeality.

**Body as social, cultural**
*Body-for-others, Communication, Intersubjective, Performative*

Whilst phenomenology places direct, lived experience at the fore of its analysis of being, Merleau-Ponty (1962) points out that we also have a body-for-others, the body in its social, cultural world. Our actions acquire meaning within patterned systems of interaction with others.

How the body is performed in social space and what is considered acceptable social behaviour is changing under the influence of emerging technologies, such as mobile phones, wearable health diagnostic tools, electronic clothing, surveillance cameras, sensored environments, etc. Jacucci et al. (2005) describe an example of the performative use of ubiquitous media, where tracking technologies recorded bodily movements and how this influenced how people walked and moved in space.

**DESIGN APPROACHES AND METHODS FOR WORKING WITH THE BODY AND BODILY LITERACY**

There is a growing interest in actively working with the body in the design of interactive technologies (e.g., Svanæs, 2000; Schiphorst and Andersen, 2004; Jacucci et al., 2005; Klooster and Overbeeke, 2005; Djajadiningrat et al., 2007; Hummels et al., 2007; Jensen, 2007; Larssen et al., 2007; Fugtmann et al., 2008; Antle et al., 2009; Loke and Robertson, 2010; Ross and Wensveen, 2010; Wilde, 2010; Schiphorst, 2011). Design researchers are exploring the active engagement of the body and its capacity for sensing, feeling and intuiting in the process of design. This includes the experience of one’s own body as a source of knowledge, inspiration and judgement, and the exploiting of tacit knowledge embedded in embodied skills. The creative potential of the body is being harnessed for design exploration, idea generation, testing and evaluation of concepts, prototypes and working systems.

These approaches require designers to develop a bodily literacy, as well as more traditional competencies in digital, interactive, computational and material design. Sensitivity and skill in relation to the body, movement, and felt, kinaesthetic experience are the fundamentals of embodied knowledge necessary for building bodily literacy. For designers to work fluently and collaboratively with the body in design, a language and vocabulary for shared understanding grounded in bodily concepts is a prerequisite.

The current approaches include the use of physical movement by designers to gain a bodily understanding of gestures and movements and to communicate design ideas and findings, and the use of enactment and role-playing for generating, exploring and evaluating design concepts and for creating empathy with users and contexts of use. There is an interest in methods and attentional strategies that prioritize direct experience and first-hand, first-person perspectives of movement and felt, kinaesthetic experience. Inspiration for these approaches and methods has come predominantly from dance, theatrical performance and somatics. Somatic approaches in particular heighten the ability to direct attention and awareness to facets of experience. For example, paying attention to, and experimenting with, different combinations of movement parameters through improvisation, leads to increased sensitivity to felt sensations and to increased ability to produce and direct movement with greater subtlety and range.

**CONCLUSION**

We have briefly sketched an overview of emerging design research and practice, which values the lived body as a central theoretical foundation. The roots of contemporary commitments to designing for the lived body have been traced to situated, phenomenological and feminist approaches to technology design and use. The concepts of the body presented in this paper are the beginning of a more developed framework and can help sensitize and orient designers to different perspectives on the body that play out in the design process and resultant products and practices. By developing bodily literacy,
designers can better articulate and advocate for the internal, felt qualities of bodily experience and new forms of interaction that value the lived body.

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