3
User Experience within HCI

"This… is about the way we know the world and ourselves and about an alternative way through which we may know the world and ourselves."[1]

"…designing systems to support rich, meaningful, and pleasurable human experiences requires moving away from the model of engineering experience and towards an interdisciplinary approach to computing, in which technology design is intertwined with philosophical and cultural analysis."[2]

"So as HCI turns its attention to experience then, perhaps it is time to explore new metaphors from other disciplines in order to find a way of answering the problematic questions [of subjective first-person felt-life]."[3]

3.1 Introduction

This Chapter explores User Experience and Embodiment within the field of Human Computer Interaction. Rooted in the disciplines of usability engineering and computer science, HCI has collaborated with an array of traditions as varied as psychology, cognitive science, design, ethnography, philosophy, humanities and the arts. The research within HCI is as pragmatic as it is interdisciplinary, continuously striving to balance innovation, computational eloquence and human-centered design. Its critical approach and collaborative values work to transform knowledge through shared practice. This analysis emphasizes the richness of interdisciplinary collaboration in HCI, positioning 'the turn to experience' within HCI as a partner in the shifting landscape of embodied cognition that is engaging the sciences, humanities and the arts. By

[1] Neuman, Y. (2003). Processes and Boundaries of the Mind: Extending the Limit Line. New York: Kluwer Academic, p. 3.
[2] Sengers, P. (2003b). The Engineering of Experience, in *Funology: From Usability to Enjoyment.* M.A. Blythe, A.F. Monk, K. Overbeeke & P.C. Wright (eds.), Dordrecht, The Netherlands: Kluwer Academic Publishers, 19-29.
[3] Wright. P., & McCarthy, J. (2005). The value of the novel in designing for experience, *Future Interaction Design,* London: Springer-Verlag, p. 9-30.

surveying approaches to embodiment, this chapter outlines the varied historical influences of human computer interaction: from technical rationalism to its intersection with science, art and the humanities, and the experience-centered histories of somatics. It calls upon the interdisciplinary voices of HCI and orchestrates the varieties of user experience within technology design. This chapter continues to explore the epistemological value centres within HCI, seeking to illustrate complementarity between emerging practices of human-centred computing and the first-person embodied methodologies within the fields of somatics and performance.

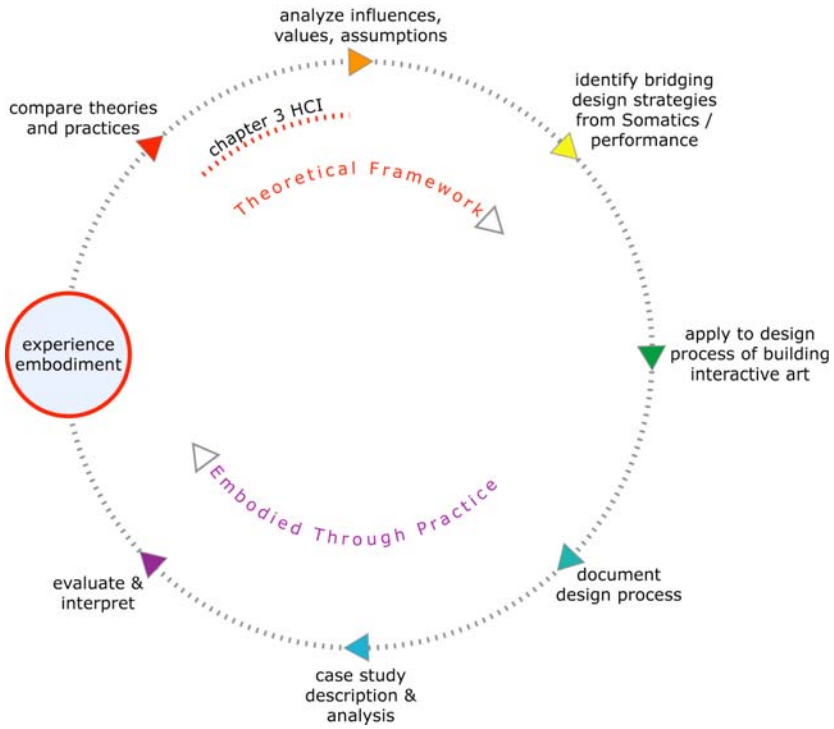

Figure 16. Compares Theories and Practices of Experience and Embodiment within HCI Analyzing Its Influences and Values in a Historical Context

3.1.1 Continued Growth of Embodied Interaction

Embodied Interaction continues to gain significance within the field of Human Computer Interaction. Its growing recognition is evidenced in part by a steady increase in publication and design focused on experience. The emerging role of embodiment

explores the need to refine instrumental knowledge of the human body in action, particularly when that action is applied to the use of technology (see for example, Macaulay et al, 2006). The enduring need to interact through experience has spawned a variety of interdisciplinary bridging strategies; the goal is to gain a deeper understanding of human experience in the context of technology design[4]. Along with phenomenology, cognitive science, psychology and the arts, recent interdisciplinary contributions to HCI include the knowledge-rich domains of somatics and performance that carry long-standing traditions of embodied practice[5].

The growing interest in embodied interaction continues to invite conceptual development that can account for subjectivity, and can support design for experience. Acknowledging that we have not yet established substantive theory of the specific technical nature of embodied practice within HCI, Wright and McCarthy suggest that:

> There is … an uneasy silence as to what actually constitutes experience. Questions such as how to set boundaries distinguishing a specific user experience from a general flow of experience, how to account for subjectivity, and whether it is possible to design for experience, have remained conspicuously unanswered. In short, despite a growing acceptance of the need to focus on experience the concept of user experience is *not well developed conceptually*. Without conceptual development, there is a danger that user experience and related concepts such as trust, loyalty, identity, and engagement will not be fully realized in studies of people and technology.[6] [italics mine]

I seek to contribute to the *conceptual development* of user experience, particularly in accounting for subjectivity in the context of research, by presenting explanatory evidence in the form of first-person methodologies that can be applied to design for technology. This research contributes embodied processes to *critical technical practice* where reflection-in-action can invite a radical interdisciplinary dialogue between the technical practices of both computation and embodiment.

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[4] Examples can be found in (Davis, 2003), (McCarthy & Wright, 2004) and (Sengers, 2003a).

[5] For example in phenomenology (Dourish, 2001), cognitive science (Hurtienne & Israel, 2007), psychology and the arts (Höök, 2004; Sengers, 2003a; & Andersen, Jacobs & Polazzi, 2003), somatics and performance (Kallio, 2003; Larssen, Robertson & Edwards, 2006; Kjolberg, 2004; Moen, 2007; Schiphorst, 2007).

[6] Wright, P., McCarthy, J., & Meekison, L. (2003). Making Sense of Technology, in *Funology: From Usability to Enjoyment*, M.A. Blythe, A.F. Monk, K. Overbeeke & P.C. Wright (eds.), Dordrecht, The Netherlands: Kluwer Academic Publishers, p. 43-53.

3.1.2 Richness of Interdisciplinary Exploration

The field of Human Computer Interaction is interdisciplinary by nature and by design, from its birth in usability engineering, ergonomics and computing science: fields that were themselves hybrids by birth [Figure 17][7]. HCI has continued to extend its computational context with a growing area of research *characterizing* the varieties of experiential qualities explored in interaction[8].

> There are varieties of experiences… and we need to characterise these varieties if we are to improve user experience.[9]

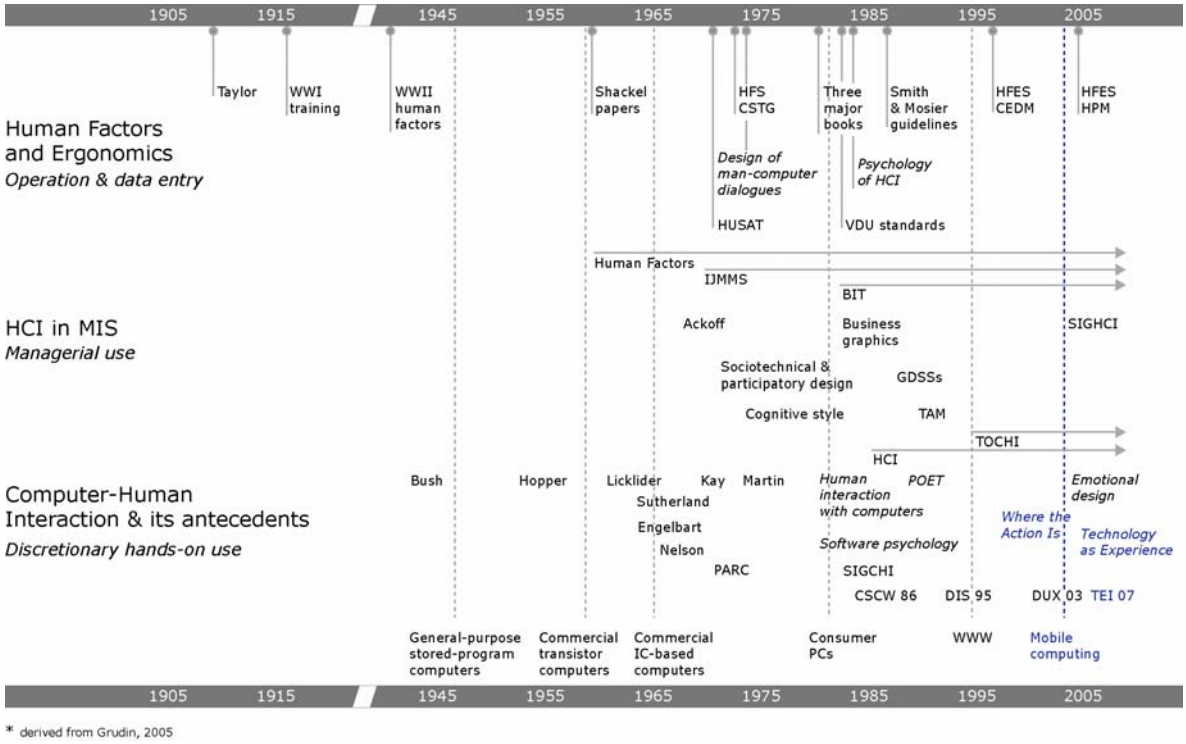

Figure 17. The Three Historical Faces of HCI as described by Jonathan Grudin, 2005

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[7] Figure 17 is derived from Jonathan Grudin's (2005) *Three Faces of Human Computer Interaction*, in which he emphasizes HCI's history in Taylorism, Ergonomics, and Usability Engineering. This view illustrates a history of Technical Rationalism underlying HCI. My own analysis contextualizes HCI within a history of thought and practice focusing on *Embodiment*, and complements this view, emphasizing the larger landscape of cultural and social movements that include philosophy, psychology, the arts and a contemporary history of science. [Refer to Figure 18 in this Chapter].

[8] Figure 17 illustrates the growth of experience from within the HCI as indicated in the 'blue text' [my additions]. As noted, the impact of continued miniaturization and the emergence of new technologies such as mobile computing and invisible computing are some of the technological influences that have accompanied the 'turn to experience'.

[9] McCarthy, J., Wright, P., Wallace, J., & Dearden, A. (2006). The experience of enchantment in human–computer interaction, *Personal and Ubiquitous Computing*, *10*(6), p. 369–378.

This development of the *varieties* of user experience illustrates the richness and specificity used to articulate experience within HCI research. The ACM Digital Library resounds with author title-keywords as qualitative and expressive as: awareness, play, reflection, resonance, empathy, enchantment, forgiveness, appreciation, trust, felt-life, intimacy, sensuality, intuition, embodiment, affect, sex, even love[10]. This list could easily be associated with Literature, Film, Biography or Art: disciplines that derive their practice through meaning making in the world. As HCI extends beyond its normative 'core' of usability research and turns to user experience, it is also engaging in meaning making through technology design. The qualitative richness of interdisciplinary research is central to the history of human computer interaction. The trends that lie beneath the conceptual underbelly of HCI are exemplified in the need to explore and test the specificity of experience. Combine the growing list of experiential qualities with technological keywords such as: invisible computing, nanotechnology, smart-fabrics, organic computing, biological technologies, embedded systems, body-area-networks and we begin to sketch a landscape of increasing ubiquity, personalization, interconnectivity, wearability, miniaturization and mobility. While these technologies are all literally moving closer to our skin and even beneath it, there is an ever-increasing need for techniques that can help us to design for the landscape of the self.

[10] This list is taken from author titles and keywords in the ACM Digital Library and refers to ACM publications based on content described by the list above. These include: aesthetics (Fiore & Wright, 2005), affect (Boehner, DePaula, Dourish & Sengers, 2005; Sengers, Liesendahl, et al, 2002), ambiguity (Gaver, Beaver & Benford, 2003), appreciative inquiry (Denning & Yaholkovsky, 2008), attention (Horvitz, Kadie, Paek & Hovel, 2003), attractiveness (Schrepp, Held & Laugwitz, 2006), awareness (Chalmers, 2002; Heath, Svensson, et al, 2002), contemplative interaction (Hansen, 2005), embodiment (Klemmer, Verplank & Ju, 2005), emotion (Mandryk, Atkins & Inkpen, 2006), empathy (Preece, 1998; Fiore & Wright, 2005; Hall, Paiva, Aylett & Woods, 2004; Treadaway, 2007), enchantment (McCarthy, Wright, Wallace & Dearden, 2006), experience (Desmet & Hekkert, 2007), expression (Moggridge, 1999; Ståhl, Sundström & Höök, 2005), felt-life (McCarthy & Wright, 2005; Larssen, Robertson & Edwards, 2006), feminism (Adam & Richardson, 2001), fluency (Löwgren, 2007), forgiveness (Vasalou & Pitt, 2005), frustration (Riseberg, Klein, Fernandez & Picard, 1998), intimacy (Vetere, Gibbs, et al, 2005), intuition (Hurtienne & Israel, 2007), love (Russo & Hekkert, 2007), magic (Madsen, 2000), materiality (Hallnäs, Melin & Redström, 2002), meaning (Höök, 2004), openness (Sengers & Gaver, 2006), perceptual interfaces (Pentland, 2000), play (Mandryk, Atkins & Inkpen, 2006; Wakkary & Hatala, 2007; Wright & McCarthy, 2008; Andersen, Jacobs & Polazzi, 2003), presence (Hallnäs & Redström, 2002), quality (Alben, 1996), reflection (Sengers, Boehner, Shay & Joseph, 2005), resonance (Hummels & van der Helm, 2004), sensuality (Benford et al, 2005; Isbister, Höök, et al, 2006; Hofmeester, Kemp & Blankendaal, 1996), serendipity (Newman, Sedivy et al, 2002), sex (Blythe & Jones, 2004; Brewer, Williams & Wyche, 2006), slowness (Hallnäs & Redström, 2001), somaesthetics (Lim, Stolterman, Jung & Donaldson, 2007), trust (Bickmore & Schulman, 2007; Riegelsberger, Vasalou, et al 2007), value (Friedman & Kahn, 2000; Boztepe, 2007), wonder (Paulos & Beckmann, 2006).

Embodied interaction requires embodied *methodologies*. Interdisciplinary exploration can contribute to conceptual development of user experience, particularly in relationship to the 'Technologies of the Self'.

> But 'engineering' truly rich experiences requires more of system designers than just technical skills… They can't just love their code; they must learn to love the complexity of user experience as well and be conversant in it. This suggests the incorporation of practices like cultural studies, anthropology, speculative design, surreal art, culture jamming, story-telling, cultural history, sociology, improvisation, and autobiographies, which have found ways to address and understand the complexity of human experience without making formal models of it.[11]

The history of science has developed in an increasingly positivist technological world. It is both outward striving and outward looking. Yet the trend of ubiquity, miniaturization, and invisible computing (Weiser, 1994)[12] asks us to shift our gaze toward experience, embodiment, and the self. Design for experience requires a re-balancing of 'gazes' as well as 'sensory modalities'. Adopting an epistemological strategy that blends rather than opposes these 'gazes' will strengthen interdisciplinary dialogue with a greater *continuum* of viewpoints. Our visual sense allows us to perceive an expansive, distant view. Our more proximal intimate senses can augment the far-reaching data about our world with the informational landscape of the self (Gibson, 1966). Similarly, our third-person observations have supported the outward gaze: visibility, the enlightenment and the development of modern science. Our first-person observations can support our inward gaze: techniques of subjective knowing and the experience of the self within research.

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[11] Sengers, P. (2003b). The Engineering of Experience, in *Funology: From Usability to Enjoyment*, M.A. Blythe, A.F. Monk, K. Overbeeke, & P.C. Wright (eds), Dordrecht, The Netherlands: Kluwer Publishers, p. 19-29.

[12] 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. He called for greater interdisciplinary design strategies, stating the need to cross-pollinate technology design by bridging knowledge and practice from the arts and humanities including: philosophy, phenomenology, anthropology, psychology, post-modernism, sociology of science and feminist criticism. Weiser also suggested that we include our own subjective experience in our research and design. (Weiser, 1994).

These trends point to a seismic shift across disciplines softening long held ideologies that have separated body from mind, first- from third-person views, and reason from subjectivity. I seek to position the 'turn to experience' within HCI as a partner in this shifting interdisciplinary understanding of the centrality of embodied cognition and its approach to meaning, reason, thought and the technologies of the self.

3.2 Meaning and Technology: the Confluence of Embodiment and Reason

We are witnessing a reformulation of epistemologies of practice within human computer interaction centered in the need to create richer models of experience. This turn toward experience: toward recognizing the interconnectedness of the parts to the whole, the continuity of the stream of experience, the embodied nature of the rational and thinking mind and the inclusion of the self, are echoed in the rhetoric of many contemporary disciplines throughout the sciences, humanities and the arts.

While scientific thought is being recognized as ideological, relative and value-laden (Putnam, 1981; Lewontin, 1991), historic scientific models and ideologies are being queried by academic and artistic disciplines (Polanyi, 1958; Schön, 1983; Neuman, 2003; Johnson, 2007). Hilary Putnam, in *Reason, Truth and History* (1981) describes:

> [My] aim… is to break the strangle hold which a number of dichotomies appear to have on the thinking of both philosophers and laymen. Chief among these is the dichotomy between objective and subjective views of truth and reason. Once such a dichotomy as the dichotomy between 'objective' and 'subjective' has become accepted, accepted not as a mere pair of categories but as a characterization of types of views and styles of thought, thinkers begin to view [them] as ideological labels.[13]

Putnam follows by suggesting that as dichotomies, these characterizations and ideological frameworks *cannot be whole*: they create views of the world that by definition become alienated or separated:

[13] Putnam, H. (1981). *Reason, Truth and History,* Cambridge, UK: Cambridge University Press, p. ix.

> The current views of 'truth' are alienated views; they cause one to lose one part or another of one's self and the world… my purpose is to sketch the leading ideas of a *non-alienated* view.[14] [italics mine].

Putnam's proposed *non-alienated* view acknowledges that rational thought (including what science refers to as *truth* or *logic*) is based upon sets of values, and that a value-neutral perspective does not exist. His description of a non-alienated view is one that does not forget one's self or the world in which one exists. A description of a non-alienated view that 'remembers the self' echoes Foucault's concept of self-inclusion and 'care of the self' in his description of the 'Technologies of the Self'[15]. Christopher Alexander's (2003) concept of 'the mirror-of-the-self test' resonates with Putnam's non-alienated view, and with the inclusion of the self in methods of knowledge construction as described by Foucault. Alexander describes empirical methods that *include the self* within the observation method.

> When I was observing issues of wholeness and life in a thing, I did not try to observe things as if I myself did not exist. Instead, again and again I tried to discern which of two objects was more like a mirror of my own self, which one had more feeling, which seemed to have more life, which one made me experience greater wholeness in myself, and so on… This kind of observation would have been considered inadmissible in the canon of then-contemporary science.[16]

Alexander goes on to describe the empirical nature of his mirror-of-the-self test, which allows access to empirical investigation of *quality* and life in artifacts. In Alexander's view, his method of observation includes the self within the world, and as such does not alienate the self for the world, nor the world for the self. The cornerstone of Alexander's approach is the observation of *wholeness* as we experience it in the world mirrored within ourselves. This technique is based on the view that as observers of the

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[14] Ibid, p. xi-xii.

[15] A discussion of Foucault and his concept of the Technologies of the Self is described in Chapter Two.

[16] Alexander, C. (2002). Chapter 9: Beyond Descartes: A new form of scientific observation, in *The Nature of Order: An Essay on the Art of Building and the Nature of the Universe, Book One, The Phenomenon of Life,* Berkeley: The Center for Environmental Structure, p. 352.

world we are not separate from it. Alexander, like James and Dewey[17], bases his results on *experience*:

> I want to emphasize that this method of observation, like the method of Descartes, still refers always to *experience. It is empirical in nature*. It dismisses fantasy and seeks constantly to avoid speculation. In this sense it is as empirical as the method of Descartes. But where Descartes only allowed observation to focus on the outer reality of mechanisms in the world, my method requires that we focus on the inner reality of feeling *as well.*
>
> The results I have reported are based on experience, they report experience, and they describe experience. The experience in question is experience of inner feeling. But the amalgamated results of this experience still ultimately refer to facts about the world: the different degrees of life that world has in different places. Because of that, our knowledge can be shared.[18]

Like many scientists and philosophers that critique the *ideology* of science (which differs from critiquing the instrumentality or value of its methods), Alexander offers up a viewpoint in which both 'objective' and [inter-] 'subjective' observation compliment and 'add-value' to one another, supporting a *non-alienated* view of empiricism that in effect unifies and softens the ideological status of these long-held counter-positions. In this regard, he states:

> I should like to call the Cartesian method the *first* method of observation that allows us to find agreement about the world. Nowadays, this first method of observation—the process of obtaining truthful insights about the world, by standing outside the world as an observer—dominates modern science. It has become, in effect the *only* way in which we obtain information about the world.
>
> I believe that what I have described… may be thought of as a *second* method of observation… it might one day seem comparable in value to the first method—and complementary to it.[19]

Alexander is describing an *embodied methodology* that is rigorous in its own right, that can operate in partnership with normative empirical methods, and that can give access to an aesthetics of 'felt-life' in a way that can be validated and integrated through

[17] Pragmatist philosophers William James (1999; 2003) and James Dewey (1932; 1934; 1989; 1997).
[18] Alexander, C. (2002), op. cit. p. 353.
[19] Ibid, p. 368.

experience. Additionally, Alexander's descriptions accord with embodied methodologies and techniques found within body-based practices, where engagement with the senses (seeing, feeling, awareness), coupled with attention, enable access to embodied knowledge:

> The first method has helped us to find out how the world works in the machine-like sense. With it we have accomplished miracles, nearly, in the breadth of our scientific understanding. The second method of observation may bring us further miracles. It may perhaps bring us to the doorstep of another kind of world, in which we see, feel, become aware of a second layer of existence, beyond the mechanistic view of science and technology: a layer which is the underpinning of [architecture and the arts] and which is, also, the basis of our emotional and [feeling] relation to the world.[20]

Alexander resolves the notion of dichotomy by acknowledging that there is no need to position observational viewpoints in opposition to one another. This is reminiscent of the multi-vocal approach of Depraz, Varela and Vermersch regarding systems of validation for first, second and third person methodologies, and that of Bonnie Bainbridge Cohen's with regard to Eastern and Western techniques of structuring mind-body knowledge[21]. For Alexander, differing forms of observation can be included along a continuum:

> It is necessary to understand that there is no choice required between the [two methods]… If we follow both methods—the method of Descartes for things that are outside ourselves and can be represented as machines; and the method I have explained, where we have to study or judge wholeness—we shall then arrive at a picture of the world which includes the self and which is able to recognize the personal nature of the universe.[22]

Michael Polanyi's *Personal Knowledge* (1958) accords with Alexander in his association of the *personal* nature of comprehending the world. Polanyi rejects the ideal of scientific detachment, acknowledging Gestalt psychology, and insisting on a form of knowledge that includes the self, and that actively *alters the self*, through its enaction:

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[20] Ibid, p. 369.

[21] See Chapter Two: discussion of Depraz, Varela and Vermersch (2003), op. cit., p. 44-46; and Cohen, B.B. (1993), op. cit., p. 60.

[22] Alexander, C. (2002), op. cit., p. 369.

an active comprehension that requires technical skill and can access a collective objective validity[23]. Like Putnam, Polanyi and Alexander, Lewontin (1991) also argues against an ideology of reduction, and suggests that we need to recast the dichotomies to enable a 'science of the parts' that can operate in collaboration with a 'science of the whole':

> A lot of nature … [as we shall see] … cannot be broken up into independent parts to be studied in isolation, and it is pure ideology to suppose that it can be.[24]

Lewontin suggests that a third 'meta-view' could blend the value systems of two views simultaneously: the views of reductionism in partnership with a view of an interconnected world. Like Lewontin, Yair Neumen (2007) stresses the importance of viewing various research methodologies as *tools* of knowledge building. In *Reviving the Living: Meaning Making in Living Systems*, Neuman acknowledges:

> We should keep in mind that reductionism is only one tool in the intellectual toolkit of a scientist.[25]
>
> The main limit of reductionism is that it cannot guide us in understanding the behaviour of living wholes.[26]

As part of this scientific milieu, HCI is also engaged *within* the shifting views of what constitutes methodologies of reason, knowledge, and validation. And very much like Putnam, Alexander, Lewontin and Neuman, researchers within HCI are extending their intellectual 'toolkits' to design for user experience: a design space that requires methodologies that can 'guide us in understanding the behaviour of living wholes'. The 'turn to experience' within HCI has been incrementally increasing its conceptual frameworks (Agre, 1997; Dourish, 2001; McCarthy & Wright, 2004). Historically, the 'engineering of experience' (Sengers, 2003b) and its accompanying usability research

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[23] Polanyi, M. (1958). *Personal Knowledge: Towards a Post-Critical Philosophy*, Chicago: University of Chicago Press, p. vii.
[24] Lewontin, R.C. (1991). *Biology as Ideology*, New York: Harper Perennial, p. 15.
[25] Neuman, Y. (2007). *Reviving the Living, Meaning Making in Living Systems* (Volume 6 Studies in Multidisciplinarity), Amsterdam: Elsevier, p. 8.
[26] Ibid, p. 7.

favored methods that were able to optimize functionality and quantify efficiency. Now, the turn to experience is *re*formulating a broader range of interdisciplinary and equally rigorous *embodied* techniques for conceptualizing experience. This is due in part to the greater landscape of approaches to scientific knowledge and to the influence of disciplines such cognitive science, the humanities and the arts.

Mark Johnson's *The Meaning of the Body* (2007) bridges concepts of embodiment across cognitive science, linguistics, philosophy, pragmatism and neuroscience. Echoing the epistemologies of practice of somatics, Johnson describes the importance of understanding experience *at the level of bodily processes*:

> The structural aspects of bodily interactions [are] dependent on submerged aspects of bodily understandings. It [is] important to probe below concepts, propositions and sentences into the sensorimotor processes by which we know the world… what is now needed is a far deeper exploration into the qualities, feelings, emotions, and bodily processes that make meaning possible.[27]

The 'far deeper' exploration that Johnson suggests is concurrent with technical practices of the embodied first-person methodologies described by Francisco Varela in the previous chapter. Varela notes that body-based somatic practitioners validate and enrich analysis of the first-person experience of cognition through the development of techniques and practice:

> One can observe that practitioners [of embodied first-person methods] are the only ones to have explored this phenomenology of cognition… [As] practitioners: they use techniques, they diagnose problems and attempt to solve them on bases that are pragmatic, [rather than] scientific, since the science… does not yet exist… [These practitioners] have been inventing new guides, new observables, new techniques of modification, new forms to help in change on the level of cognitive activities, beliefs, emotions. All work directly with human experience, subjectivity, *developing that which we might call a psycho-phenomenological practice.* This represents an immense resource of non-thematized knowledge.[28]

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[27] Johnson, M. (2007). *The Meaning of the Body: Aesthetics of Human Understanding*, Chicago: The University of Chicago Press, p. x.
[28] Depraz, N., Varela, F.J., & Vermersch, P. (2003), op. cit., p. 167.

Varela acknowledges practice-based knowledge in body-based somatic disciplines, highlighting its pragmatic technical relationship to Schön's notion of reflection-in-action, and its epistemologies of practice as 'pre-empting' scientific knowledge. In this regard Varela comments: "they are pragmatic, not theoretical or scientific, since the science on which they would need to ground their practice does not yet exist."[29]

This is a precise example of the existence of the two complementary yet differing epistemologies of practice: the trajectory based in first-person experience outlined by Varela, values knowledge enacted through pragmatics of experience and "an epistemology of practice which places technical problem solving within a broader context of reflective inquiry, shows how reflection-in-action may be rigorous in its own right, and links the art of practice in uncertainty and uniqueness to the scientist's art of research".[30]

Mark Johnson's argument for embodied cognition follows directly from this approach. Johnson grounds his arguments firmly in the pragmatist philosophy of John Dewey, weaving an aesthetics of experience that is supported by contemporary research in the sciences (linguistics, psychology and neuroscience) and illustrated by artistic practice. Johnson is among a group of contemporary researchers that has taken up the call of Nikolaas Tinbergen's 1974 Nobel Laureate address, which suggested an increase in "open-mindedness, collaboration, attention to the body as a whole, and to the unity of body and mind"[31].

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[29] Ibid.

[30] Schön, D.A. (1983), op. cit., p. 69.

[31] Tinbergen, N. (1974). Ethology and Stress Diseases, *Science, New Series*, *185*(4145). American Association for the Advancement of Science, p. 26.

Johnson, like Putnam and others argues that there remains a pervasive cultural misunderstanding that has led to misconceptions, based in dichotomies that direct our attention away from a non-alienated view:

> Chief among these harmful misconceptions are that 1) the mind is disembodied, 2) thinking transcends feeling, 3) feelings are not part of meaning and knowledge, 4) aesthetics concerns are matters of mere subjective taste, and 5) the arts are a luxury, rather than a condition of full human flourishing.[32]

Johnson's rich multi-vocal defense of bodily-based feeling in human meaning-making shares acknowledgement of John Dewey's pragmatist approach to the aesthetics of experience:

> Following Dewey, I want to turn these misconceptions on their head by showing that aesthetics must become the basis of any profound understanding of meaning and thought.[33]

In addition to integrating the aesthetics of experience within a view of an embodied self, Johnson illustrates how recent scientific knowledge of neuroscience supports a pragmatic universe in which thinking, feeling and acting are deeply and physically interconnected within a continuity of experience constructed by and through the body.

> How imagination can be both formal and material, rational and bodily – is that there is not an unbridgeable gap between these two realms in the first place. Once we no longer demand a disembodied (or nonphysical) rationality, then there is no particular reason to exclude embodied imagination from the bounds of reason.[34]

Concepts that link the aesthetics of experience with a pragmatist view of embodied enaction are explored by Richard Shusterman (1992; 1997; 2000): a pragmatist philosopher who coined the term 'somaesthetics' to describe an embodied aesthetics that is continuous, whole and grounded in the body's perceptive processes.

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[32] Johnson, M. (2007), op. cit., p. xi.
[33] Ibid.
[34] Johnson, M. (1987). The Body in the Mind: The Bodily Basis of Meaning, Imagination and Reason, Chicago: The University of Chicago Press, p. 169.

These braided views provide examples from within the growing research that supports the centrality of embodied cognition, the interconnectedness of the body within the continuity of experience and the confluence of embodiment, subjectivity and reason. As the relevance of these theories gain significance in HCI, we continue to witness an outpouring of interest in knowledge and methods that originate from within a seemingly endless variety of fields. HCI is seeing the influence of cognitive science, sociology, pragmatism, phenomenology, psychology, neurophysiology, performance practice such as theatre, dance, reflective and contemplative traditions and critical theory[35].

3.3 An Interweaving of a History of Embodied Influences

Drawing a comparative historical perspective across the influences that have led to the contemporary practices of HCI and somatics, we find a variety of historical interconnections that are more than coincidental. These exist between the underlying philosophies of pragmatism, the body-based disciplines of somatics and the applied and engineering sciences of human computer interaction. They also exist in the supporting social, cultural and intellectual structures that define and shape Western cultural thought and practice particularly in relation to technology, experience and the representation of knowledge of the body. While Dewey has richly influenced the emerging views of user experience, the aesthetics of interaction, technology as design and the importance of qualities of experience, Dewey himself had been directly influenced by two decades of work and practice with F.M. Alexander. Alexander's specific embodied practices and technologies of the self profoundly affected Dewey's philosophy of aesthetics, art, experience and education. And where Alexander is an

[35] Some of these influences within HCI include: Cognitive Science (Johnson, M., 2007, 1987; McNeil, 1992; Metzinger & Gallese, 2003), Sociology (Nardi, 2001), Pragmatism (Dewey, 1934; James, 2003; Shusterman, 1992), Phenomenology (Merleau-Ponty, 1964, 1968; Bergson, 1988; Dourish, 2001), Psychology (Gibson, 1966; Lakoff & Johnson, 1999), Neurophysiology (Damasio, 1994, 2001, 2003; Bach Y Rita, 1962), Performance Practice such as Theatre (Boal, 1992; Schechner & Woolford, 1997; Laurel, 1992) and Dance (Kjölberg, 2004; Schiphorst, 1997b), Somatics (Cohen, 1993; Johnson, D.H., 1995; Laban & Lawrence, 1974; Ginsberg, 1999), Reflective and Contemplative Traditions (Yasuo, 1987; Depraz, Varela & Vermersch, 2003), and Critical Theory (Massumi, 2002).

innovator of practice, Dewey's philosophy originated the application of practice to philosophic thought: as such Dewey's work is one of rigorously embodied concepts, an aesthetics that has a direct applicability to living thought, feeling and action. Dewey's pragmatist approach to 'learning how to learn' has influenced cognition, philosophy and the design for experience within technology. Another pragmatist philosopher, Richard Shusterman has entered the literature of HCI through his development of pragmatist aesthetics[36]. Shusterman, also strongly influenced by Dewey, developed and articulated a philosophy of the self which he termed somaesthetics[37]

> Somaesthetics can be defined as the critical study of the experience and use of one's body as a locus of sensory-aesthetic appreciation (aesthesis) and creative self-fashioning. It is devoted to knowledge, discourses, practices, and bodily disciplines that structure such somatic care or can improve it. If we put aside traditional philosophical prejudice against the body and simply recall philosophy's central aims of knowledge, self-knowledge, right action, and its quest for the good life, then the philosophical value of somaesthetics should become clear.[38]

As pragmatists, philosophers that have provided founding concepts supporting theories of experience within HCI, both Dewey and Shusterman have studied and reference somatics practices within their own writing. Chapter Two gave examples from Dewey's writing. In Shusterman's case he writes:

> If self-knowledge (rather than mere knowledge of worldly facts) is philosophy's prime cognitive aim, then knowledge of one's bodily dimension must not be ignored… somaesthetics works at improving awareness of our bodily states and feelings, thus providing greater insight… Outside the legitimized realm of academic philosophy, somatic [practitioners] like Reich, F. M. Alexander, and Feldenkrais affirm deep

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[36] Kallio, T. (2003). Why we choose the more attractive looking objects - somatic markers and somaesthetics in user experience, *ACM DPPI'03*, June 23-26, Pittsburgh, Pennsylvania, p. 142-143; Heinrich, F., (2007). The aesthetics of interactive artifacts: Thoughts on performative beauty, *Proceedings of the 2nd international Conference on Digital Interactive Media in Entertainment and Arts*, (Perth, Australia, September 19-21, 2007), DIMEA '07, p. 58-64; Lim, Y.-K., Stolterman, E., Jung, H., & Donaldson, J. (2007). Interaction gestalt and the design of aesthetic interactions, *Proceedings of the 2007 Conference on Designing Pleasurable Products and Interfaces*, New York: ACM Press, p. 239-254.

[37] This term is also used in Eastern philosophies of embodied mind and practice, see Yasuo, Y. (1989) in Shaner, D.E., & Nagatomo, S. (1989). *Science and Comparative Philosophy: Introducing Yuasa Yasuo*, Leiden, The Netherlands: E.J. Brill, p. 133, 257-258.

[38] Shusterman, R. (1992). Somaesthetics: a Disciplinary Proposal, in *Pragmatist Aesthetics: Living Beauty, Rethinking Art*, Oxford, UK: Rowman & Littlefield Publishers, p. 267.

> reciprocal influences between one's body and one's psychological [and cognitive] development.[39]

Within HCI, Shusterman's concept of somaesthetics has been referred to by Kallio (2003) and Heinrich (2007) and recently taken up by Lim and Stolterman (2007) in their discussion of *Interaction Gestalt and the Design of Aesthetic Interaction*. Just as Shusterman himself worked with Feldenkrais practice, we are reminded that the popularization and use of the term "Gestalt" was introduced through its founder Fritz Perls, who was acknowledged by Varela[40] and Polanyi[41] for his impact on body-based first-person practice, and whose technique was born directly out of Perl's work with Charlotte Selver, a somatics practitioner who brought Elsa Gindler's work to America from Germany. From within HCI, Lim and Stolterman explain their inclusion of somaesthetics in their approach to interaction gestalt:

> Since our goal is to provide practical and useful knowledge, which does not oppose the fundamental concepts emphasized in holistic accounts of experience, we started to look into another concept, "somaesthetics," introduced by Shusterman, which is influenced by Dewey's perspective[42]

Time and time again, we see the influence of these *non-alienated* views so central to the field of somatics and its body-based techniques, in the approach to design for experience and embodied interaction. The ability of HCI to discern the 'usefulness' and instrumentality of somatics-based principles and techniques is illustrative of its own pragmatic approach.

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[39] Ibid, p. 271.

[40] Francisco Varela describes Perls contribution to first-person practices in the chapter Concerning Practice, Depraz, N., Varela, F.J., & Vermersch, P. (2003), op. cit., p. 168.

[41] Michael Polanyi in his introduction to *Personal Knowledge* acknowledges the development of his concepts to the findings of Gestalt psychology. "I have used the findings of Gestalt Psychology as my first clues to this conceptual reform", see Polanyi, M. (1958). *Personal Knowledge: Toward a Post-Critical Philosophy,* Chicago: University of Chicago Press, p. vii.

[42] Lim, Y.-K., Stolterman, E., Jung, H., & Donaldson, J. (2007), op. cit., p. 239-254.

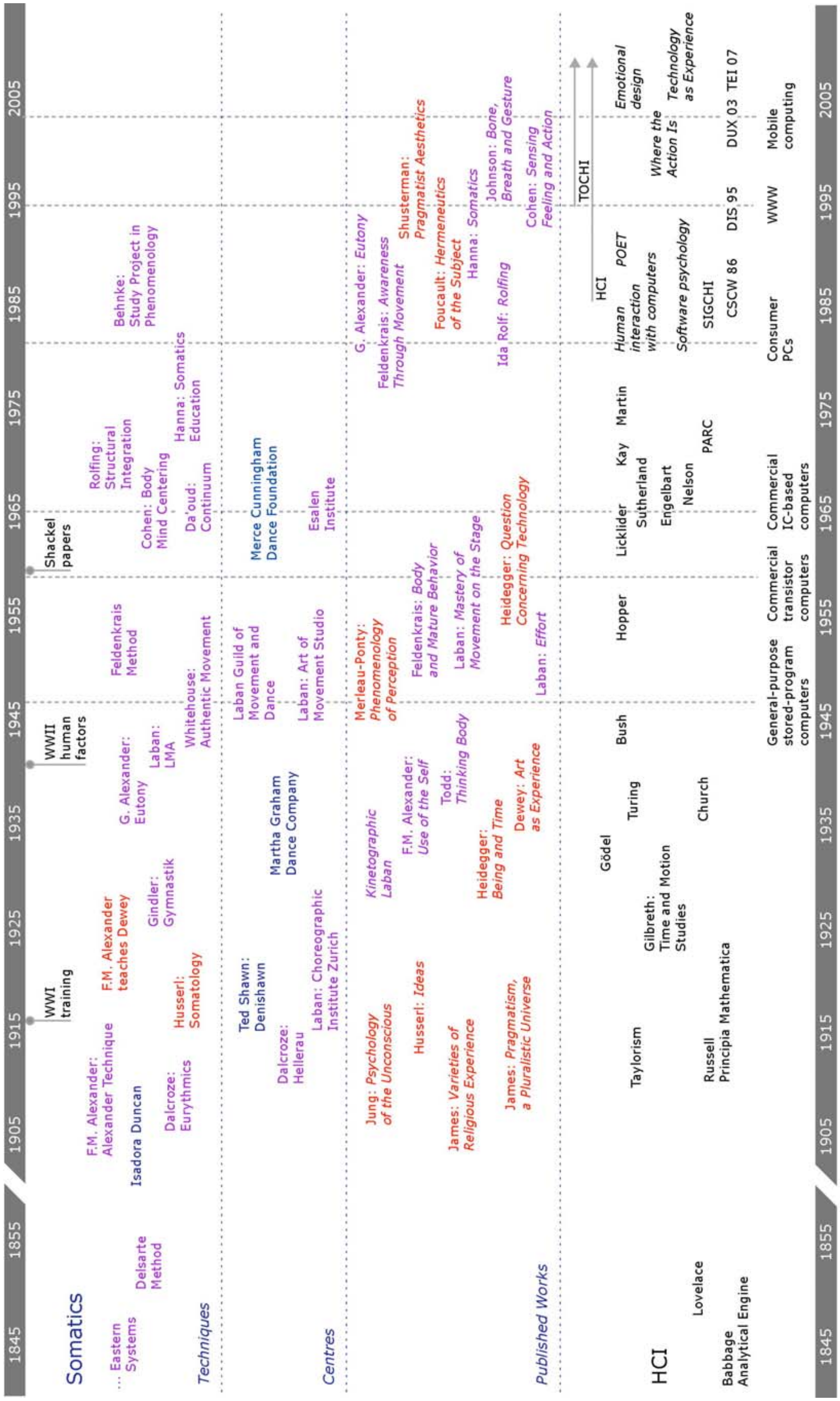

Figure 18. Comparative History of corresponding developments within HCI & Somatics

The examples presented within this Chapter seek to illustrate 1) the overlapping and intertwining of the concepts and physical practices across domains of design for interaction and the practice of the self, 2) the continued threading of HCI with its exploration of concepts of subjective practice and aesthetics of experience and 3) although not popularized, nor highlighted within the rhetoric of science, the dance of interconnection that has existed throughout the nineteenth and twentieth centuries in the shared landscape of what has come to be known as HCI and what has come to be known as somatics: the embodied nature of the rational and thinking mind, and the shifting interdisciplinary understanding of embodied cognition and its approach to meaning, reason, thought and the technologies of the self. This comparative history is a trajectory of interconnected technical epistemologies of practice that have developed along individual paths and yet are partners in the shifting landscape of embodied cognition engaging the sciences, humanities and cultural practices of art and the self.