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Transitions in Human Computer Interaction: From Data Embodiment to Experience Capitalism

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Introduction: The Politics and Philosophy of Critical-HCI

The intention of this article is to develop a critical theory of human computer interaction (critical-HCI) that tests some of the assumptions and omissions made in the field as it transitions from a cognitive theoretical frame to a phenomenological understanding of user experience described by Harrison et al (2007) as a third research paradigm and similarly Bødker (2006, 2015) as third wave HCI. As a significant constituent of twenty-first-century trends in HCI, the focus on experience has provided some novel avenues of enquiry focused on embodied interactions (Dourish 1999; 2004), felt experiences (Wright and McCarthy 2004), emotions and affect (Norman 2004; Picard 1997) grasped in ever more pervasive and *smart* technological contexts of use (e.g. Kuniavsky 2010). Nonetheless, this article contends that interest in experience does more than simply address new use contexts in academic circles. It also draws attention to a distinct bridge between conventional HCI disciplinary concerns with predominantly task based digital work and a growing business interest in consumer experiences in digital environments. Indeed, as the notion of the user experience (UX) becomes embedded in the HCI curriculum, commercial practices and the operational level of digital media, it simultaneously develops into a powerful marketing tool that business enterprises readily utilize in order to tap into experiential triggers that establish, some argue, cognitive, emotional and visceral engagements between consumers and the digital commodities, services and brands they consume (Norman 2004).

It is my further contention that the problem of experience needs to be addressed by critical-HCI in two interrelated ways. On one hand, a critical approach needs to explore the role market logic plays in putting user experiences to work - what I go on to call in this article *experience capitalism*: a term closely related to notions of an experience economy. This is an economic model that ushers in new experiential contexts for user/consumer interactions with the marketplace increasingly accessed through pervasive digital media technologies with

enhanced operational capacities. Here we find a significant and potentially reciprocal overlap between established media theory critiques of the political economy in which digital communication technologies are operative and the need for critical-HCI. On the other, critical-HCI needs to fully engage with ontological understandings of experience hitherto realized in HCI by way of a *phenomenological matrix* (Harrison et al 2007). The idea is to test the limits of this matrix by drawing on an alternative philosophy of experience, which, I argue, helps critical-HCI to more effectively approach ontological transitions to new technological contexts of interaction. This means bringing in an old thinker (A.N. Whitehead) to consider experience in novel ways that relate ontological concerns to this broader political concept (and persistence) of *experience capitalism*.

What is at stake in this political-philosophical enquiry is the status of human consciousness as understood by, on one hand, current phenomenological HCI, and on the other, the *nonbifurcated* theory of experience Whitehead (2004) conceived of in the 1920s. The twofold problem that consequently emerges from this dual venture concerns the extent to which experience of twenty-first-century digital media systems can be regarded as under the spell of subjective minds, or alternatively, conceived of as a production of subjective experience composed in the durational events of interaction. The article concludes by asking if it is the case that, as one post-phenomenologist media theorist assumes, the ontological status of a once privileged human experience of media is somehow cut out of the loop between user interaction and operational media (Hansen 2015), or, following Whitehead's nonbifurcated adventure, can we conceive of a politics of experience in which the mindful experience of (and human interaction with) the external world is regarded as inseparable from the durational passage of events.

The Three Paradigms of HCI Revisited

This article marks a development on an earlier critical-HCI focus on efficiency analysis that runs seamlessly through the three paradigms of HCI (Sampson 2016, 45-74). To briefly recap on this work it is important to note that each paradigm is defined by Harrison et al (2007) according to three distinct metaphors of interaction. The first concerns the body/machine couplings developed in a predominantly engineering/pragmatic focus on ergonomic design (let us call this the ergonomic paradigm). The second (the cognitive paradigm) is arrived at through the influence of cognitive psychology and a theoretical framework developed around

the mind/computer metaphor. The third paradigm (my main focus here) is informed by a number of trends in HCI research including phenomenological arrived at notions of embodied interaction, a neuroscientific leaning toward the role of emotions, feelings and affect in cognitive computer work and recognition of new technological use contexts brought about by innovations in pervasive computing, for example. For reasons that will become apparent, I have replaced the notion of a phenomenological matrix with a catchall name for this recent shift in focus: the experience paradigm. However, following my earlier approach to efficiency analysis in each paradigm, I will similarly argue here that experience is not simply the defining factor of a third paradigm of computer interaction, but can be traced through all three paradigms as they each endeavour to capture the variations of experience in different ways. So unlike Bødker (2006), for example, who argues for a discontinuity between a second paradigm related to computer work efficiency and a third all about online consumer experience, I note a continuity apparent in the efficiency analysis of work and consumption in which experiences are similarly put to work. Indeed, in addition to the contextual political and philosophical discussion below, the article will also set out a nascent agenda for a critical-HCI events based analysis of each paradigm focused on an alternative concept of experience informed by Whitehead.

Part One: A Political Economy of Experience

This first section brings in a political perspective intended to address a general omission in HCI research concerning the user experience; that is to say, it draws attention to the role capitalism plays in shaping a new alienating economic space of commodity production developing around shared experiences and the increasing ubiquity of an operational level of digital technology intended to capture, cultivate and put experiences to work. To begin with, the politics of user experience needs to be couched in discussions concerned with what has been termed the experience economy (Pine and Gilmore 2010). This is an economic model intimately related to developmental trends in HCI research and its wider relation to a burgeoning UX industry. To be sure, it is the very foundation on which the aforementioned bridge between HCI and business has been constructed. It would seem that whereas earlier HCI research paradigms were dependent on the metaphorical coupling of human bodies and minds to machines in the digital workplace, a fresh focus on experience shifts ever more toward understanding the processing of emotional, affective and felt experiences with new

digital communication contexts involved in work and consumption. As follows, the experience economy is composed of a digital circuitry linking together workers, consumers and business in ways that are assumed to owe more to the aesthetic of a Walt Disney theme park or theatrical production than Henry Ford's factory model (Pine and Gilmore 2010, 56).

The origins of the experience economy have been traced back to Alvin Toffler's 1970 book, *Future Shock*, and a chapter therein titled "The Experience Makers" which prophesizes where the economy is heading after the exhaustion of the service industries (Pine and Gilmore, 2013). It is here that Toffler (1970, 208-09) first introduces the idea of the experience industries.

[The experience industries are] a revolutionary expansion of certain industries whose sole output consists not of manufactured goods, nor even ordinary services, but pre-programmed 'experiences'. The experience industry could turn out to be one of the pillars of super-industrialism, the very foundation, in fact, of the post-service economy... the experience industry of the future and the great psychological corporations, or psych-corps... will dominate.

A similar theme emerges in the field of consumer research in the early 1980s where Holbrook and Hirschman (1982, 132-40) argue for "an experiential view" of consumption focused on the symbolic, hedonic (the pursuit of fantasies, feelings, and fun), and aesthetics of the consumption experience. It is in 1999, nonetheless, when Pine and Gilmore (2010), seemingly unaware of Toffler's futurology, introduce a notion of the experience economy that can now be concretely related to the current digital landscape. As follows, the twenty-first-century expansion of the UX industry (a convergence of interaction design and marketing akin to Toffler's psych-corps) can indeed be grasped as a major component of a political economy of experience marked by a shift from commodities, factory goods, and services to the added value of experiential consumption increasingly associated with industrial scale operations in a digitalized environment.

Following the experience economy model, the added value of digital experiences can, on one hand, include conventional commodities, goods and services readily transformed into new experiences realized through design, branding and marketing. The point is that the experience economy is more attuned to the idea that it is the experience itself that often

captivates user-consumer attention, leading to emotional engagements and the all-important purchase intent (Norman 2004). At its most deep-seated though, on the other hand, there is a commodification of experiences that do not refer back to a tangible product or service. The design of smart phone interactions with social media are apposite here. The value extracted from user interactions with social media apps, for example, does not appear to relate in any palpable way to a conventional product, but instead extracts value from the experience of social interaction. It is this digital transformation of commodity production that arguably leads to a business need to realize value in newly mediated interactions and experiences related to social context. It is indeed the work of the UX industry, composed of UX consultants, interaction designers, information architects, ethnographers, behavioural psychologists, big data researchers, coders, biofeedback experts, network strategists and online marketers to produce the sensory environments in which shared experiences can be captured, cultivated and exploited.

The UX industry is able to draw on the resourceful expertise of a range of specialists to prime sensory environments in which experiences might occur, but no one person or business enterprise *produces* experience. To be sure, the broader concept of experience capitalism emerges from research into (and extracting value from) what is already *in action*. Borrowing from Langlois and Elmer's (2013) approach to corporate social media, we might say that what experience capitalism does is more closely aligned to the *patterning* of experience, and I might add, significantly focused on the relational aspects of interaction and the capacity of machines to learn from social context rather than individual subjective experience. Here we can see how Pine and Gilmore's (2010) Erving Goffman inspired theatre productions are perhaps expanded to a point where the capture of the performance of experience moves beyond any one locatable subjective viewpoint to the massive-scale automations of experience gathering. As these big data captures become more pervasively realized through the invention of ubiquitous computer technologies, the subjective experience – described by Goffman as the *presentation of self*, is, as Greenfield (2006) argues, increasingly teased out into the public domain. That is to say, human subjectivity is not the producer of experience (*indeed, as I will contend below, it never has been*). On the contrary, experience capitalism persists in a world full of social media apps, relational databases, sensors and computerized things that process experiences in which subjectivities are constantly being made.

We can see the extent to which this economic shift toward experience steadily dovetails with the three paradigms of HCI. Ostensibly, the pragmatic concerns of early designers of computing systems demonstrated very little regard for the user experience beyond a Tayloristic concern with bodily fatigue associated with inefficiencies in the workplace. However, the eventual introduction of social factors into ergonomics followed by a conceptual move to a second paradigm underpinned by cognitive psychology and centrality of the information metaphors of mind/computer coupling, transitions increasingly toward a focus on user need, for example, through usability studies. The subsequent development of user related services, like user testing, heralds a distinctive trend toward incorporating elements of use initially focused on cognitive processes of memory, attention and perception, but latterly incorporating user motivation, frustration and satisfaction, requiring some knowledge of emotions, feelings and affect. This trend can perhaps be seen as a precursor to third paradigm concerns with the processing of felt experience, including previously marginalized research questions, such as, what is fun (Harrison et al 2007).

To fully understand the bridge that spans HCI and the experience economy, there is a need to look more closely at two components of third paradigm research. Firstly, there are fresh concerns with the role emotions, affect and feelings play in the processing of experience. Secondly, the research focus shifts towards exploring new pervasive contexts of computing use. It is my contention here that while much attention has been given to the undoubted importance of these two components of third paradigm HCI (e.g. Boehner et al 2007), there is a further need to explore how each becomes interwoven with the experience economy.

Processing Experience through Emotions, Feelings and Affect

The third paradigm marks the significant appearance of emotion in HCI research as it emerges from its marginal positioning in the cognitive paradigm. Most notably this interest in emotion stems from the HCI related affective computing research carried out by Rosalind Picard (1997) at MIT, as well as the work of HCI and UX guru, Don Norman (2004), whose influential emotional design thesis borrows from neuroscientific ideas concerning the so-called emotional brain thesis to inform a model of experience processing. According to Norman (2004: 21-24) experience is processed through three interconnected levels: reflective (cognitive), behavioural (use) and visceral (affective). This approach does not however go unchallenged in HCI. To be sure, Harrison et al (2007) draw attention to a “wide

range of [opposing] approaches to emotion” including challenges to the “central role” it is assumed to play in cognition as a kind of “information flow.” In contrast, there is a rejection of the “equation of emotion with information” in favour of an “interpretation and co-construction of emotion in action [and interaction]” (Harrison 2007). The transition from second to third paradigm HCI research plays a key role in how these opposing conceptions of emotional experience take shape. To begin with, the accusation against Norman’s model of experience processing is that it (a), remains stuck with one foot firmly in the cognitive paradigm and its tendency to reduce experience to the internal processor (and rationality) of the individual user’s mind (i.e. the cognitive mind/computer metaphor), and (b) tends to counterpoise cognition and emotion. A second kind of emotional experience therefore emerges which is referenced back to Wittgenstein, and argues that emotions are not the opposite of cognition, but like cognition, they are made in social and cultural interactions. Indeed, Boehner et al (2007) argue for a culturally grounded understanding of emotional experience in HCI research that recognizes the dynamics of shared experience socially constructed in action and interaction.

Experiencing the Internet of Things

Following fairly recent discourses from the technology sector, we can see how the digitized experience economy has the potential to considerably expand beyond the current wave of social computing to the Internet of Things (IoT). We may indeed already have one foot firmly standing in a future wherein experiential data, mostly captured today by way of conventional computing devices like PCs, mobile tablets and smart phones, are being gathered from interactions with pervasive computing in every conceivable location, everywhere and at any time. To be sure, experiences are already being captured through interactions with everyday things like cars and so-called wearables (fitness gadgets and training shoes, watches etc.), and now other things, like kettles, mirrors, speakers, furniture, pavements, and streetlamps are fast becoming computational devices. There are a number of implications for the growth of the experience economy (and the focus of HCI research) in terms of the changing spatiotemporal experience of computing. To begin with, the disappearance of the conventional graphical user interface (GUI) and dissolving of computer power into these everyday objects will alter the way the subject/object relation with technology is approached. Encounters with IoT will be triggered by non-task interactions, fleeting moments of contact,

often hidden from users, and even accidentally engendered interaction. Furthermore, biometric detection systems could potentially capture data about the affective valence of the body. Here the capacity of facial recognition software, for example, to detect emotional responses to environmental stimuli comes into play. Secondly, pervasive computing challenges the way cognitive process, like memory, perception and attention, have been conventionally studied in HCI. For instance, although generally considered as an augmentation of memory, media technology can capture past experiences, lost to memory in the complex passage and variation of events, so that they can be prompted back into action in the present. In other words, via machine learning technologies, forgotten experiences can work in the background to generate inferred experiential performances (Blackwell, 2015) that become perceptible in the here and now of the experience economy. Thirdly, although the capture of entangled experiences relating to animals, landscape and climate is already yielding a kind of nonhuman experiential data, the pervasive operational level of computing may well threaten the status of an assumed human centred, conscious experience (Hansen 2015).

The Phenomenological Matrix

Harrison et al (2007) contend that the changing digital environment draws our attention to the importance of embodiment in third paradigm HCI research. How we come to “understand the world, ourselves, and interaction” in these new contexts crucially derives, they argue, “from our location in a physical and social world as embodied actors” (Harrison et al 2007). Embodied interaction has become one of the major concerns of HCI, as such, and to understand it researchers have turned to phenomenology. Dourish (1999; 2004), for example, sees these new contexts as intimately linked to the technological changes he first observed in the latter part of the twentieth century. To begin with, in the 1970s, GUI technology introduced a visualization of computing that prompted a representational turn in the study of interaction typified by cognitive task based testing and mental models utilized in the cognitive paradigm. Yet by the 80s the growth in digital network communication adds new importance to the social in interaction design, prompting a trend in research toward analysing distributed notions of cognition. Subsequently, in the 90s, when computing first begins to break out of the screen and make its way into the physical environment in the shape of tangible technologies, attention is drawn toward the limits of the cognitive

approach. It is indeed these two latter developments in the context of computer use (social and tangible) that, Dourish (2004, 15-22) argues, require a new HCI framework focused on embodiment and grasped through the twentieth century phenomenological tradition.

Embodiment is defined in a way that makes it useful to the HCI researcher because it provides a “property of being manifest in and of the every-day world” in which interactions take place (Dourish 1999). This property is not, however, simply restricted to physical things, like computers or mobile devices, but can include participatory patterns, like conversations between “two equally embodied people” set against “a backdrop of an equally embodied set of relationships, actions, assessments and understandings” (Dourish 1999). This backdrop owes an initial debt to Husserl’s phenomenology, insofar as it is seen as part of a transition away from an experience of the world grasped through the realm of abstract ideas (idealism) to one derived from the experience of concrete phenomena. However, importantly, more attention is given to Heidegger and Merleau-Ponty in third paradigm HCI research. In the first instance, Heidegger famously tried to escape Husserl’s “mentalistic model that placed the focus of experience in the head” (Dourish, 1999). This is, evidently, important to the third paradigm’s similar transition from the cognitive realm of mental modelling to embodied interaction whereby interaction is no longer considered *in the head* (or mind), “but out in the world... that is already organised in terms of meaning and purpose” (Dourish 2004, 108). Indeed, Heidegger’s ontological worldview is not taken as a given - it arises through interaction (Dourish 1999).

Dourish is not the first to utilize Heidegger for HCI purposes. Below he uses Winograd and Flores (1986) adoption of the phenomenological distinction between “ready-to-hand” and “present-at-hand” to explain a distinctly first paradigm experience.

[C]onsider the mouse connected to my computer. Much of the time, I act through the mouse; the mouse is an extension of my hand as I select objects, operate menus and so forth. The mouse is, in Heidegger’s terms, ready-to-hand.

Sometimes, however, for instance on those occasions when I reach the edge of the mousepad and cannot move the mouse further, my orientation towards the mouse changes; now, I become conscious of the mouse mediating my action, and the

mouse becomes the object of my attention as I pick it up and move it back to the centre of the mouse-pad. When I act on the mouse in this way, being mindful of it as an object of my activity, the mouse is present-at-hand (Dourish 2011, 109).

This switching between *automatic* interaction and *mindful* attention suggests that the mouse only really *exists* because of the way it becomes present-at-hand through embodied interaction. The point is that the mindful activity of using the mouse is constitutive of ontology, not independent of it (Dourish, 1999). The mouse comes into being in the mind because, it would seem, it is part of an embodied experience of being in the world. Indeed, this notion of mindful embodiment is developed further, Dourish (2004, 114) notes, by Dreyfus (1996) who brings in the phenomenology of perception developed by Maurice Merleau-Ponty (1962). Here we find that perception itself is an *active process*, carried out by *an embodied subject*. As a result, third paradigm HCI research begins to focus on a somewhat dualistic distinction between the “physical embodiment of a human subject, with legs and arms, and of a certain size and shape” and a “cultural world” from which subjects extract meaning from (Dourish 2004, 114). From this stance the importance of developing “bodily skills and situational responses,” alongside mindful acts (or “cultural skills”), which in turn respond to the user’s embeddedness in this “cultural world,” comes to the fore (Dourish 1999). It is in between bodily and mindful interactions that abilities and understandings of computing are developed. There is also a considerable social component to this notion of interaction. On one hand then, we find the presence of the phenomenological body of the user-subject, who, on the other hand, simultaneously becomes the “objective body” experienced and understood by others in the cultural worlds they encounter (Dourish 2004, 115). From this point on, HCI researchers start to draw on Merleau-Ponty’s phenomenal perception of embodied and cultural worlds to develop, for example, “a taxonomy of embodied actions for the analysis of group activity” (Dourish 2004, 115; Robertson 1997).

Although escaping Husserl’s mental prison of the head to explain how experience emerges from human interaction with the world, human perception remains stubbornly (and problematically) central to the phenomenologist’s ontology. Whether or not it is in the head or embodied in the world, HCI phenomenology similarly begins with the notion that it is the human who has the experience. In other words, where the action is can be grasped

ontologically as it is sensed (in the head, in the hand or through some other bodily interaction) to the human. So why use Whitehead to challenge such a position and what tools can we take from this radical departure from the phenomenological tradition?

Part Two: A Whiteheadian Adventure in HCI

A Whiteheadian adventure in HCI offers a challenging but also profound alternative concept of experience that illuminates these emerging use contexts in new ways distinct from a phenomenological approach that has thus far situated minds and bodies in a *bifurcated* relation to environmental experience (Whitehead 2004). This is Whitehead's (2004) ostensibly uncanny notion that experience did not start with subjective human consciousness. That is to say, the world, and the cosmos it floats in, did not simply begin with the arrival of human awareness. Indeed, it is not human consciousness that draws attention to experience. It is, on the contrary, experience that draws attention to an anomalous worldview limited by its own perception of the *here and now*. For Whitehead, it is important to avoid a solipsistic theory of mindful perception which erroneously bifurcates from the concreteness of the passage of nature from which it emerged. Whitehead's adventure therefore offers a constraining philosophical point of departure since it is not phenomenal human consciousness that sheds light on experience, but experience in the actual world that draws attention to the aberration that is human consciousness. In other words, it is very important that the place and time (the *here and now*) of interaction is no longer simply understood as an anthropomorphic phenomenal experience, but rather grasped through a set of tools that refuse the bifurcation between mind and the nature of what is experienced. As follows, in Whitehead's early process philosophy, the embodied location of points in time and positions in space suggested in the phenomenological matrix are not regarded as well formulated problems since they overlook the complex "temporal thickness" and intensity of the durational quality of the *actual occasions* (or events) of experience (Whitehead 2004, 56).

Of course, HCI researchers may well want to question the value of an approach to HCI that side-lines the human, or more specifically, human consciousness. However, this stance is important to critical-HCI because the transient perception of the subject-user of the here and now of experience only represents a small slice of the passage of events occurring in the actual world. Arguably therefore the focus on human perception neglects to grasp the full

extent of the shift to the experience economy and changes to the technological infrastructure that newly redefine *where the action is*. This is not, however, an approach that is dead set against perception. But perception needs to be seen as only *taking into account* what occurs (Stengers 2014, 147). This is not the same as saying that perception produces reality. Perception does not decide if things are more or less real! That is to say, embodied interaction only goes as far as declaring mere instants of percipient, and sometimes specious, events in experience. What the adventure profoundly tells us is that it is, inversely, the process of reality that produces subjectivity.

Analytical Tools for Non-Bifurcated Experience

In a nutshell, Whitehead helps us rethink the status of human consciousness in HCI. While the phenomenologist brings in a bifurcation between the perceiving human mind, embodiment and experience in the actual world, a Whiteheadian adventure eschews theories that force such a bifurcation. The phenomenologist, for example, takes what is experienced in the actual world as the *here* and *now*. What is ready-in-hand, for instance, becomes a position in space and a point in time from which meanings can be constructed from what is present-in-hand. But this perception of the here and now of experience is, following Whitehead, an often misplaced abstraction of a far more complex relation to reality experienced through a concrete passage of events. For Whitehead then the data of experience are not in the mind. The actual world is not apprehended by the mind; on the contrary the mind is part of the passage of events in the actual world. Significantly though, it is not that mindfulness does not exist; evidently, it does, but the mind only has a “foothold” in experience rather than a “command post” (Stengers 2014, 67).

Whitehead was determined not to limit his philosophical outlook to theories that made such a bifurcation happen. He looked, as such, to develop new concepts of experience that are not exclusively the property of human perception, but rather inclusive and interlocked with the actual world humans are a part of. Of course, this is a complex task. It is necessary to, first, undo the subject predicated philosophies developed over epochs of human consciousness; to completely disengage from the solipsistic sense that humans are the masters of subjectivity when it comes to observing *real* material substances or the formulation of ideas that describe them. It also means overcoming the language games we have absorbed into our minds that explain our subjective experience of the real world in such limited ways. Second, and clearly

related to HCI, we need to challenge the rigidity of subject-object relations as the only way to think about the ontology of spatial interaction, and, third, Whitehead prompts us to move beyond purely spatial concepts of interaction to radically approach experience in terms of the passage of events.

Freeing Subjects and Objects from the Syntax Trap

The Whiteheadian adventure asks us to test the limits of language and redesign it in a similar way to which the tools of physics are intended to better probe the dynamics of the actual world. As Whitehead contends, language was designed to handle a static world and fails, as such, to express the dynamics of reality (Urban 1951, 304). For example, in his endeavour to refuse bifurcation Whitehead criticized the orthodox concept of “having an experience” of an object since it is erroneously determined by the mould of the subject-predicate. That is to say, the subject (the knower) is always *situated* by the experience of the object (the known). As Victor Lowe (1951, 106) argues, the subject-predicate mould is “stamped on the face of experience” so that the experient is the subject who is always qualified by the sensations of the objective world. This is how language traps experience in the unidirectional relation between the private subject and the public object.

Whitehead’s intervention into the trappings of language are of use to critical-HCI for two main reasons. Firstly, we see how the subject predicate trap is already at work in the research focus on situated interactions where, for example, it might be said that the user *experiences* the smooth ergonomics of the mouse so that the subject-user is situated by their experience of the public object. As a counterintuitive alternative, Whiteheadian subjects can be made into objects, and inversely, objects into subjects. The notion that objects can experience subjects, as is the case when a well-designed mouse experiences the hand of the user, should not perhaps be an entirely alien design concept in tangible computing or ergonomics. But, by drawing on Whitehead’s reinvention of terms like feeling, emotion, satisfaction and enjoyment theorists are able to develop effective ways to account for the relationalities of experience not yet adequately realized, so that it might be possible to conjure up a concept of the mouse *feeling* the warmth of the user’s hand. The subject does not simply know the object, but is provoked into knowing by the experience of the object. Furthermore, in the new IoT contexts of interaction a user who encounters an object can become the subject of interaction. It might be the case then, as Hayles (2009) similarly argues, that in twenty-first-

century media subject agency has ceded control to the technological object; that is to say, the binary divide between active, communicative subjects and passive, silent, fixed objects, no longer works. HCI researchers may also have to take into account objects that have become sociable (Mitew 2014), sidestepping human awareness or taking the place of humans altogether. Ultimately though, rethinking experience as neither predicated by subject nor object makes way for immanent relations in which subjective forces are not predetermined as the knowers of objects, but focus attention instead on the shifting relations in which each experiences the other.

Secondly, in Whitehead, we encounter a viable alternative to Heidegger's solution to Husserl's problematic concept of experience as locked inside the head wherein experience is said to be "the self-enjoyment of being one among many, and of being one arising out of the composition of the many." (Whitehead 1985, 145). This is not a self-satisfying moment in time beginning in the head, brain, mind or body. Experience may indeed be related to human activities of the brain, mind or body, but they cannot be decoupled from the interlocking relations of the actual world. As Whitehead (cited in Dewey 1951, 644. Emphasis added by Dewey) puts it:

[W]e cannot determine with what molecules the brain begins and the rest of the body ends. Further, we cannot tell with what molecules the body ends and the external world begins. The truth is that the brain is continuous with the body, and the body is continuous with the rest of the natural world. Human experience is an act of self-origination including the whole of nature, limited to the *perspective* of a focal region, located within the body, but not necessarily persisting in any fixed coordination with a definite part of the brain.

Clearly, this is not experience limited to any privileged sense organ (the brain or the sensation of a body), or indeed, a higher level of consciousness (the all-perceiving mind with the capacity for language). Although, Whitehead (1967, 78) concedes that human consciousness may well be an exhibit of the "most intense form of the plasticity of nature," there is no dichotomy between the human and what is experienced, and ultimately, in this nonbifurcated sense-making assemblage, *nature is closed to mind*.

Space is Interaction

As we will see below Whitehead fundamentally changes the concept of space by introducing a process philosophy in which it is the passage of events that is experienced. To be sure, early on in his so-called pre-speculative epistemological phase Whitehead sought to develop a relational theory intended to overturn the ancient Greek's notion of absolute space (Lowe 1951, 53-54). This nascent trajectory of the adventure begins with a mathematician's interest in overturning orthodox geometry. The problem for Whitehead is the geometric point! His relational theory of space thus notes how time is missing or constrained to points in the Euclidean geometric grid. He argues that things do not occur in points in space; points are not ultimate entities, but abstractions of complex durations. We need to therefore forget a concept of space defined as the place where we find bodies at certain fixed points in time, acting on each other. Indeed, interaction is not a property of space. Bodies are not in space because they interact. Space is, in itself, a certain kind of process of interaction. Interaction in space is not, as such, defined by one point effecting another, for example, the hand meeting the mouse, but is a *coming together* of a coherent population of interacting bodies into a *society of events*. It is this process of coming together, what Whitehead would go on to call *concrecence*, which requires attention and needs explaining as best we can (Lowe 1951, 104).

In critical-HCI we might start by redefining interaction as an *imminent relation* in which it is not points in time or space that are experienced, but durations. This again fundamentally changes the terms of third paradigm HCI research. Where the action is does not bring us to a location determined by the perceiving mind or indeed where a body interacts with a computer, but space itself is interaction. Here we can see how the first paradigm may well have been onto something that the second and third have gone on to ignore. Instead of concentrating on perceptive locations of interaction *in* space – i.e. the points in space where hands (and minds) meet the mouse – ergonomic experts engaged in capturing (and breaking down) computer tasks into discrete activities in time. Albeit an oversimplification of a passage of time lacking in the *thickness* required by Whitehead's theory of events (Stengers 2014, 52), the first paradigm ergonomic study of interaction is not limited to a notion of perception fixed to a geometric grid.

Like third paradigm HCI, the Whiteheadian adventure endeavours to escape from the same Cartesian structures that underpin the second cognitive paradigm. To do this Whitehead

borrowed from William James's concept of *pure experience* to make a contra-Cartesian move (Stengers 2014, 70). But we must first clearly distinguish here between the phenomenological contra-Cartesian position Dourish (2004, 127; 191) takes in *Where the Action Is* and Whitehead's event analysis. On one hand, Dourish (2004, vii) is critical of the cognitive paradigm's convention of grasping interaction through a mind-computer metaphor that seems to have lost its relation to a body. As we have seen, embodied interaction is not just information in the mind; it is also experienced in the hand. On the other hand though, Whitehead does not regard mind or body as the situation where interaction occurs, but rather draws attention to how both are composed in a passage of events. The "I" of the mind (and the body from which it seems to belong) does not determine who we are, since in the duration of events, both body and mind are swept up in the present before slipping into the past. So unlike Descartes dualism, the mind does not determine who we are. Again, this is not the command post of experience we find in the phenomenological matrix. To be sure, the mind always comes later! The experience does not therefore belong to the mind. The mind's perceptual judgements, as well as its apparent capacity for memory and attention, can only *testify* to the passage of events from its percipient foothold - in the duration of events (Stengers 2014, 75).

From an events perspective then we can begin to look at perception in a very different light from the phenomenological subject and her interaction with concrete objects in abstract points of time and space. Perception needs to be approached not by way of what is ready or present-in-hand, but by way of what is *in passage*; in what Whitehead calls a percipient event (Whitehead 2004, 107-08). So unlike the phenomenal mind that puts concrete objects to death because they are only *ready-to-hand* or miraculously brings them back to life since they are *here* right now and *present-at-hand*, in mental space, it is the event itself that becomes the concrete fact of experience. There would be no objects to perceive, no mindfulness of objects, without the passing of these concrete events. The object perceived is not therefore what is concrete or what brings about the abstractions of consciousness. Whiteheadian objects are not concrete substances from which abstract properties arise; on the contrary, objects are abstractions (Stengers 2014, 90-91). In an events analysis, it is not enough to say *here* is the mouse since it will be perceived in a complex array of abstract objects, including how it is sensed through a clicking noise even if it is not seen, as well as the

haptic physicality and perception of shape or even viewed under a microscope as a mass of molecules, and so on. Abstract objects are not experienced merely in the *now* either. They provide a uniqueness and continuity that presents the foothold the mind needs in the events that pass it by; *there is* the mouse and *there it is again!* It is not, as such, an object *in* a given space. It is a mouse-event or pattern of interaction that produces the subjective reality of the mouse. Ontologically, the mouse is not therefore hidden from consciousness, but it is *declared* in the percipient encounter with events (Stengers 2014, 46). To put this another way, it is not the abstract properties of the concrete object that declares the mouse, but rather the mouse is an abstract object perceived of in the unified concrescence of the events that declare it. The subject who perceives the mouse is not the author of the event, or indeed, the author of the many variations in mouse-events. But we must not simply replace subject/object with object/event relations. We need to think of interaction as a society or a nexus of events in passage that provide *ingression* to objects so that the object is expressed in the event and the event expressed in the object (Whitehead 2004, 144-52). As Stengers (2014, 52) puts it, every duration of an event “contains other durations and is contained in other durations.” This is the relational temporal thickness of Whitehead’s event that cannot be grasped in individual points in time or space. As follows, we need to recall that making the subject the author of this kind of mouse-event reintroduces bifurcation. The human mind (however exceptional its plasticity in nature) cannot experience the whole event. The subject does not decide on events (whether the mouse is here or not here), as such. The events decide the subject. The subject’s point of view (this percipient window on experience) belongs to an “impersonal web” of events (Stengers 2014, 65). To put it another way, events are not a privileged conscious point of view the user adopts. Users may well occupy the *here*, but it is their relation to the *now* that sweeps them up in a complex flow of events in which they might confuse the observational present for something that exceeds the mere foothold the mind has in all of this complexity.

To counter the phenomenal mind, which finds meaning in the symmetry of the *here* and *now* Whitehead introduces us to the asymmetry of the *here and now*. Yes, the percipient event locates us in the *here* but this *here* does not move in tandem with the *now*. The durational *now* scoops up the *here* producing infinite variation. It is indeed, as Stengers (2014, 67) points out, the *and* in the *here and now* that really matters in terms of meaning making. This

is what relates the asymmetrical sense of an observational present (the *here*) to the *now* in durational passage. This is Whitehead's *cogredience* (Whitehead 2004, 108-09), which would later be developed more fully in process philosophy as the vector-like concept of prehension.

Prehending HCI

The need for prehension begins with a problem regarding how humans confusingly perceive what's *here* with real things that are supposed to exist at a distance; as *there*. Prehension, according to Lowe (1951, 97), therefore provides the "thread" of process and reality. It is the vector that makes events into concrescent unities, and analyzable, as such. The prehension take us beyond the here and now of phenomenality by otherwise looking to how the *there* becomes the *here*. Unlike the idealist's answer to this problem wherein the abstraction of space by the mind results in a solipsistic subjective perception we find a production of reality in what is felt is always *becoming* (Whitehead 1985, 236-43): the past (objective datum – what is prehended) is alive and well in the present derivation (subjective form – how it is prehended). Prehensions thus provide a way of grasping how what is *there* becomes something *here*. In other words, a prehension is the relation established between events in which the past has a stake in the composition of what is new. Again, it is not simply the *here* and *now* (immediate present) that matters to Whitehead, but how prehension sweeps past events up into a unity (or nexus) in which something *there* becomes something *here* (causal efficacy). Following Whitehead's nonbifurcated event analysis then, the mouse cannot be said to be *in* or *out* of mind because the past (what is prehended as the mouse) is always in the now (this is how the mouse becomes a subjective form). In short, the mouse is experienced as a flow of events (a process) whereby the past event flows into the present event.

The use of prehension in critical HCI might also help researchers to go beyond Dourish's criticism of the second cognitive paradigm by not only radically inverting the notion that action in the world necessarily comes after concrete experiences of objects (the mouse) followed by an abstraction (the mouse in hand or mind), but also questioning the very concept of social context. Indeed, as Blackwell (2015) argues, much of the study of situated and embodied interaction misses the new technical landscape in which social context is engendered by machine learning systems. Machine learning operates on "'grounded' data,

and their 'cognition' is based wholly on information collected from the real world" (Blackwell, 2015). These systems directly interact with social context insofar as they collect data from social media, cookies and relational databases making the user experience increasingly *inferred* and akin to Toffler's forecast of a pre-programmed experience industry. For Blackwell, the critical issue at stake now is that by making humans into "data sources" in the service of machine learning systems, it is no longer simply a problem of grasping human cognition as situated in the machine, but instead we need to recognize the inhumane character of a 'cognition' emerging from a new technological context. Prehension can, as such, help us to reconceive of a user experience beyond the subjective relations of an Euclidean objective world of the here and now, by looking to a spatiotemporal concept of interaction defined by what is experienced *over there* (by a machine) becoming experienced *here* (by the human). These are concerns in critical HCI that considerably overlap with similar concerns in media theory.

Return to Experience Capitalism

[There has been] a shift in the economy of experience itself, a shift from a media system that addresses humans first and foremost to a system that registers the environmentality of the world itself, prior to, and without any necessary relation with, human affairs (Hansen 2015, 8).

Marc Hansen's use of Whitehead helps us to conclude this discussion with a seemingly different orientation of the problem concerning human experience in digital culture to that forwarded by phenomenological HCI. It is, ultimately, a post-phenomenological media theory which unashamedly backslides into the phenomenological human-centred territory it tries to escape, but, nonetheless, Hansen draws attention to the difficulties of developing a robust nonbifurcated analysis of experience capitalism. His argument is a complex one, the detail and fault lines of which cannot be fully unpacked here, but I want to focus for a moment on one conclusion Hansen makes concerning the human experience of twenty-first-century media; that is to say, that the current wave of digital media technology refuses human minds *access* to the kind of worldly experience the phenomenological matrix introduces. This is because, what Hansen (2015, 81) calls 'higher-order perceptual experiences' are no longer

implicated, he claims, in the making of the operational levels of digital culture, including data gathering and mining.

At first look, this may seem like a plausible explanation for what happens when capitalism, weaponized by the latest operations of digital technology, captures and commodifies experience. Nonetheless, what I argue here is that the notion of the loss of human experience in digital culture, suggested by Hansen, glosses over Whitehead's more profound and constraining concept of nonbifurcated actual experience - something Hansen (2015) reduces to this "worldly production of experience" in which the ontology of duration appears to be full of gaps and ruptures between human consciousness and technologically produced experience. As Greg Seigworth (2015) similarly argues in a recent talk:

Hansen opens an experiential gap or an interval between the body's perceptual apparatuses and the making of worldly sensibility (the latter can be done and *done more comprehensively* in Hansen's view by, say, technical machines of various sorts). But such a conception creates a rather troubling kind of ahistorical suspension or hiatus in any sense of what might be longer stretches of temporal continuity – durations persisting alongside any array of ruptures / gaps / delays – within the ontological itself.

To be sure, the experiential gap that Hansen offers up seems to break all the rules of Whiteheadian nonbifurcation. The point is that human experience is not increased or lessened; it is not a case of less or more consciousness in twenty-first-century media, or for that matter is experience something that can simply fall through an experiential gap. On the contrary, experience is generative in the circuitries of the capitalist economy, which records and patterns interactions as they occur in spatiotemporal occasions. Indeed, the experience of the there, and there it is again, mouse-event is transformed in pervasive digital media, but only in respect to the novel digital objects that now ingress with the thickness of durational passage.

Significantly, ubiquitous, always-on, big-time data gathering operations do capture *more* experience than a mere mouse click, but we have our media history confused if we think that there was ever a time when the human mind had a privileged status in media space. Hansan's account, like the phenomenological matrix, is reminiscent of the alien in Nicolas

Roeg's 1976 film *The Man Who Fell to Earth*, Thomas Newton, who can experience all of the events of the analogue media world into which he fell. Sitting in front of multiple TV screens Newton seems to inhabit the symmetry of the here and now. "Get out of my mind, all of you... Leave my mind alone, all of you. Stay where you belong!" he shouts at the screens. But humans are not aliens of this kind. We cannot detach our experiences of media objects (sensed or otherwise) from the entangled thickness of duration. We do not operate from such a command post! In other words, while it does seem to be the case that capitalism is, via large scale data gathering and machine learning, implicated in the processing of experience, it is important to stress that, so-called higher order human experiences are not bifurcated from Whitehead's actual experience, and therefore, rather than being cut out of the loop of actual experience, human experiences are instead captured in a complex maelstrom of eventful entanglements that confound notions of predicated subjective conscious experience and objective reality.

To conclude, a critical-HCI theory of experience capitalism should not be concerned with trying to wrestle back human consciousness from operational media; that is to say, putting the command post mind back into the loop between conscious interaction and the technological unconscious operations of data gathering. On the contrary, following a nonbifurcated line, we might need to admit to the impossibility of such a task and focus instead on the far more dystopic grip of experience capitalism in which the mere foothold of the mind in the durational thickness of events is captured in a twenty-first-century media circuitry. We may choose to ponder our asymmetrical experiences in this circuitry, but the most pressing critical issue, it would seem, is the extent to which capitalism experiences us! Although seemingly overlapping critical concerns from some quarters of HCI and media theory, this circuitry presents a very different politics of experience to those that are founded on a perceived loss of human judgement in the face of a new dehumanizing technological context. The power of experience capitalism, weaponized by data gathering and machine learning, is not to be found in the human's experiential exclusion from an inhumane world of inferred interaction. On the contrary, although there is more work to be carried out to fully grasp the folded nature of human computer interaction and its relation to experience capitalism, this is a power that seems to tap directly into the often improvised experiences and events in which subjectivity is produced. The power of experience capitalism is therefore

found in a capacity toprehend past events so that they become part of the composition of what is experienced as new.

Expand on experience capitalism - Something here on the convergence of current trends in HCI (see reviewer one) and media theory

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