The Polysemy of Human-Computer Interaction

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Abstract

This chapter provides exemplars of the influence of digital artifacts upon cultural experiences. We argue that the associations between people and artifacts, and specifically digital artifacts, is an increasingly dense, interwoven, and pivotal aspect of everyday cultural experience. Artifacts themselves resist any stability of meaning by being continuously disassembled and reassembled into newly meaningful assemblages. Digital artifacts extend this complexity by accelerating and extending cultural relationships both temporally and geographically, resulting in a wider range of potential and actual relationships in an expansive number of contexts. Through the connections that digital artifacts hold to people, there is a continuously fluid polysemous multivocality that incorporates the multiple and expansive parameters of power, meaning, and cultural knowledges. The human ability to alter and repurpose artifacts to suit immediate and shifting needs prevents any innate definitional quality from making a "table" a table or a "blog" a blog. Purpose and meaning of an artifact is continuously defined and then redefined between individuals and across time, beyond the reach of the original designers or manufacturers.

> *Things have thus become regarded as texts, structured sign systems whose relationship with each other and the social world is to be decoded. In various post-structural approaches to material forms, the metaphors of language, or discourse, and text have remained dominant in an understanding of things. The new emphasis here has been on polysemy, biographical, historical and cultural shifts in meaning, the active role or "agency" of things in constituting rather than reflecting social realities, power/knowledge relations and the poetics and politics of the process of interpretation itself, that we write things rather than somehow passively read off their meanings independently of our social and political location, values and interests.* (Tilley, 2002. p. 23)

1 Introduction

Within the polysemy of human interaction, artifacts play a key role in the construction of shared and persistent meaning. The variability of use, form, and purpose of artifacts and the lack of precision that exists in their relationship to individuals ensure that any meanings are necessarily fluid. The associations between people and artifacts, and specifically digital

artifacts, is an increasingly dense, interwoven, and pivotal aspect of cultural experience. Artifacts have always made this contribution to cultural logics and knowledges. Digitial artifacts, however, accelerate and extend these relationships both temporally and geographically, resulting in a wider range of relationships in an expansive number of contexts. Through the connections that digital artifacts hold to people, there is of a continuously fluid polysemous multivocality that incorporates multiple power, meaning, and cultural knowledges. The human ability to alter and repurpose artifacts to suit immediate and shifting needs prevents any innate definitional quality from making a "table" a table or a "blog" a blog. Purpose and meaning of an artifact is continuously defined and then redefined between individuals and across time, beyond the reach of the original designers and manufacturers.

As the use of information and communications technologies becomes ubiquitous in daily life, increased usage of technology alters how people initiate and engage in everyday social experiences. Premium examples of the influence of digital artifacts on cultural experience can readily be found with the advent of mobile social software, the uptake of YouTube as a mainstream media outlet, the importance of MySpace.com for (re)defining and extending social networks, and what is colloquially described as the "Internet of Things" as a gauge of contemporary technologies' existing social acceptability. Artifacts also resist any stability of meaning by being continuously disassembled and reassembled into newly meaningful assemblages. Our world is constructed by the human ability to alter and repurpose the meaning and understanding of things. We exist in a social soup of polysemous cultural meanings that are framed by objects, feelings, memories, meanings, and understandings. The digital artifact as an artifact and, as a continuation of these theoretical understandings, continuously alters human-computer interaction (HCI) and design. Within these relationships of people to things, digital artifacts that are over-designed at their point of creation decrease the use value of the technology itself and reduce the capability for these artifacts to respond and interactively communicate with those who use them.

2 The intellectual heritage of material culture

The exploration of artifacts is primarily informed by the intellectual heritage of material culture studies. Contemporary work of authors such as Buchli (2002), Miller (1991), Shanks & Hodder (1997), and Tilley (1989)—who themselves utilize the writings of postmodernists, critical theorists and feminists, among others—question traditional understanding of objects as inherently meaningful and meaning-stable entities. A consequence of this work is an extensive body of literature that communicates with contemporary debates regarding HCI and design that offers a critical and politically nuanced framework for interpretation.

The perceived lack of, and concern for the lack of, physical presence is a pivotal focus for the critical examination of digital artifacts in terms of their contribution to social and cultural experience. The close association of material culture studies with physical artifacts has also produced an intellectual reluctance to associate this body of work with digital culture. Oldenziel (1996, p. 65) questions the prerequisite of this focus by posing the question, "What is materiality in cyberspace?", to which she answers with another question and the implied claim that "Is it not more or less what semioticians have proposed for some time that things are not existent and meaningless unless a meaning has been ascribed to them through essentially linguistic processes?"

Material culture studies has a lengthy history that is primarily associated with collectors, archaeology, and the modernist project for knowing. Buchli (2002, p. 5) argues that the entire

super-category "material culture" was itself an intellectual invention that

> materializes something entirely new and uniquely Victorian and Western, as modern as the artifacts of industrialism on display at the Great Exposition of 1851 from which our more systematic nineteenth century collection of ethnographic material culture took their inspiration.

However, despite this heritage and the reluctance of researchers, material culture studies is not artifact obsessed, artifact bound, or reduced to the tallying of physical remains. Material culture studies has matured into a discipline that has as its central imperative to interpret cultural practice. This broad remit draws upon a wide-ranging collection of authors from many disciplines in the humanities and social sciences. More critically nuanced studies have introduced a tightly integrated understanding of artifacts in relation to the cultures that produce, consume, interpret (and discard) them (Miller, 1991). The critical turn in material culture studies posits an understanding that the cultural consumption of an artifact is not necessarily bound to its production or its original design purpose. Tilley (2002, p. 27) makes this observation in relation to discussions of gender in a Melanesian context when it was observed that this "is a way of thinking about the relationship between producers and their products centering upon *activity*. It is this that produces meanings and serves to gender both persons and artifacts." Action- or consumption-based perspectives allows material culture studies to break from the simplistic association of artifacts with archaeological provenance. Material culture is capable of examining *any* artifact in the broadest sense. Increased distancing from traditional archaeological contexts also enables the examination of artifacts to move beyond looking at only functional and tool-based items. Ultimately the flexibility provided by existing critical interpretation disconnects the assumption that physical presence is the central quality defining an artifact.

3 Digital artifacts and everyday life: Within or without?

With increased recognition for the ever-presence of the digital artifact, there is a significant and close relationship to mainstream culture. In this context, how a digital artifact is created, and by implication how it is designed, becomes an important aspect of the everyday and influences wider and wider ranges of individuals. *Digital* has become increasingly synonymous with those social experiences enabled through the mediations of information technology (Thrift, 1996, p. 1464). Popular emphasis upon the technology that enables navigation and access to the hegemonic and celebratory "computer world," however, belies its thoroughly social foundations (Sheridan & Zeltzer, 1997, p. 86). Technology-oriented presentations of the digital world, in the contemporary guise of cyberspace, the Internet, or the World Wide Web, have cast it as a panacea for the problems and experiences of reality (Graham, 1997, p. 41; cf. Stoll, 1995, pp. 10–11). IBM and Microsoft promote their tools as the key to globe-spanning successful commerce. In a similar vein some educational technologists predict the demise of the formal lecture theatre (cf. Stoll, 1995, p. 146). Although these claims solidify the digital world as a definable aspect of cultural practice and as a space for social experience, they do little to clarify any assumed or perceived distinction between "digital" and "human" life. At an immediate and sensory level the digital world is present in a somehow disembodied contrast to the "reality" of physical presence; however, precursors of this form of cultural experience can be located with radio listening and television viewing (Green, 1997, p. 59) and even the success of the UK's Open University. Disembodiment is the distinctive quality of social experience conducted within a digital

provenance. However, and of greater significance for the design and creation of digital artifacts, computer-mediated experience reflects and imitates the practices of real life (Whittle 1997, p. 12).

Regarding the Internet as an environment containing artifacts necessitates a critical and interpretative position regarding the artifact itself, both in cyberspace and in real life. Irrespective of any perceptions of immateriality, the Internet emphasizes artifacts, including those with a digital provenance, as culturally significant (Shanks & Hodder, 1997, p. 8). Artifactual research worldviews are distinct from "everything-as-text"-oriented interpretations. Gottdiener (1995, p. 22) claims

> the issue is not the relationship between the everyday meanings and social practice, but of articulating a philosophy of consciousness independent of social context. Such a position, although challenging to philosophy and the sciences that depend on textual interpretation, has limited value in the analysis of material culture.

If the digital is briefly considered beyond the scope of solely technological definitions, it is most consistently described as a social space without physicality. Thrift (1996, p. 1465) cites a range of conceptualizations of the digital that are all founded upon spatially orientated definitions. Lefebvre's *The Production of Space* (1991) is the starting point for many of these definitions. Lefebvre (1991, pp. 38–39) argues that social space cannot be directly equated with physical space. He also cautions against the "fetishisation" of this space in itself (1991, p. 90). "Itself the outcome of past actions, social space is what permits fresh actions to occur, while suggesting others and prohibiting yet others.... Social space implies a great diversity of knowledge" (Lefebvre, 1991, p. 73). The warning against fetishisation is particularly relevant as it endangers analysis, focusing upon a weak conceptual "wrapper" rather than the relationships of people to things. Wise (1997) reasserts the significance of Lefebvre's triadic conceptualization of space and the privilege of "representational space" within other discussions of social space. Nuanced understandings of social space, Wise (1997, p. 78) claims, prevent the technological contributions to the formation of spatial practice from being disentangled, in any meaningful way, from the symbolic representations of that space. These interrelated mediatory influences prevent discussion of the digital from descending into technological determinist arguments.

Defining the digital world within a critical framework does not discard the technology that mediates these cultural practices, but neither should these approaches be driven by the mere presence of this, or any other, specifically named technology. Technology is intertwined with other cultural phenomena and contributes to the particularity of the provenance in which cultural practices are found and shaped. The emphasis that has been placed upon computing technology should be assessed as a subjective claim that supports particular interest groups and, it could be claimed, particular interested corporations (Bereano, 1997, p. 27). Seeking and finding some form of distinct reality within the digital world attenuates the differences between the space being observed from the space in which the researcher is observing. However, placing primacy on the immediacy of experience in a single space—the fetishisation of space—potentially ignores the ways in which experience and understanding of cultural practices is always multilocational. Everyday life is simultaneously located in many spaces without specific qualification, and it would be a similar methodological nonsense to disentangle the experience(s) of space(s) inside a car parked in a shopping mall in a large city as it is to speak solely of a virtual space as an isolated cultural construction.

A variety of already possible Internet activities show that the experience of the everyday continually reaffirms the reality of the digital environment. These experiences include the significant stages of life such as marriage ceremonies, birth and funereal ceremonies, as well as malicious activities, such as stalking and rape (Silver, 2000, p. 22) and various forms of

consumption, including on-line shopping, gambling, and teaching and learning, as well as more mundane written and spoken communication. Experiences that cross between digital and physical space, by relating sites of cultural engagement to one another, further stress that multiple provenances of experience combine to reconfirm the intertwined reality of each space. An example of these intersections between digital experience and physical consequence is the early case of the cyberstalking of Jayne Hitchcock, now the president of Working to Halt Online Abuse (WHOA). During a 2-year period, the stalker spammed, sent e-mail floods, sent unwanted mail order goods, and had the FBI investigate her. Cynthia Armistead, in example of another of cyberstalking, experienced physical stalking, e-mail abuse, and the use of her name and email address for sex services. The significance of these incidents is the manner in which the specific qualities of multiple provenances of cultural practice (Geertz, 1973/1993, p. 22; Marcus, 1995) have been used to maximize the social impact on the victim. The experiences of Hitchcock and Armistead are increasingly mundane, normalized, and routine aspects of everyday life that are regularly reported, ever more briefly, in the media.

Technology and the design of artifacts are ever-present in the discussion of the digital artifact as part of the shifting transitional interface between physical and digital spaces. Information technology, through its constant presence and its observational absence, assists in affirming the reality and purpose of the digital. However, experience of the digital does not directly equate with the experience of any specific technology, software, or hardware, although this does impart distinct qualities onto that particular representation of space (Lefebvre 1991, p. 38).

Analysis of digital artifacts tends to bind analysis to a specific provenance. The abundance of articles that discuss Web pages and Web sites as the meaningful level of study indicates the appeal for this form of analysis (e.g., Cronin, 1998; Rich, 1998; Sclafane, 1998; Smith 1998). Investigation of specific Web pages endangers the disentangling a digital object from its wider assemblage of cultural and social relations, including other Web pages, for which it is presumed to be a singularly meaningful and interpretable thing. In effect, the analysis of a particular artifact as an isolated object tends towards the effacement of its relationship to the experiences of everyday life and contextualizes it solely as an artifact of technology (Wakeford, 2000, p. 35). One example of over-design and the obliteration of everyday life from examination of the Web is the insistence on top-down considerations for Web sites that ignore search engines, bookmarks, or even human memory. The object of this seemingly neutral technology is then privileged with the "voice" and powerful hegemonic weight of information technology and the biased status of data. As a consequence the cultural meanings that remain to be interpreted from this object are primarily mediated through the wider metameanings attached to the general technology itself rather than the contextualized and specific mediation of everyday use and experience. While examination of individual objects, such as Web pages, is an important avenue for analysis, it cannot become the focus of all analysis, as the tendency will be towards the over-design of artifacts or actions with a digital provenance. Such an approach, applied more widely, would necessitate, for example, every discussion of the telephone to be prefaced with a discussion of telephony, and media studies would be required to speculate on the qualities, nature and meaning of the cathode ray tube and radio frequency propagation.

4 Cultural Artifact—Digital Provenance

The artifact is a culturally meaning-laden "thing." However, discussion of the artifact inevitably conflates it with its physical qualities as an apparently coherent, necessary, and

synonymous relationship (Miller, 1991, p. 31). A physical thing that is "meaningful" is always an artifact (cf. Shanks & Hodder, 1997, p. 17). However, discussions that commence with the interpretation of artifactual meanings and design are not bound to any specific material form.

The reference of a digital object to a physical analogy is unnecessary when the Internet has become such a dominant and mainstream site of cultural activity in postindustrial societies (Touraine, 1974, p. 116). Gadamer (1989, pp. 242–254), however, suggests that without a fusion of horizons there can be no communication between parties, in this case among a variety of provenances. For the user undertaking an everyday interpretation of artifacts that is fully immersed in the spaces of the Internet, the awareness and sense of the artifact, and a desire for them, is integral to the current location and environment. The intellectual contradictions between physical and digital artifacts are a political conflict in the broadest sense.

While meaning is generally perceived to shift around the anchorage of an artifact's physical qualities, its various qualities, including its design, provide different forms of meaning-stabilizing anchorages (Miller, 1991, p. 116; Miller & Slater, 2000). However, none of these anchorage points are individually stable entities; they are all, along with the artifact itself, the product of shifting social and cultural forces (cf. Miller, 1991, pp. 126–127). The anchorage of style, in all its indefiniteness, is an important quality for many forms of artifacts (Lemonnier 1993, p. 11). For example, the continually changing form of domestic motor vehicles is tied to a range of qualities including prestige, style, economic imperatives, and, consequently, petrol consumption, and engine size.

The tendency to intellectually anchor the artifact to physical qualities emphasizes its original design as the point where particular sets of meanings were made stable (Miller, 1991, p. 3). However, some qualities of the artifact must precede its creation and many others are recrafted after its creation. The tools that aid creation of an artifact also reveal the close interrelationship of artifacts with one another. The very specific utility of woodworking tools, such as planes, shapers, and chisels, is one example of how particular artifacts are not designed in isolation without some understanding of future provenance, desire, or need for the artifacts that they will create. In these tools, qualities such as utility and the raw materials become aspects of the design of the artifact that is created. While there is a need for pre-existing artifacts to craft the indefinite but necessary environment for new artifacts to come into existence, after design and manufacture of an artifact, the relationship of specific qualities to an intended meaning may hold only fleeting association that does not persist through space, time, or across cultures. The further the object is separated from its time and place of original design, the wider the range of potential meanings that will become ascribed to it. Distance, acquired through temporal or spatial separation, is the most effective means of increasing the polysemous qualities of the artifact (Shanks & Hodder, 1997, p. 9).

The increased fluidity of cultural meanings that crafts an artifact's qualities is a hallmark of postindustrial culture (Smart, 1992, pp. 52 & 143; Touraine, 1974). This fluidity is reflected in the relationship of the ideational and physical within contemporary culture as a politically negotiated position. Baudrillard (1981/1994, p. 19) takes this negotiation to an extreme with his claim that, "the impossibility of rediscovering an absolute level of the real is of the same order as the impossibility of staging illusion. Illusion is no longer possible, because the real is no longer possible."

Baudrillard's theorization of the "real" and illusion enable their negotiation to be considered in the postdesign context, and by implication the digital, effectively rendering the physical a nonessential quality of the artifact. Another example, which also suggests that artifacts are not the consequence of any fixed or measured amount of design, comes from archaeology. The materials extracted from archaeological digs again become artifactual

through the ascriptions offered of them by archaeologists seen through significant cultural and temporal distance (Hodder, 1989, p. 67). The interpreted artifacts of archaeology possess a complex provenance. The already debatable nature of meaning possessed by artifacts is further problematized by archaeology; the "real" meanings ascribed to the artifact at its creation are distanced from the "imagined" meanings ascribed by archaeologists (Lemonnier, 1993).

Artifacts evoke particular understandings of the culture(s) that they exist within. An artifact can only be designed or understood by being considered in situ and in relation to the other artifacts of that space (Miller, 1991, pp. 109–11; Shanks & Hodder, 1997, p. 11). And even in this context, Aunger (2006, p. 724) observes, "not all social messages are equally attended to or adopted by their receivers." The contextual environment constructs an expectation for the artifact and, in turn, the artifact crafts an expectation for the space. This reciprocation connects artifacts and meanings, creating a normality. The expectation and even desire for normality provides a key anchorage around the meaning of an artifact in this association with a particular meaning or set of meanings.

Everyday artifacts are positioned within existing power structures. The paucity in the range of interpretations that are available is a consequence of their persistence within the mundane. Their interpretation is similarly a consequence of the particular power relations that act upon the artifact. Our claim is that the limited range of interpretations applicable to a fork is closely related to the extent that the fork is bound, through its mundaneness, within a dense system of social and artifactual relationships. With the example of the fork, it is bound to other apparently mundane items with an intensity that almost prohibits conceptualizing (within contemporary Western culture) without an understanding of a knife. This stable microsystem frames and supports wider parameters of power including, for example, the understanding of dinnertime etiquette. The conflation of physical qualities of the fork with the concept of the artifact called "fork" restricts which artifacts can possess "forkness." The artifact is restricted by these boundaries of meaning but in continually different ways. These limitations are not inherent in the artifact itself but develop through the mediation of contemporary social and cultural relations and the manner by which artifacts are perceived. Tilley (1989, p. 191) says, "an object, any object, has no ultimate or unitary meaning that can be held to exhaust it."

The example of the fork reinforces the deceptiveness of designing and understanding an artifact primarily through its physical qualities. The fork's functional simplicity, as a fork, is a designed simplicity crafted over a lengthy period that reveals the currently received physical forms of the artifact. None of this heritage can be understood, seen, or needs to be seen through direct, uncritical, or untheorized observation. In this way, the fork represents a near-ultimate form in terms of its interface and design.

Defining the artifact as a product of culture that agglomerates various qualities provides the opportunity for understanding future design in HCI. The cautionary aspect of these claims is that the digital artifact is very much a product of its time. Without the influence of debates about cyberspace, the virtual, and the Web, the suggestion that the immaterial and digital can equally be considered artifactual would be seen as esoteric, eccentric, or verging on the theological.

Materiality is one of the qualities particularly ascribed to the artifact, and is sometimes insisted upon as the most significant quality of an artifact (Buchli, 1995, p. 189; Miller, 1991, p. 3). The conflating of the artifact to a particular set of physical qualities can be questioned in the light of a usable and accessible cyberspace that extends beyond the capabilities of unmediated, immediate, and personal exchange. The digital artifact also breaks down the apparent logic for the binarism and separation of symbolism and materiality (Buchli, 1995, p. 186). Seeing the artifact as an artifact allows the textual position to be discarded for an

understanding in which the artifact is placed in a direct relationship to human agency (Thomas, 1997, p. 211). This position, with an insistence upon the need for a confirmed and personally affirmed physical reality, leads, potentially, to the argument that, for example, an artifact must be visible (Criado, 1997, p. 198), or touched, to be interpreted. This complexity ensures that there is never, and can never be, a raw articulation or clean sense of meaning (Riceour, 1981), but rather a conceptual and experiential polysemous soup filled with related tendencies, possibilities, and oppositions.

Archaeologists infer the presence of absent artifacts from surrounding objects and spatial relationships. The conventional archaeological record, too, only returns a selection of objects through the combined consequences of time and provenance and as a reflection of the relationships of social power in that and subsequent periods of time (Pearson, 1997). Digital artifacts provide denser strata but can only be partially representative of the prevailing social and cultural relations found on-line. The online journal *Slate* summarizes the representational nature of the Internet by claiming that "to archive the Internet with absolute fidelity would require cloning not only every computer on the Internet, but also every person using every computer" (Barnes, 1997, p. 2). Baudrillard's (1981/1994, pp. 1–2) more general observations regarding simulation extends this point:

> The territory no longer precedes the map, nor does it survive it. It is nevertheless the map that precedes the territory...today it is the territory whose shreds slowly rot across the extent of the map.... But it is no longer a question of either maps or territories. Something has disappeared, the sovereign difference, between one and the other, that constituted the charm of abstraction.

5 Designing artifacts

Attempting to identify and design an artifact on an interpretative plane within the shifting versions of reality and in relation to the contemporary culture is a fraught task. We utilize the term *artifact* in the conventionally received sense as "the product of human action" (Richardson, 1974, pp. 4–5). However, what requires re-examination in light of the significance of HCI and the Web are the acts and actions that are understood to produce the artifact. More widely, it is the interrelationship of artifacts and humans within particular environmental contexts that contribute to each other's definition. It is in the constant reconfiguration and shifting interrelationships between people and artifacts—what is described elsewhere as culture—that produces an understanding of the artifact and an understanding of ourselves. The indefinite, problematic, and variously defined culture assumes a particular reality when it is perceived through artifacts (Soja, 1989, p. 79). Seeking the product of human action on the Web necessitates understanding the artifact as the result of particular intersecting cultural relationships. An artifact is an artifact because humans define it (Hides. 1997, p. 11).

Artifacts move with varying relationships of intensity to the constantly dynamic cycles of social and cultural interpretation and misinterpretation. "Artifactuality," as the collection of an artifact's qualities, operates as a single unified signifier for an arrangement of social relationships (Miller, 1991, p. 13). Most significantly, archaeology deals initially with the qualities of the artifact in order to proceed to an interpretation of the social and cultural conditions in which the artifact was originally ascribed meanings (Buchli, 1995, p. 189; Tilley, 1989, p. 191).

Artifacts are products of human manufacture that have persistence beyond and outside individual subjectivity and are not bound to a specific subject's immediate experience (Richardson, 1974, p. 4). Artifacts have fixed qualities that allow at least minimal

interpretation over extended periods of time, irrespective of spatial separation or their alienation from their designer. Miller (1991, pp. 61–62), by drawing upon the intellectual tradition of Munn, identifies the persistence of meaning over significant spatial difference with the canoes of the Kula. What is being portrayed here is a concern with the creation of an object in which social relations are implicated, but which will ultimately be delivered up for the use of other people, by being launched into the Kula Ring. This is an example of the problem of alienation: Certain conditions serve to separate the creators from the object of their creative processes.

It is worth considering the extreme positions in these discussions of the artifact. For the realist, the artifact is "there" telling "us" about the cultural life paths of "others" (Hides, 1997, p. 13). A constructivist position, in contrast, suggests that the artifact tells "us" about "ourselves" through our interpretation of the artifact; it is an act of autobiography revealed by our imparting of particular meanings onto its presence (Baudrillard, 1970/1996, p. 105; Buchli, 1995). The distinction between the interpretations of the anthropologist from the generally more casual observations of the nonanthropologist can be contrasted in a similar manner. To extrapolate cultural life paths from an artifact requires a range of knowledges that cannot be automatically inferred from the examination of an artifact's observable qualities. To achieve this form of interpretation requires the privilege, legitimacy and, probably, training of an anthropologist and the theoretical perspective of the "realist." In contrast, interpreting the artifact as an act of autobiography, in relation to one's own subjectivity, imitates more anticipated everyday processes of interpretation, ascription, and meaning making in relation to an artifact. The artifact can be considered by its various qualities, such as utility and aesthetic appeal, the social status it imparts, its value or comparative rarity in relation to the social experiences, and motivations of those who engage with it (Buchli, 1995, p. 190).

6 Spimes and the Internet of Things: An artifactual conundrum?

"Spimes" and the Internet of Things are labels for what is currently a primarily conceptual understanding of the evolution of the Internet and of objects more broadly. However, they are significant for this discussion as the consolidation of a series of technological developments and technologist understandings of the contemporary and future artifact-filled world. These things also represent the "next step" in the increasingly blurred distinction between physical and digital artifacts to the point that the need or purpose of the division is effectively effaced.

Spimes are conceptual objects introduced by Bruce Sterling at SIGGRAPH 2004 and through his book, *Shaping Things* (2005). Spimes are most simply defined as "noisy objects." (Sterling, 2005, p. 11). More specifically a spime is a physical object that is uniquely identifiable and is aware of its location and current environment. Spimes are conventional everyday objects that are enhanced with the capacity to systematically receive and send data. The spime-object collects and throws out to its surrounding environment vast amounts of data that could be collected and utilized. What is generally implied rather than explicitly defined in Sterling's definition is that the noise of a spime is collected and transmitted in a digital rather than analog format. Sterling can imply this format, as it is clearly the intention in his discussion. This implied assumption leads to the somewhat erroneous belief that the concept of the noisy object is a new and as-yet conceptual thing when it is merely the digital spime that is yet to become available. However, as we have already outlined, the distinction of physical and digital has increasingly become a meaningless and flaccid distinction.

We are already surrounded by albeit less smart and analog spimes in the form of existing physical objects: the fork, the knife, and other mundane objects. The imprecision of the

relationship between humans and artifacts is a consequence of the continuously fluid and analog format with which we interact. As straightforward examples of this phenomenon, the multiple meanings conveyed through the printed word provides us with only partial understanding when we read the words on a cereal packet while, similarly, the patina of age on an antique can only partially reflect the environments that it has passed through. Noisy analog data, in the form of conveyed meanings, associations, and context from these old spimes is ever-present but never wholly or permanently captured. More formal analysis and interpretation of the variety of meanings transmitted by analog spimes has been the preserve, as we have already indicated, of material culture studies. The day-to-day interpretation of these same objects is what we do everyday. The digital spime does not alter the already theorized or everyday human relationships with artifacts, although it is possible for suitably specified technology to capture quantitative data from the spime. This transfer of data defers the human relationship with the original spime to become mediated through yet another artifact: digital, physical, or physical with digital capabilities (i.e., another spime). The human–artifact relationship remains firmly positioned as an interpreted mediated negotiation of polysemy through previous human experience and knowledge and the locational, environmental, and relational context of the artifact itself.

7 The polysemous soup of digital artifacts: Design or anti-design?

The Internet of Things provides the technical capacity to make the linkage between physical artifacts (generally well-theorized things) and specific digital artifacts (poorly-theorized things). A reflection of the determinism that surrounds the technological bias for this development is the degree with which the Internet of Things has been conducted with little social critique and, instead, has been expressed as a series of capabilities or actions that exist largely *in potentia*. Irrespective of their provenance, things are defined and made meaningful by people. Consequently designing and defining future artifacts is an act shaped by previous cultural experience, knowledge, and experience with other things. Pivotal to this debate and the relationship of people with artifacts is Sterling's (2005, p. 11) introduction of the concept of the spime, an object that is entirely trackable during its entire lifetime, which is a concept completely alien to material culture theory and a concept of the object that is readily critiqued.

As elements of the digital impact upon different aspects of everyday life and cultural activity, it becomes increasingly less useful to focus on understanding, and therefore to design around presumed differences between digital and physical realities. Instead, a more specific mode of analysis is required that reconnects spaces of connected cultural activity. Culturally aware approaches de-emphasize technologically determined discussions of contemporary digital spaces in toto and advocate a relative approach in which research is conducted with observation *in* the digital rather than *of* the digital.

The immediate problem for conducting critical digital research is to deliver a position that acknowledges a digital provenance of experience without automatically affirming the simplistic observation that everything digital is not real or physical. The social sciences have expended considerable effort tackling ontological issues regarding reality through works that have entered the sociological canon, such as those of Berger and Luckmann (1966), Arbib and Hesse (1986), and Foucault (1973/1983). These analyses suggest that the assignment of quantities of "reality" to social phenomena is illusory; similarly, the digital world cannot be dismissed or disregarded solely because it lacks corporeality. "Space is social morphology: it is to lived experience what form itself is to the living organism, and just as intimately bound up with function and structure" (Lefebvre. 1991, p. 94). The boundaries to experience in the

digital world are the consequence of the complexities of a specific provenance and not because the digital world somehow lacks reality: The virtual is equally capable of producing cultural "truths," meaning, and engagement.

8 Conclusion

Successful artifacts are notorious for resisting the application of design. The "best" artifacts are those that have evolved, been extensively used, and (re)adapted. The example of the fork (or open source software) is pertinent. Rapid and participatory development and change is preferable to individual design. The individual social understanding offered by a single designer cannot be compared to the collective weight of social understanding that many users provide and increasingly willingly offer. Identifying the key features of an artifact and designing solely for those features present the danger of designing for desire rather than for greater social need or purpose. This approach takes the route of the "best" inventors— Edison's commercial knowledge prevailed over Tesla's ability as an inventor. The result of this example is a Western world left with a commercially successful but inefficient series of artifacts that were willingly adopted and accepted on criteria other than design alone.

The polysemy of human experience and human relationship to artifacts ensures that there is no ultimate or obvious adoption of the best artifacts, whatever that may mean. Designers can adopt and absorb this understanding by becoming part of a participatory process that incorporates feedback loops directly into the design process. The digital artifact is not burdened by the conventional process of manufacture and the ultimate commitment that conventional production implies. Digital artifacts can be created, tried, tested, and discarded within a timeframe measured in hours rather than months. However, this flexibility and rapidity must parallel concurrent understanding that some design (and some things) must simply be discarded, as rapidly and as willingly as they can be created.

This is not a position that advocates anarchy or a complete disregard for design. We are making the argument for design processes that develop artifacts within the social and cultural environment where they will be utilized. In other words, designers of digital artifacts need to exploit the participatory, generally adept, and critical environment that Internet and Web technologies have increasingly supported.

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