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# Personal Inventories: Toward Durable Human-Product Relationships

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**Abstract**

In this paper, I build on perspectives in Human-Computer Interaction (HCI) and design literature to develop a theoretical lens to conduct personal inventories of human-product relationships within the home. I describe an ongoing empirical study examining participants' attitudes toward and relationships with interactive technology, and frame this research within the nascent and growing literature in HCI on environmental sustainability. I will present early findings from this study and discuss how these implications can inform potential future design practice within the HCI community.

**Keywords**

Sustainability, interaction design, material aesthetics, reflective design, value-sensitive design

**ACM Classification Keywords**

H5.m. [Information interfaces and presentation (e.g., HCI)]: Miscellaneous. J.7. [Computers in other systems]: Consumer Products.

**Introduction**

Design is poised to aid humans in bringing material order and existence to their desires, ideals, and values, and ultimately generate more preferable ways of being in and with the world [8]. However, the effects of design are never transparent nor neutral, but rather complex, systemic, and enduring. Each new birth of design in the world potentially produces a series of

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unintended consequences [9]. In this way, design affects populations and environments that it is not directly intended for. Building on previous discussions in HCI & design [1, 4, 7, 8, 9], I argue it is imperative interaction designers intentionally consider the possible far-reaching consequences resulting from their actions.

To gauge the necessity for an intentional approach to design, one need look no further than the current state of the earth's biosphere. Since the industrial revolution carbon dioxide levels have steadily risen in our atmosphere, a trend linked with global warming that is predicted to continue [6]. While it is widely known that our planet's resources are limited, it is less widely publicized that an increasing amount of today's waste is electronics related. In particular, interactive technologies have short product lifetimes and are perceived to quickly lose value [5]. Among other things, this product lifecycle results in a high contribution of toxic materials to the waste stream, disposal workers' exposure to chemicals known to produce health hazards, and ultimately the ongoing hasty consumption and disposal of electronics [5].

In this light, I argue it is essential that designers of interactive technology develop new ways to extend the longevity of digital artifice. Moreover, recent arguments have suggested that the perspective of sustainability ought to be the central focus of interaction design [1]. However, there is little empirical research from a design perspective exploring the particular qualities contributing to some products' durable, winsome character and others' unwholesomely disposable nature. What knowledge ought to inform the design of future interactive products more likely to result in long-term human attachment? In what follows I (i) offer a

brief review of pertinent perspectives in HCI and design literature, (ii) describe an ongoing study examining human-product relationships in the domestic domain, (iii) discuss initial findings and implications, and (iv) conclude with future directions of this research.

## Background

### *Ensolement & Material Aesthetics*

In [8], Nelson & Stolterman discuss the notion of *ensolement*, which is characterized by the relationship that emerges when "the meaning and value of a design is taken in as a feeling of being deeply moved and as consequence, a feeling of being significantly changed" [8]:269. In short, *ensolement* refers to the deep appreciation of a product's essential quality and character as it is involved in one's life. The expression *ensolement* can be problematic as an English word in terms of the complex concept it aims to represent. However, in the context of this paper, it is a useful label to discuss deeper issues relating to participants' orientations toward particular devices encountered in this study. The initial empirical research discussed in the following section of this paper explores the core assumption that if products become ensouled, humans will be more prone to develop meaningful relationships and care for these products over time. However, from the point of design theory, the question remains: what principles should guide designers to develop interactive products more likely to become ensouled and deeply worthwhile?

In asserting a perspective on the material aesthetics of culturally enduring products, Peter Paul Verbeek proposes the design criteria of *transparency* and *engagement* [13]. *Transparency* is characterized by the notion that a product's functionality should be



**Figure 1.** Design choices solve old problems, while producing new ones.



**Figure 2.** Poor quality construction prevents long term relationships.

understandable and accessible, making “it possible for people to become involved with products as material entities.” [13]:227. The concept of *engagement* calls for products to be more dependent on human operation, rather than less. Additionally, this notion suggests devices be integrated into everyday life in more involving and alluring ways. Collectively, this perspective proposes, “if products are to be designed to encourage attachment, it is necessary to design them so that humans deal with the products *themselves* and not only with what they do or signify” [13]:232. By virtue of transparent and engaging interactions, it appears more likely that meaningful human-product relationships will emerge and be sustained over time. Similar to ethnical and critical approaches in HCI [4, 11, 12], at its core, the material aesthetics perspective reflects values of user autonomy and self-determination.

Products designed for humans to fluidly understand, use, and appropriate them into their everyday lives creates an engaging space of possibilities where users develop a deeper sense of a product’s role in their life and, consequently, how their life relates to the product. It is in this co-shaping process that values of self-determination are reinforced and worthwhile relationships are developed. Over time, humans may develop a sensibility for taking care of worthwhile products as they age and change with them. In what immediately follows, these combined perspectives form the theoretical lens for the initial empirical study aiming to explore and unfold (i) the nature of human-products relationships within the home, (ii) the particular qualities and circumstances contributing to ensouled designs, and (iii) how this collective knowledge can be

made accessible to guide future research and practice within HCI.

### Ongoing Personal Inventories Study

As focus in HCI and design communities continue to move from the office and toward contexts of everyday life, the domestic domain has emerged as a key area of interest. This ongoing study aims to collect, categorize, and describe the individual personal inventories of domestic interactive and other technologies in a systemic way. Building on earlier empirical research [2], this study aims to examine things and how they mediate between people and the world. Investigations into the intimate material ecologies characterizing the domestic domain provide a deeply nuanced look at how things shape human behavior and the nature of relationships that form among humans and products. Previous research involving domestic symbols and identity construction [3] as well as multi-sited ethnographic inquires with heavy emphasis on design opportunities [10, 14] form this study’s methodological foundation. During the course of in-home contextual interviews, various questions were posed to probe participants’ reflections on their most liked and disliked things and the reasons behind these attitudes.

Participants in this initial personal inventories study ranged in age from early 20’s to late 50’s. While several households have taken part in this study (n=8), responses from two participants (referred to as P1 & P2 respectively) are presented in this section to highlight noteworthy findings. When prompted with questions about their most loved or disliked objects, participants provided a range of responses relating to functionality, quality of construction, enjoyment, and context-of-use. Figure 1 displays a series of pepper grinders belonging



**Figure 3.** The crank powered flashlight offers potential to extend attachment to other devices.

to P1 that vary in material and technological complexity. The two leftmost grinders operate manually and had been in P1's possession for the longest, however she was unable to use them due to arthritis in her wrists. While the two rightmost devices automate the grinding procedure, they required complicated loading tasks, rendering them equally unusable. In this instance, objects embedding the materials and processes of technological automation provided the disabled participant with increased autonomy to engage in a once common practice. Nonetheless, unanticipated problems restricted this newfound independence, ultimately resulting in the purchase of a second electronic grinder with comparable problems.

Figure 2 illustrates a collection of nine of vacuum cleaners or cleaning devices owned by P1. While these devices provided various levels of specialized functionality, the participant was largely disappointed with their material quality. As a result, the vacuum boxed in the background was intentionally purchased to be a replacement for the medium-sized cleaners, which routinely break and are disposed of. The poor quality construction of these vacuum cleaners prevents the participant from engaging with them in any way other than a means to an end. In other words, the vacuums are viewed as the means through which cleaning is achieved, rather than things with their own particularities that change over time. The participant did have an endearing connection with the small black cleaner featured in the foreground, which reminded her of the variety of environments she has lived in with it over the years. In this case, longevity of use, rather than visual aesthetics, contributed to the participant's deeper attachment to the device over time.



**Figure 4.** The music box is an ensouled heirloom tying to previous contexts of use.

A collection of flashlights ranging in age and type of power supply are presented in figure 3. While the participant rarely uses flashlights in her everyday life, she continues to purchase new models in search of the "best" device. Three of the five flashlights featured in this photograph are manually powered and renewable energy capability appeared to be the core criterion to contend for the "best." While the yellow manually powered flashlight had been in her possession for twenty five years and tied to a long history, the participant was most strongly attached to her recently purchased crank-powered flashlight (featured in the center of the photograph). The participant found this device easiest to interact with and it provided additional functionality capable of charging household members' cell phones. The nature of the interaction with this device was shaped by the potential to fluidly produce the power for the product itself. The participant directly interacted and connected with the flashlight as a material entity and, in turn, extended this connection to digital devices in need of charging that were common to the local material ecology. In this case, engaging interactions completely dependent on human operation resulted in deeper product attachment, as opposed to previous contexts of use.

The nineteenth century music box (figure 4) is an exemplary ensouled object, evoking rich melodies, while stimulating participants' memories of family members in times past. The music box was a gift from P2's grandfather and it was regarded as his most loved object. P2 also was delighted that the music box required no electricity, instead running on a manually operated crank. P2 described a similar deep attachment to his vintage audio equipment (figure 5), noting the long lasting quality of construction, tangible and



**Figure 5.** This vintage audio equipment was ensouled through personal care over time.

intuitive interface, and, more generally, a long history of personal experiences tied to fixing these devices. The participant viewed the antique music box as a classic family heirloom, however, through his direct interaction and care for the vintage audio equipment over time, it too had become an heirloom object deeply endowed with meaning.

### Findings & Implications

This research reports initial findings from an ongoing study and significant trends are noticeably emerging. Products that participants found deeply meaningful tended to tie to dense experiential histories of use or, in the case of the crank-powered flashlight, short-term integrated sensorial and material interactions. The initial observations and analyses of personal inventory data as well as the theoretical lens discussed in this paper are foundational to the proposals in this section. The following implications are aimed at informing future interaction design practice and facilitating potentially more meaningful human-product interactions and relationships.

*Openness*—Humans engage in everyday design activities to produce more preferable states of reality in their daily lives, which is primarily achieved through reflective and creative use of common objects [14]. The design of domestic interactive devices ought to be more open to humans creatively transforming and integrating them within their local material ecologies, rather than instituting uniform productions [12]. This may contribute to designs that integrate technology in more unique and alluring ways. Furthermore, this perspective promotes quality, maintenance, and creativity over shifting trends in consumer culture that often result in premature obsolescence.

*Cultivating Engagement in the Material Ecology*—Devices such as the crank-power flashlight engage participants in sensorial experiences as they directly interact with the core means through which a product achieves its functionality. In this example, P1 utilized the crank flashlight’s power producing capability to charge other household items—projecting the experience of powering a technological device through intentional determination onto another digital product common to the local material ecology. The manually produced electricity powers other devices and, in doing so, endows them with meaning. This type of interaction models a nurturing practice that may lead to the conscious consideration and care for products over time—potentially increasing the longevity of devices that are often prematurely disposed of.

*Augmentation*—The typical domestic setting is overrun with technological devices, each with a particular interface and instructions for use. Domestic culture is characterized by familiar routines, interactions, and practices. Interactive technology design should build off of already existing familiar practices that harmonize with activities and aesthetics of interaction within the domestic domain. Moreover, new ways to augment already existing domestic objects with new functionality should be explored, as opposed to introducing entirely new devices. Subtly integrating dynamic information or computation into commonplace objects may provoke increased awareness of objects in one’s life and, in turn, facilitate more longterm attachment and care.

### Conclusion & Future Directions

This ongoing study aims to better understand the nature of human-product relationships in the home,

with an eye toward how objects become ensouled. Moreover, this study aims to generate concrete design knowledge promoting longevity of use via more meaningful interactive product experience. In this paper, I have reviewed the theoretical origins inspiring this study, discussed early empirical research into domestic personal inventories, and proposed implications for design based on initial findings.

This ongoing study will continue to (i) examine the nature of human-product relationships within the home, (ii) explore the space of relationships and interactions among objects in local material ecologies and (iii) refine the methodology for conducting personal inventories. The overarching goal of this study aims to develop empirical knowledge capable of informing the design of future, potentially more enduring domestic interactive technology. Furthermore, this research aims to advance from a design perspective discourse on environmental sustainability in HCI and, ultimately, contribute to a more meaningful material culture.

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