

# ENSOULMENT AND SUSTAINABLE INTERACTION DESIGN

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## ABSTRACT:

This paper considers the concept of ensoulment in relation to the design principle of promoting quality & equality within Sustainable Interaction Design (SID). The design-theoretic origins and implications are discussed and the background needed to understand this concept and principle are stated. Appropriate design research methods are discussed. Parts of a completed survey are described and initial findings from an ongoing elicitation study for collecting personal inventories is also presented. The implications of the survey and elicitation study for larger scale design research are described, with an eye towards future research.

## 1. INTRODUCTION

The emergent trend under study is the linking of concerns about sustainability—environmental sustainability in particular—within the theory and practice of design with the

materials of interactive, information technologies known as interaction design. Sustainability has been a key issue in many design venues; nonetheless, its importance within the arena of interaction design—also known as Human-Computer Interaction (HCI)—is a recent concern. This paper focuses on the concept of *ensoulment* and the principle of *promoting quality & equality* as catalysts to sustainable behaviors.

In Nelson & Stolterman (2003), the notion of “ensoulment” is introduced as a superlative to notions of “quality” and “qualities” as metrics of design success. In Blevis (2006; 2007), a design principle called “promoting quality & equality” is proposed as one of several principles targeted at bringing notions of sustainability—environmental sustainability in particular—to the arena of design in the context of human-computer interaction (HCI). In this paper, we consider the interplay between notions of “ensoulment” and notions of “promoting quality & equality” in terms of the material effects of design with the materials of information technologies, particularly in the context of sustainable interaction design (SID).

The notion of “ensoulment” goes beyond the notion of quality to suggest a mechanism by which to promote an aesthetic of well-loved designs in which “the meaning and value of a design is taken in as a feeling of being deeply moved and as a consequence, a feeling of being significantly changed” (Nelson & Stolterman, 2003:p.269). Ensoulment may be conceived not just as an emergent quality of constituent qualities, but as part of an ethical imperative to promote sustainable design.

The notion of “promoting quality & equality” goes beyond the notion of simple recycling and reuse to suggest a mechanism

*“(i) which includes the idea that the design of new objects or systems with embedded materials of information technologies implies the need to consider quality as a construct of affect and longevity, and quality in the sense of anticipating means of renewal and reuse, thereby motivating the prolonged value of such objects or systems and providing equality of experience to new owners of such objects and systems whenever ownership transfers, and (ii) which includes the idea that things of poor quality invite disposal and are unsuitable for bridging social divides; and that the aesthetics of disposability is a barrier to sustainability and equality” (Blevis, 2007).*

The notion of sustainability is familiar in many design practices. Nonetheless, this notion is relatively novel in the arena of HCI and design. In what follows, we claim that notions like “ensoulment” and “promoting quality & equality” are essential parts of an ethical and sound foundation for understanding the sustainability effects of design with the materials of information technologies.

Even though this relationship has been studied in diverse fields with a broad set of methodologies, there are very few studies that, from a design perspective, try to unfold what make designs ensouled and care for by their owners, especially in a way that is useful for designers. One assumption in this paper is that such knowledge could inform designers to better consider sustainable design options not easily imagined or envisioned.

Also in what follows, we provide background and theory which make the case for our approach and delimit the theoretical foundations and concepts that support our undertaking. We then introduce two studies we have conducted and are conducting which are targeted at framing some of the aspects that we see as central to our argument. We conclude the paper with a future oriented discussion in which we explore the value of advancing research directions for sustainable interaction design (SID) especially with respect to notions of promoting the longevity of artifacts.

## 2. BACKGROUND: SUSTAINABLE INTERACTION DESIGN

Sustainability as an issue of environmental and other concerns is now commonplace, even in popular media. Nonetheless, sustainability as an issue of the design, use, and reuse of artifacts built with the materials of information technologies—what is commonly referred to as interaction design or human-computer interaction (HCI)—is a very recent concern.

The notion of sustainable interaction design (SID) is first presented in (Blevis, 2006; 2007), where the perspective of sustainability in the context of the materials of information technologies is traced especially to writings by (Alexander, 2002; Fry, 1999; Heidegger, 1954; Willis, 2006; Winograd & Flores, 1986). A special interest group meeting at the 2007 ACM CHI conference in San Jose was organized by Mankoff and others (Mankoff et al., 2007). A number of other authors have dealt with issues related to a values-rich interpretation of interaction design, including (Dourish, 2006; Fallman, 2003; Friedman, et al. 2006; Friedman, 1977; Lowgren & Stolterman, 2004; Makelberge, 2003; Nardi, 1999). Several other authors have embedded concerns for

sustainability and interaction design within their work, including (Makelberge, 2003; Stegall, 2006; Reed et al., 2005; Thackara, 2005; Woolley, 2003). Finally, several authors have described the notion of design as a critical reflective practice, primarily (Schön, 1983) and also (Cross, 2001; Fallman, 2003; Lowgren & Stolterman, 2004; Norman, 1998; 2002; Papanek, 1985; Zimmerman et al., 2007) and others. This conceptualization of design as a reflective practice motivates much of the methodology described in this paper.

In (Blevis, 2006), a rubric of material effects for understanding interaction design is presented and illustrated. The effects of the rubric are *disposal, salvage, recycling, remanufacturing for reuse, reuse as is, achieving longevity of use, sharing for maximal use, achieving heirloom status, finding wholesome alternatives to use, and active repair of misuse*. The material effects of *remanufacturing for reuse, reuse as is, achieving longevity of use, sharing for maximal use, and achieving heirloom status* all relate to the notion of ensoulment. The design principle of promoting quality & equality is introduced in (Blevis, 2007) along with several other design principles relating to sustainability in the context of interaction design and the notion of ensoulment is introduced in (Nelson & Stolterman, 2003).

### 3. THEORY: ENSOULMENT

In (Nelson & Stolterman, 2003), the notion of *ensoulment* is postulated as a concept about designed artifact that is not exclusively nor even explicitly tied to notions of sustainability. Nonetheless, the implications of the notion of ensoulment for sustainable behaviors are apparent. Ensouled things imply well-cared for things, looked-after things, durable and enduring things. Such things lend themselves to sustainable behaviors more than things that are frequently disposed.

The notion of ensoulment by Nelson & Stolterman is not defined as a separate quality of an artifact. Instead ensoulment can be seen as an emergent overall “quality”. In daily language we say that we need to “put our souls” into something. Such expressions reveal that there is a belief that if we put a lot of effort, focus, energy, carefulness in details, and so forth into the design and production of an artifact, we can “ensoul” the artifact. One of the aimed-for “effects” of ensoulment is based on the assumption that if an artifact is ensouled, the “user” or owner will recognize it and see the artifact as more valuable. This is way of thinking about designed objects that has been argued in other writings (Alexander, 1979; Hillman, 1992). Even though Alexander uses a different

concept, his argumentation is similar. The notion he uses is “timelessness”. Coming from architecture, he addresses the question of why certain buildings become timeless and others do not. In architecture it is well known that when a building is commonly understood as “ensouled” or “timeless” it will be taken care of—in some cases in the human sense of forever. Hillman uses the notion of “soul” to describe the quality we can find in places and things that has been designed and made by the careful attention to details (“notitia”) of the maker.

In (Verbeek, 2005), Verbeek argues for a philosophy of technology that is not focused on the preconditions of technology or the technology as a societal “force” or “system”. Instead he argues that we have in our analysis of technology to focus on the things themselves. He refers to a Dutch organization called “Eternally Yours” ([www.eternally-yours.nl](http://www.eternally-yours.nl)), organized by industrial designers. The purpose of this group’s approach is to focus on lengthening what they call a product’s “*psychological lifetime*”. Verbeek writes

*"Most products are thrown away long before they are broken or obsolete, usually because of changing tastes and fashions. Eternally Yours attempts to combat this tendency of products to wind up prematurely in the landfill by designing products that invite people to become attached to them. Eternally Yours strives to achieve what the Italian designer Enzo Manzini calls "caring for objects". Products must be allowed the possibility to "grow old in a dignified way", and so to break out of our implicit cultural assumption that artifacts only have a limited lifetime and instrumental value. In order to stimulate this kind of attachment, as I show, one first has to analyze the relations between human beings and artifacts. The post-phenomenological perspective can make important contributions in precisely this area."*

In a review of the book by the philosopher of technology, Albert Borgmann (Borgmann, 2005) the book is praised, but Borgmann adds the essential query

*"What's the aggregate effect of all the devices at people's disposal? This is an empirical rather than transcendental question."*

Verbeek further writes

*"First of all, it has become clear that an approach to technology in terms of concrete technological artifacts is essential in the philosophy of technology."*

Stated otherwise, we may say that we need to move away from the notion that the consequences of use are to be found in the Technology with a capital “T,” instead the consequences of use may be found in the “things” themselves, the artifacts themselves.

Verbeek still further writes:

*“Things—and in our current culture especially technological artifacts—mediate how human beings are present in their world and how the world is present to them; they shape both subjectivity and objectivity.”*

and

*“The design of technology thereby becomes no longer an internal technological affair, but appears to be a moral matter as well.”*

and

*“Technologies are not merely functional objects that also have dimensions of style and meaning; they mediate the relations between human beings and their world, and thereby shape human experiences and existence. Technologies help to determine how people act, so that it is not only people but also things who answers to the classical moral question, “How to live?”. It is time that we take the contributions of technology seriously and combine our forces to provide new answers to this ancient question that still applies to the technological world in which we live.”*

We are making a great deal of Verbeek’s philosophical reasoning, and it is because we believe that it is a philosophical argumentation that makes the case that it is a good idea to do studies in the way we describe in the next section—that is by surveying people about their attitudes towards *particular* things and by constructing *personal inventories* of things and attitudes for particular people. We are looking at “things” and how they mediate between people and the world, and in that mediation is part of the answer to the question of how to act more sustainably. Things “force” us to behave in certain ways, but they do so differently in different contexts.

We also accept the comment from Borgmann that if we accept this perspective of the importance of the particular technological artifacts, the way to understand how that “aggregates” is through empirical studies that stay close to the broader understanding of technology that Verbeek proposes. Taken together this gives us the methodological underpinning for a study on ensouled

artifacts and what kind of qualities and characteristics they have that make people into good caretakers.

#### 4. RESEARCH

**The aesthetics of disposability.** From the points of view of ensoulment, quality & equality, and sustainability, the Apple iPod is one of the most enigmatic devices. Even in our initial interviews, it appears to be an “ensouled” design—people are very fond of it, it has brand-*caché* above and beyond any of its competitors, and it is made of apparently very high quality materials and assembly. Nonetheless, in contrast to many portable music devices from the past which may have been intended to be heirloom quality artifacts, some iPods are marketed in airport vending machines as shown in Fig. 1. This use of vending machines appears to relate more to an aesthetics of disposability than to any sense of an ensouled, high quality, enduring device. Are iPods ever sold or handed down from one person to another? And even if they are not, can they still be said to be ensouled?



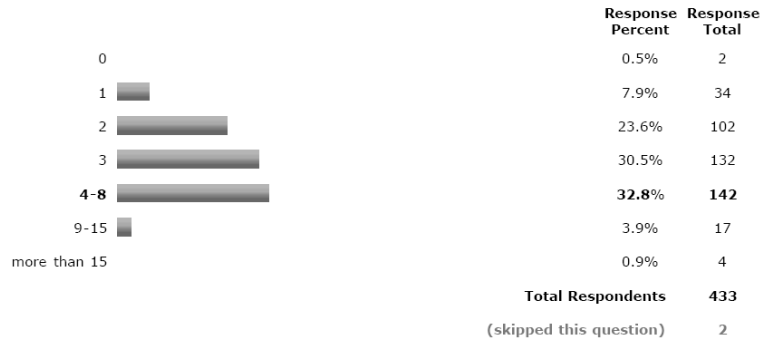
Figure 1. The Aesthetics of Disposability

The iPod example serves only to show how complex the world has become. In earnest, we claim that it is important to study how people use and regard the things they have in the particular cases in addition to average ones, especially things made with the materials of interactive technologies. For this reason, we have conducted a *survey* of a large undergraduate freshmen class at our mid-western US university to understand how they think about interactive technologies (IU-IRB #06-11332) and we have also begun an ongoing *elicitation study* (IU-IRB #07-12036) to inform the design of a scalable instrument for describing individual personal inventories of interactive and other technologies in a systematic way.

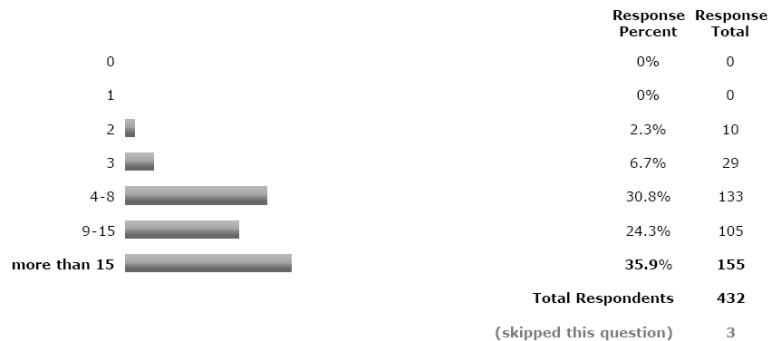
## The Survey

The *survey* was conducted of a large undergraduate freshmen class with 435 respondents. The purpose of the study was to understand how the students think about interactive technologies and other objects in their lives when it comes to possession, disposal, renewal, and what objects they consider to be worth saving and caring for.

6. How many cellular telephones have you owned in your lifetime?



7. How many pairs of shoes do you own now?



8. How many watches do you own now?



Figure 2. Summary of responses to three questions from a survey of 435 students in an undergraduate freshman class.

**Cell Phones, Shoes, & Watches.** In the survey, we asked the mostly freshman student participants about the numbers of cell phones, shoes, and watches they own (Figure 2). The data indicates that the number of cell phones owned by these young people is incredibly high, nearly



approaching the number of shoes owned. The number of watches owned was quite small, possibly because many young people use their cell phones as a kind of pocket watch, eliminating the need for wristwatches. From a sustainability perspective, we see that the proliferation of “un-ensouled” cell phones is a problem. See (Nardi et al., 2003) for example.

23. If money were not an object, how often would you change (purchase new or used or 'trade-in' or acquire in addition to what you already own) your:

	less than once in five years	once in five years	once in 3 years	once in two years	once in 1 year	once in 6 months	more than once in 6 months	don't have one and would not buy one	Response Average
laptop computer	4% (18)	9% (40)	26% (109)	<b>32% (135)</b>	22% (94)	3% (12)	4% (16)	0% (2)	<b>3.84</b>
car	17% (72)	21% (89)	<b>24% (101)</b>	17% (72)	14% (59)	4% (15)	4% (17)	0% (2)	<b>3.19</b>
cell phone	3% (12)	2% (10)	5% (20)	25% (106)	<b>47% (198)</b>	12% (49)	7% (28)	0% (1)	<b>4.73</b>
mp3 player	5% (21)	5% (22)	21% (89)	25% (104)	<b>30% (127)</b>	7% (30)	3% (12)	4% (19)	<b>4.24</b>
camera	7% (28)	10% (43)	17% (73)	<b>28% (118)</b>	26% (112)	6% (27)	4% (17)	1% (6)	<b>4.00</b>
house	<b>70% (298)</b>	16% (70)	6% (25)	2% (9)	2% (10)	0% (1)	2% (9)	1% (4)	<b>1.64</b>
shoes	1% (6)	1% (3)	3% (11)	3% (13)	11% (48)	23% (96)	<b>58% (245)</b>	0% (1)	<b>6.23</b>
watches	12% (53)	6% (25)	8% (35)	12% (53)	<b>23% (99)</b>	11% (47)	16% (70)	10% (44)	<b>4.79</b>
clothes	1% (4)	0% (2)	2% (7)	4% (16)	9% (36)	14% (58)	<b>70% (292)</b>	0% (2)	<b>6.43</b>
kitchen appliances	15% (65)	13% (57)	15% (64)	14% (61)	<b>21% (91)</b>	12% (49)	7% (28)	3% (11)	<b>3.87</b>
pens	3% (12)	2% (7)	2% (8)	4% (15)	13% (55)	18% (75)	<b>58% (245)</b>	2% (7)	<b>6.15</b>
							<b>Total Respondents</b>		<b>428</b>
							(skipped this question)		<b>7</b>

Figure 3. Summary of responses to a question from a survey of 435 students in an undergraduate freshman class.

**Frequency of acquisition.** Also in the survey, we asked how often participants would replace certain kinds of things, if money were not an object (Figure 3). Approximately from most frequently replaced to least, the items were clothes, shoes and pens, cell phones, mp3 players, watches, kitchen appliances, laptop computers, cameras, cars, and houses. Frequency of acquisition is only one metric which does not necessarily imply ensoulment or lack of ensoulment. Another explanation for ordering of the list may be the relative cost of these things, even though the question specifically asks respondents not to consider cost. As an issue of sustainability, ensoulment, and quality, one wishes that the perceived durability and longevity—the *psychological lifetime* in the terms of the Eternally Yours group mentioned above—of interactive

devices like cell phones, mp3 players, and computers would be longer than the response data indicate.

**Size of a home.** Another interesting finding from the survey is the responses to a question about the ideal size of a home (Figure 4). The trend towards replacing homes with larger and larger homes in the US is a trend that runs in opposition to sustainability ideals of passing a homestead from one generation to another. That 84.5% of the respondents think that a home of more than 2000 square feet is ideal for a family of four may be surprising to many readers.

19. How big in square feet (10 square feet = approx. 1 square meter) should an ideal house be for a family of four?

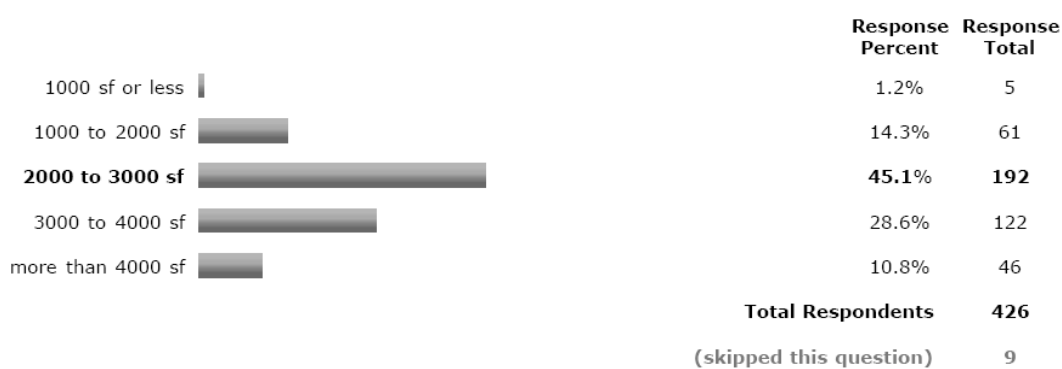


Figure 4. Summary of responses to a question from a survey of 435 students in an undergraduate freshman class

**What kinds of things are ensouled?** In the survey, we asked participants which things they own or expect to own which they expect that they would pass from one generation to another (Figure 5A-5C). This data is enormously interesting and we have reproduced all of the non-blank responses in the figure. Some of the most often mentioned things are family heirlooms passed down from parents or grandparents including jewellery, furniture, antiques, watches, and photographs. Aside from family heirlooms, cars were frequently mentioned, as was jewellery, furniture, antiques, clothes, pictures and photographs. Some interesting items not as common include guns, bibles, toys, and musical instruments. Some respondents listed collections, such as sports memorabilia, shoe collections, movies, paintings, and artwork. Some respondents mentioned non-tangibles such as knowledge and values. Conspicuously absent or seldom mentioned are interactive devices, including computers, video games and video game hardware, cell phones, GPS devices, PDAs and so forth.

1. Family heirlooms such as pictures, jewelry, and family artifacts.
2. Sentimental Jewelry.
3. my grandfathers bracelet.
4. I will pass on a ring from my great grandmother.
5. We'll probably pass on our family picture albums.
6. Rings and jewelry
7. good quality things
8. My mom's collections. Jewelry. My home.
9. jewelry
10. Any family heirloom
11. toys, camera, car
12. House Cars Heirlooms, ie, jewelry, military awards
13. Dressors, Beds, Jewlery
14. House
15. yes. some clothing will be passed down to my children. Also, kitchen ware and appliance will be passed on as long as they are still working.
16. The only thing I have been given from family members that I will also pass along is jewelry and a Bible.
17. I will pass on my the knife that was given to me by my grandfather.
18. money, house, antiques
19. small family items that were given to my parents
20. rings, watches
21. jewlery perfume tray/ bottles sterling silverware china plates designer clothes
22. None at the moment
23. jewlery or other family keepsakes
24. Not at the moment
25. Family jewelry Old children toys
26. yes Art works, guns,and antiques
27. I own a 2004 corvette that I would like to pass down. I would like to acquire a sufficient amount of money to pass down.
28. pictures
29. Jewelry,
30. Photographs
31. Yes, pictures and books.
32. I can't recall anything right now.
33. Things from my granparents house, and actually my grandparents house.
34. jewelry
35. Jewelry
36. Teddy bear from my father I will continue to pass down. I do not know if I will be passed down anything, and I may start passing down something to my kids.
37. Dishes, Furniture, Family Hierlooms
38. jewelry
39. Maybe jewelry my mom or grandma has given me
40. Yes, things like artifacts and other random collections.
41. jewlery
42. jewelry
43. Jewlery
44. My mother's jewelery and good china. My old dolls from when I was little.
45. Baseball and Basketball Card collections Watches, coins rings or some kind of jewelry
46. Jewlery
47. Family heirlooms like jewelery.
48. clothing
49. Basically, we will pass down the family heirloom, besides that, the property would be passed down to the children and personal belongings that one treasures
50. yes, some jewelry and my journals
51. family jewelery, books, china, silverware, property, furniture
52. Clothes, furniture, toys
53. Jewelry, All my possessions, Money
54. I expect to pass down jewelery, collectible items, and a hope chest to my children.
55. Family jewelry, Family charity foundation
56. Jewlery
57. Car, labtop, clothes, shoes, cellphone, camera,
58. Furniture, kitchen appliances, automobiles, a tractor, a house, clothing
59. family heirlooms
60. jewlery
61. furniture, paintings
62. Furniture Clothes from older siblings
63. Maybe some clothes, thats probably it though.
64. My vehicles, my furniture, the farm, Mom & Dad's antiques and homestead, my inheritance
65. Pictures, Cars, Jewlery
66. Yes I do. These things are mostly in the category of valuble jewelery.
67. old currency old books old fire arms
68. Yes, Saint Christopher's medal.
69. only house
70. Paintings,watches,other artwork, books, jewelery
71. property maybe vehicles cell phones jewelry photos keepsake items from childhood family bible electronics (t.v., stereo, etc.) furniture clothing
72. Yes; jewelry; family pictures; personal items such as baby book, baptism dress, communion dress, and clothes; and diaries
73. my grandmothers charm bracelet my mothers jewelry
74. Land, money, antiques, farm machinery
75. Earrings from my Mother, my grandmother's ring and China.
76. yes, clothes for vintage looks
77. jewlery
78. jewelry, pictures, etc.
79. jewlery
80. I will probably pass down my family tree, my dad gave it to me so i will give it to my kid.
81. Yes, I have clothing that I expect to pass on to my younger cousins.
82. things like jewlery or things that are almost priceless or and engadgement ring eventually
83. Pieces of jewelry
84. Mother's jewelry
85. property
86. Paintings, Jewlery
87. not sure
88. jewelry furniture figurines
89. jewelry, photographs, sorority badge, books, childhood toys
90. Jewlery Family Photos Antiques
91. Pictures, Family memorabilia...
92. Yes I have collected a very large set of baseball cards growing up and would like it if my kids could someday have them
93. Jewlery
94. My car, autographs
95. family jewelery and money
96. Yes, for example family antiques, jewelery, and pictures and what not.
97. my teddy bear.
98. cars
99. Yes clothing, pictures
100. My grandpa's flask was passed down to me and I will pass that on to one of my children. I hope my dad will pass down his motorcycle to me.
101. Things like pictures and things that show our family history.
102. Family Heirlooms (jewelry, etc) a house
103. i don't know of anything
104. MY Fathers Hat

Figure 5A: Non-blank responses to the question “Do you own any things or expect to be given some things that you think you will pass along to your own children or other family members? What are these things?” [total of “no” or blank responses 435 – 315 = 120]

105. A ring of my mother's  
106. some family jewerly  
107. family heirlooms that are not worth much monetary value, like paintings (that my grandma painted) and old costume jewelry of great grandmas  
108. maybe my parents house? i have no idea  
109. antique furniture, pictures, stories, scrap books, books, music box collection, paintings (art)  
110. clothes, toys, pictures, movies, yearbooks, memorabilia  
111. books  
112. Baseball card collection  
113. Land  
114. My dad's watches, my moms jewelry, furniture, books, such personal items as those.  
115. baseball cards  
116. I do not have anything right now.  
117. Yes, -savings bonds That is all i can think of  
118. souvenirs & musical instruments  
119. House Stocks  
120. Electronics  
121. Yes, my house.  
122. I think that I will be given a buisness, which I will then pass down to my son.  
123. My personal business in which I was the founder.  
124. Jewlery  
125. picture albums, jewelry  
126. There are a few pocket watches that my dad has, some he aquired from my grandpa, and some he bought, those will be passed on to me and I will pass them on my to children.  
127. jewerly, my suv to my little brother, and clothes to my little sister  
128. A bear that has been passed down from my father from his childhood to me. Also, items from Grandpas like things from WWII.  
129. yes, some jewelry.  
130. Art work, Jewlery, clothes, purses, shoes  
131. Old baby toys, crib, some clothes, hats, old school work-such as chemistry books, jewelry, family photos, art work, furniture, etc.  
132. my mother's wedding dress  
133. Nothing at the moment  
134. yes... many different house items ranging from furniture,etc...
135. My Mom's pine furniture, china, antiques.  
136. Not Yet  
137. jewerly  
138. I can't think of anything at this time.  
139. I Have a diamond necklace that is the diamond from one of my grandpa's rings.  
140. I expect to pass family itmes that have been given to me  
141. children's books, or movies  
142. I own some family heirlooms like jewlery and antiques.  
143. furniture  
144. paintings  
145. yes, jewelry  
146. Jewelery  
147. clothes, toys  
148. My baseball card and comic book collection.  
149. my dads of old car its a 47 dodge  
150. pictures jewlery  
151. my childhood doll, my late grandma/mothers jewelry, my musical instruments, some special books  
152. Jewlery  
153. I have a baby blanket that I will give to my eldest child. I also will pass down used clothes to my little brother.  
154. Not sure...  
155. My mother's ring, some antiques in my mother's house, and pictures.  
156. I have jewelry from my grandmother that I will be expected to receive and I will pass down to my children.  
157. Watch  
158. not at this time  
159. valuables from my mother or father, things that have been passed down to them from there family.  
160. no not at this time in my life.  
161. clothing, jewelry, pictures, family heirlooms  
162. jewlery  
163. perhaps not sure what though  
164. My car.  
165. necklaces, baseball cards  
166. Yes. Jewelery  
167. Just family possessions  
168. jewelry  
169. Probably some clothes  
170. jewelry, watches, cars  
171. omega watch  
172. Jewlery
173. NO. I have nothing of value or meaning right now.  
174. Yes, jewerly, quilts, old furniture, and vintage items  
175. a family ring  
176. nothing beside jewelry and other momentos like that  
177. Graduation gifts Watch and Necklace  
178. blankets, jewelry, furniture, dishes  
179. My clothes, old dresses, purses, jewelry, etc.  
180. family heirloom baby clothes jewerly  
181. Some carpentry work my father made for me  
182. Probably just old family pictures and objects from the past.  
183. money  
184. My Grandmother's earrings  
185. Yes  
186. haha not yet  
187. Not at the moment  
188. clothing, cars, cell phones, helpful objects around the house  
189. Family antiques, photos, guitar, albums  
190. Any precious piece of jewellery passed on to me by my parents thaet they intern got from theirs  
191. My jewelry, my favorite jacket, or shirt  
192. photes  
193. Expensive musical instruments such as violin  
194. i dont know  
195. Painting done by my father.  
196. As a student, I dont have much at all to give to any of my future children. I do not know whether i will be given anything by my parents, and i certainly dont expect anything to be given to me.  
197. Jewelry, Pictures, priceless family items  
198. Education, knowlege and a nice car or house.  
199. If I got a new computer or something like that I would pass it on to someone who didn't have one.  
200. Yes, a gold coin from my grandma  
201. grandfather clock bible family jewelry  
202. Not that I'm aware of at this point.  
203. memories  
204. Photos of family.... money.... for my children and their children  
205. jewelry

Figure 5B: Non-blank responses to the question “Do you own any things or expect to be given some things that you think you will pass along to your own children or other family members? What are these things?” [total of “no” or blank responses 435 – 315 = 120]

206. Watch, memorabilia, family items. etc.
207. My grandmothers engagement ring.
208. pictures
209. Metals, Trophies, spoons, pictures, antiques, grandfather clock, china tea cups
210. Pictures, some jewelry, and maybe some clothes
211. jewelry
212. Family heirlooms.
213. jewelry
214. Jewlery,picture albums, quilts, prayer book
215. my dad's state football championship ring, wedding rings, etc.
216. A civil war gun
217. Watch, rings, badges
218. my watch
219. yes, some jewelry and clothing
220. Family Jewlery
221. I would give my jewelry, watches, paintings, and artwork.
222. Homes, Land, Jewelry
223. Jewelry
224. I would leave my children things that had high value to me such as house, property and personal things of mine.
225. My sister passed on Kitchen appliances to me when she got married. I plan on passing on my clothes that don't fit me anymore to good will. I receive clothes from my friends as well.
226. jewelry
227. jewelry from siblings, special collectors items from siblings
228. I have a lot of books that I could pass on to other family members.
229. Musical Instruments, Books
230. Certan jewelry
231. Yes the land that my parents own in virginia.
232. jewelry, purses
233. Guns, car
234. No, not that I can think of.
235. jewelery
236. My father's tools
237. Pictures
238. jewellery,books
239. Yes, money
240. Family furniture and potential property
241. Family Heirlooms
242. Car
243. my jewerly
244. I do not know
245. baseball cards, shit like that
246. pictures, cards, model cars, and other memories and valuables.
247. clothing toys that i had when i was little my tv/stereos that i have now
248. Pictures, pieces of furniture, collections of objects
249. money, watches, stock, bonds
250. Sorority Things Toys from childhood
251. Grandfathers war memorabilia
252. House, Guns, jewelry
253. None
254. My mom's old wedding ring.
255. Yes- jewelery, antiques, family history documents, pictures
256. nothing comes to mind
257. Bible
258. classic sportscar
259. No. Nothing other than objects of personal meaning.
260. shoes, clothes, car
261. Clothes, car, laptop
262. Wedding Rings, antiques, guns, family heirlooms
263. Jewelry
264. Pictures Clothes Watch Movies CD's
265. Yes. My pinky ring.
266. Jewelry
267. Yes. Furniture, knick-knacks, pictures/art, kitchen ware [plates, silverware, utensils, pots, pans, ect], & books.
268. Chicago Bears Memorabilia
269. Money
270. yes. family heirlooms such as sorority pins and photographs.
271. cars computers knowledge
272. jewelry and stocks
273. Pictures, heirlooms
274. no, except for family photos
275. yes, pictures.
276. No, not at the moment
277. No not really, by then things will be different no point in saving old stuff..unless you are afraid it might break.
278. my mom's piano, my dad's pocket watch, my grandmother's china.
279. car
280. As of now, no.
281. A Family plaq.
282. jewelry, house, cars, any land property
283. yes. my great-grandmother's quilts/blanket, jewelry etc.
284. maybe
285. Yes. Family heirlooms like Jewelry, antique furniture, photos, etc.
286. Jewelry, my parent's home, and certain stocks and investments
287. no, i have nothing of any value.
288. A SHOE COLLECTION.
289. Jewelry, money, property, furniture, china, clothing
290. Clothes, photo albums
291. Knowledge baby!
292. only my artwork
293. Not yet.
294. lap top
295. Jewelry, art, and furniture
296. jewelery
297. childhood books and movies, some collectable dolls
298. All small things in life that are underrated. Furniture Clothes Small Apliances Memorabilia Refridgerator Things that would go in my home
299. stocks real estate
300. father's collectible rifles
301. pearl earrings
302. jewelry, photographs,
303. My car, and my grandparents' jewelry
304. Clothes, shoes, furniture, morals, and integrity
305. Jewelry,Bible
306. Classic Disney movies
307. pieces of furniture
308. rings from my mother
309. Yes, I have my grandmothers ring that I will pass along.
310. Jewlery
311. quilt from my mom
312. Values
313. not at the moment
314. My car will be passed on to my sister when I buy my own car.
315. Yes, like toys,and things from my childhood that I can reflect to my children. Mostly toys from when I was a child.

Figure 5C: Non-blank responses to the question “Do you own any things or expect to be given some things that you think you will pass along to your own children or other family members? What are these things?” [total of “no” or blank responses 435 – 315 = 120]

## The Elicitation Study

We are at the moment conducting an *elicitation study*. The purpose of this study is to support the design of a scalable instrument for describing individual personal inventories of interactive and other technologies in a systematic way.



Figure 6. Electronic game center from a personal inventory.

**The ultimate game room.** From one of the personal inventories (P12) we have conducted, Figure 6 shows one of the most elaborate game rooms imaginable. There are no fewer than seven sets of different video game controllers, including the latest Nintendo Wii device. Many different kinds of dedicated video game hardware systems complete the scene. Here we may postulate that the entire installation is in a sense ensouled, even if no particular component

present or yet to be acquired is necessarily ensouled. The experiences associated with time spent with this installation are perhaps the ensouled thing. The installation is in fact a backwards compatible provider of access to a life long collection of game media by someone who can only be described as an avid collector of computer games. There is nothing of particularly high quality or durability about the hardware pictured. The sustainability issues abound—the frequent perceived need to add another game supporting device appears to be enormously and unnecessarily resource intensive.

**Personal inventories – What?.** Figure 7 summarizes personal inventories from four participants in the ongoing personal inventories study. Unlike the survey which targeted 18-21 year old freshmen, the participants in the personal inventories study tabled ranged in age from 60's (P3) to early 40's (P12), late 30's (P6), and early 30's (P7). In contrast to the survey, many of the loved things included interactive devices embedding the materials of information technologies, such as digital cameras, iPods, Apple computers, and a “smart” rice cooker. Some of the things that turned out to be unloved include iPods, a portable playstation, the Nintendo Wii, a Mac mini, a PDA, and other things. The number of computers in the households of the participants is higher than for any other interactive device. The number of iPods for two of the participants is equally impressive. As for things that are long lived, computers and interactive devices do not number in the list. Interestingly, some older technologies are kept around, including a VHS tape player, older video game consoles, and older cameras. The newest acquisitions reported by the participants were in fact all interactive devices. Music media, cell phones, and computer storage devices number among the most frequently acquired things. The reasons for replacement of things are important and include repair, upgrades to newer technologies, battery life, and new services. The amount of interactive things that all of the participants have make certain our premise that understanding the role of interactive technologies in terms of sustainable behaviors is a pressing issue.

**Personal inventories – Why?.** Figure 8 summarizes the reasons participants gave for some of their responses to the “what” questions above. Characterizing the reasons participants gave for loving the things they do speaks to one of the central points of our paper:

- items that bring pleasure
- items of visual appeal, especially art collections
- items that are used as tools of creativity, memory, and experience, such as cameras
- high quality media, in terms of resolution and bandwidth
- origins as a gift
- items which induce particular feelings or reflect identity

	P3	P12	P6	P7
What things do you have that you love?	pontoon boat jacuzzi collection of art work digital SLR camera film SLR (old) bicycle	books iPods apple G5 Sony PS3 blue ray movies	books laptop (apple) digital camera p&s neuro-fuzzy rice cooker	black laptop (apple)
What things do you have that you thought you would love but don't?	iPod	PSP (portable playstation) Nintendo Wii	cell phone (Samsung)	mac mini Sony PDA tablet PC TV multi-media connections box
What things do you have that you didn't expect to love, but do?	palm pilot	12" laptop (Mac, for watching movies on an airplane)	apple computers	black laptop (apple)
What things do you have more than one of (household)?	2 computers 4 radios 4 televisions collections (dolls, art work, masks, ...)	4 laptops (1 windows, 3 apple) iMac (music server) 2 apple G5 Dell XPS game server 4 iPods 2 televisions	3 apple computers 4 iPods 2 televisions	4 computers 2 mp3 players 2 cell phones
What are the oldest things you have that you still use?	car (10 years) dishes furniture clocks (> 30 years)	television (10-15 years)	rice cooker (not neuro-fuzzy, 15 years, gift from mother)	television (12 years)
What are the oldest things you have that you don't still use, but would not discard?	Nintendo game interactive video game glove (15 years) Polaroid camera (20 years)	VHS tape player cell phones video games (Sega)	materials for cross stitching	iMac (9 years, first computer) Nikon F2 camera (20 years)
What are the newest things you have?	digital SLR (canon rebel)	Sony PS3	computer monitor Nintendo Wii	black laptop (apple)
What things do you acquire most frequently?	cell phone (every 2 years)	iTunes store music computers (every 2-3 years) computer upgrades (video cards and hard drive capacity)	games music (iTunes) videos hard drives computers video cards	cell phones
What prompts you to acquire new things?	replace broken things upgrades to newer technologies (i.e. digital camera)	game performance upgrades (graphics)	performance (mostly for second life games) storage	battery dies new services new technologies

Figure 7. Personal Inventories from 4 Participants Part A.

It is important to note that this interpretation is taken from only 4 personal inventories shown in the table and that we expect the list above to grow as we continue this study. Nonetheless, the emphasis on qualities of ensoulment owing to context of use and experiences by this group rather



than on such things as quality of materials or currency of fashion is interesting. Some of the reasons participants gave for not liking things they expected to like related mostly to difficulty in use. The accounts of why more than one of the same thing was needed in a household included multiple users, multiple locations, collections, cross-platform compatibility issues, professional and personal contexts of use, and feeling bad about disposal. The reasons given for preferring some old things to new ones included familiarity of use, and uniqueness of some old things. The reasons for preferring new things to old ones included utility, increased capacity, versatility, performance, functionality, and looks.

	P3	P12	P6	P7
Why do you love the things you do?	bring pleasure sometimes visual (art collections) sometimes tools (camera)	quality of media (mostly in terms of resolution and bandwidth for gaming)	looks (visual form) old rice cooker (gift from mother)	induces particular feelings: “feels like me” or “never bored” or “I am smart”
Why do you not love the things you don’t?	iPod – don’t listen to music that much and it’s easier to turn on the cable television music channels	PSP – proprietary disk format, lower quality than DVD, games not good Nintendo Wii – shallow (just another controller in use)	cell phone – difficult to use, relegated to use as an emergency phone only	PDA – dark display, hard to use tablet PC – does not feel natural to use TV box – poor performance
Why do have more than one of some things?	multiple users in household, multiple locations in household, parts of collections	to resolve cross platform compatibility issues (especially with regional video codes and other media)	some things are for work, some for home, some are portable, some are stationary but better support gaming, the nature of the work varies (and so do the things needed to support same)	feel bad about throwing away old things
Why do you keep things you don’t use?	to sell them on ebay or craigslist	maybe will be able to give it away	maybe will be able to use it later, or give it away to someone else	sometimes feel guilty about throwing them away, sometimes need the data stored on them
Why do you prefer some old things to new ones?	don’t	already know how to use them. familiarity	know how to use old things	some things are unique, difficult to replace
Why do you prefer some new things to old ones?	nostalgia, utility (would like a new van because P3 had a van once before) utility (camping equipment, cameras, computers)	iPods – greater storage capacity	does more things versatility (modern rice cooker)	performance functionality looks

Figure 8. Personal Inventories from 4 Participants Part B.

**Neuro-fuzzy and a family heirloom.** Figure 9 shows a much loved “Neuro-fuzzy” rice cooker from one of the participants (P6) in the personal inventories study. Also pictured is an older rice cooker which was a gift from the participant’s mother and therefore an “ensouled” object. The neuro-fuzzy uses sensors to adjust its cooking to match different kinds of rice. The participant loves the technology-enabled function of the more modern rice cooker, while also loving the older model for sentimental reasons. While this particular example shows how ensoulment helps to prevent the disposal of the old as a consequence of the acquisition of the new, it is unclear how as a general design principle of sustainability new technology-enabled products can be made not to cause the disposal of old ones, or even better, how new technologies can be added to old ones as a means of renewal rather than requiring the acquisition of a completely new device. Moreover, such clarity will also need to account for fashion and desire as much as technological innovation.



Figure 9. Much loved “Neuro fuzzy” rice cooker and Family heirloom rice cooker (P3).

**A cloth-covered projector.** Figure10 shows a collection of multimedia equipment which serves as a living room home theater for one of the personal inventory participants (P7). To the left are dangling connectors used to hook up a laptop computer for use with the projector system both as an auxiliary monitor and also to circumvent the area encodings on some DVDs. The dangling connectors origin in a “TV multimedia connections box” (not pictured) which manages the connections between these different devices. The projector-based multimedia setup is often abandoned in favor of a CRT television that is about 12 years old. The projector is covered with a cloth when not in use, both to keep the dust off and also because its owner believes it to be ugly.

None of the items in the photograph, nor the entire system itself are ensouled in any sense, despite the participant's love of movies. The media is loved, but the delivery platform is unloved.

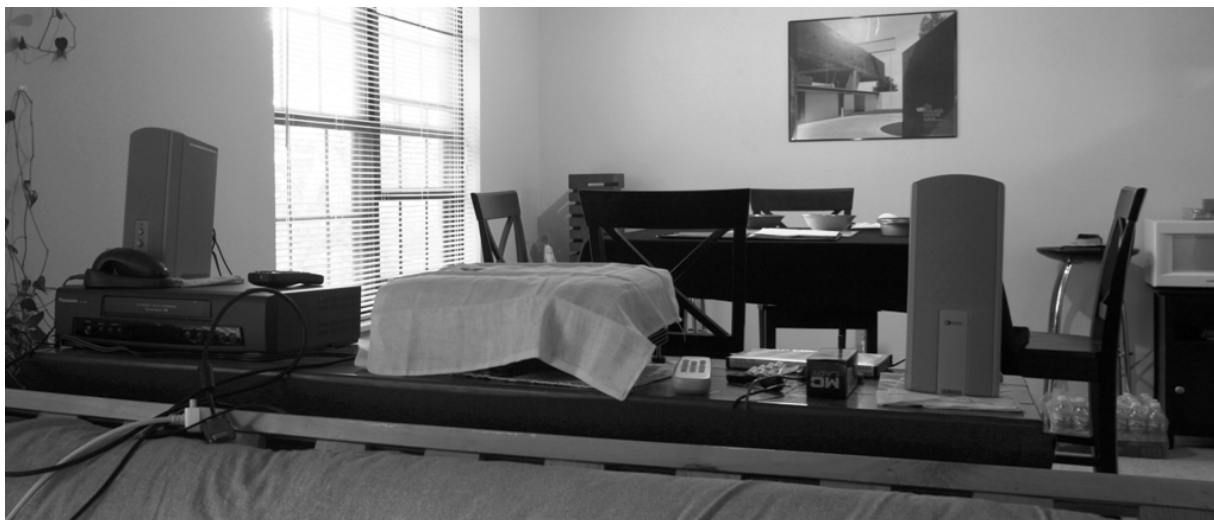


Figure 10. Projection TV setup showing dangling computer connections, Projector covered with cloth.



Figure 11. Interconnections allow selective upgrades at the expense of clutter



Figure 12. Scenes from a desk: Two ensouled objects and a disappointing one.

**Wires everywhere.** Figure 11 shows the wiring of an elaborate home computer setup from one of the personal inventories (P12) which includes a much loved iPod in the foreground. In addition to hard drives and audio speakers, the picture includes monitors for an Apple computer and a Windows-based one. The morass of interconnections are in a sense sustainable, because they allow selective upgrades to be made to the system without discarding all components. On the other hand, the clutter they create is a possible impediment to the ensoulment of such systems.

**Wires in a row.** Figure 12 shows a scene from a desk from one of the personal inventories (P7). The scene depicts two much loved devices—a black Apple laptop and an iPod, as well as one device that disappointed its owner—a Dell tablet PC. On this desk, papers, books, and other non-computer embedded more traditional desk items share a space with these three interactive devices. Notice the careful ordering of the cables which link the Apple laptop to power and peripherals which provides a contrast to the image of Figure 11.

## 5. CONCLUSIONS

The basic assumption in this paper is that there is a need for a conscious and intentional approach to sustainable design within the field of interaction design. Based on our studies so far, there is considerable support for our initial notion that a focus on concepts such as *ensoulment* and *quality* opens up a way to further foster sustainable interaction design. We argue that the theoretical support is present, even though not enough developed, and what is needed is a continued substantial effort in empirical investigations in order to explore a deeper understanding of what this means in the practical way people treat artifacts.

At this stage of research into these issues we are convinced that we need an open and explorative methodological approach. Verbeek (2005) argues that there is a highly complex and reciprocal relationship between things and people. Even though this relationship has been studied in diverse fields with a broad set of methodologies, there are very few studies that, from a design perspective, try to unfold what make designs ensouled and care for by their owners, especially in a way that is useful for designers. One assumption in this paper is that such knowledge could inform designers to better consider sustainable design options not easily imagined or envisioned.

We have provided some ideas on how such studies can be further carried out and what to look for. We also believe that our studies have shown that it is not easy to guess how people treat their artifacts. Ensoulment and quality do not seem to be nor did we expect them to be the only factors affecting longevity of use. It seems that the relationship between people and things, particularly interactive things, is a highly complex one in which ensoulment in one case does not necessarily imply ensoulment in another case. This creates methodological and maybe even theoretical challenges which underscore the need for qualitative methods focused on *particular* cases. There is a need for more studies that in a dialectical way build on empirical investigations while at the same time refines the theoretical concepts. We are only at the beginning of this process and expect to refine the personal inventories instrument especially so that it can be more widely applied.

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