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Self-Awareness as a Resource for Design: Overcoming I-methodology in the design of household cleaning products

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Abstract  
Too often designers are unaware of how their ways of doing things differ from users. “I-methodology” [1], or when we design for ourselves rather than today’s diverse population, is an obstacle to user-centered design. Increasing self-awareness, or recognizing the biases, assumptions, and stereotypes embedded in who we are as a design community can curb I-methodology’s effects on our work and open innovative space for design.

Outlined is a process which prompted self-awareness into how I conducted and thought about housework. It resulted in a critical approach to design, heightened empathy towards elders, novel research tools, and a collection of innovative cleaning products. The project demonstrates the effectiveness of user-center design methods supported and used by human-computer interaction researchers and leading design firms.

Keywords  
Project/problem statement

I am a 28-year old, Caucasian, middle-class, female, able-bodied, industrial designer working towards a PhD. in Human-Centered Computing. I prefer to avoid housework as much as possible, but when I do clean, I use the brands, products, and techniques my mother used. Many users’ experiences would be neglected and design opportunities missed if I developed cleaning products based on myself.

I-methodology, or designers unconsciously seeing themselves as representative of users, is a barrier to user-centered design. Sociologist Madeleine Akrich coined the term and describes it as the “reliance on personal experience whereby the designer replaces his professional hat by that of the layman.” To break out of this trap, designers must become more perceptive of their everyday behaviors; the historical themes embedded in technology’s development, and continue to observe users day-to-day lives.

The project’s original goal was to understand aging’s impact on housework for the purpose of design. It was motivated by: 1) older adults desire to “age in place” instead of in a nursing home or in an assisted living facility. If this is to happen, elders must be able to perform mundane household tasks. 2) Despite increased attention towards design for domestic spaces, research examining housework remains scarce. Much attention has been given to how we will entertain, stay safe, and work in future homes, but few have asked how we will keep it clean.

The project resulted in an acute sense of the need to conceptualize users based on their experiences instead of my own and a belief that this could be accomplished through increased self-awareness. This paper describes how I learned more about myself and demonstrates how this approach opens space for novel and innovative cleaning products.

The process is compatible in spirit and philosophy with Batya Friedman’s value-centered design [6] and Phoebe Senger’s critical technical practice [18] in that both call for increased reflection among designers on their practices. It also an example how highly user-focused data gathering techniques result in innovative design; processes popularized by design firms IDEO [8,11] and the former E-Lab [23].

Background

I was the project’s primary researcher and designer. Throughout the study, I was advised by faculty from Cornell University’s Design and Environmental Analysis, Science and Technology Studies, Information Science and Anthropology departments.

The thesis project was done as a requirement for an MS degree in Human-Environment Relations, in Cornell’s Design and Environmental Analysis Department. S.C. Johnson and Co. funded the study through a grant.

Fieldwork began in February 2003 and ended four months later. Data analysis and concept generation occurred during summer 2003 in collaboration with S.C. Johnson’s Consumer and Products Insights Department in Racine, Wisconsin, USA.

Challenge

Recognizing oneself or the biases, assumptions, and stereotypes inherit in who you are is a fundamental
step anthropologists take before entering the field. They understand that in order to theorize about other people’s behavior, they must be conscious of their own. Despite use of anthropological research methods (i.e. ethnography) in design, critical reflection on how designers consciously or unconsciously map their personal experiences onto their work is lacking.

I-methodology’s impact on human-centered design is implicitly addressed in current research. This is evidenced by growing recognition and concern about design which is biased towards a narrowly defined user population. Designers are typically male and between the ages of 22 and 45-years old [9]. Their abilities naturally differ from today’s elderly demographic. Empathy tools, such as clouded glasses and weighted gloves, have provided designers with ways to gain insight into how they physically and cognitively interact with products in ways that differ from elders [8]. Forlizzi et al. extend this theme by recognizing that elders relate to products in ways that transcend usability. Her team has developed design processes focused on understanding the experiential changes that come with growing older. The results are “pleasurable” user experiences that respond to elders’ anthropometric and emotional needs [5].

Female designers note I-methodology’s effect. They argue that women’s under-representation in industrial design results in products that fail to mesh with what they find appropriate, comfortable, and appealing [15]. Additionally, Thomas Landauer observed that computer programmers overestimate the degree to which what is true for them is true for others [12]. He describes this as “egocentric intuition fallacy,” and recognizes the need for user-interface designers to acknowledge how their technical skills and sensibilities differ from typical computer users.

Heightened self-awareness enables you appreciate the feelings and perspectives of others and opens space for innovative products design. Self-awareness prompts heightened empathy and opens space for innovative design. Djajadiningrat et al. [3] demonstrate this with their use of extreme characters. When designing a PDA the team imagined a drug dealer, the Pope, and a polyandrous 20-year old as users. They were inspired by individuals with characteristics they lacked (i.e. criminal, divine, or hedonistic) to widen their view on possible product concepts.

An obstacle to increased self-awareness in the design process is the limited time designers have to bring a product to market. In contrast to academic ethnography, where anthropologists devote years to fieldwork, in a business context ethnographically inspired research must take place in a constrained time period. Seeing the world through the lens of your project, or establishing a subtle and constant mindset, are ways to rapidly learn more about yourself and the topic under study [13, 17].

The concept of self-awareness has received considerable attention from psychoanalysts, philosophers, and learning science researchers. Though its definition is complex and open to debate, I define it as increasing designer’s ability to perceive their assumptions, their behaviors, and to better understand the metaphors inherit in their work. Similar to anthropologists, I believe heightened self-awareness among designers is another valuable resource for user-centered design.
Outlined is a method appropriate for the time demands found in business contexts and its effectiveness is demonstrated by a collection of innovative design concepts.

**Solution**

**Process**

This process was guided by becoming conscious of how I cleaned my home, the historical themes embedded in domestic technology’s development, and of aging’s effects on everyday experiences. Sensitizing yourself to how you think and feel about a topic makes it easier to detect differences others.

Ethnographically inspired research techniques such as “design ethnography” [13] and “cultural probes” [7] influenced the approach. These methods are well-suited for understanding the broad patterns of everyday home life that are important and relevant for the conception of new products. They acknowledge and highlight the need for flexibility, reflection and subjectivity in design; themes not typically recognized in structured design processes but that are appropriate for making sense of life’s messy nature.

The following data collection techniques effectively and efficiently uncovered aging’s effects on housework for the purpose of design. At the same time the process allowed for reflection on how I differ from people for whom I am designing. It is comprised of four stages: “Guerilla Research,” Historical Analysis, Guided Tours and context appropriate research tools.

**“Guerilla Research”**

Guerilla research is an informal, situated, and opportunistic way to learn as much as possible about a topic in a limited amount of time. Creativity and resourcefulness are essential to this rapid process.

During the project’s first month, I took advantage of and created opportunities to absorb information about and related to housework and aging.

I started by reflecting on my cleaning experiences. How often did I mop my floor? Why did I store cleaning supplies underneath the kitchen sink? Do others buy the least expensive products or do they remain loyal to a particular brand? These questions led me to the housewares aisle at local grocery stores and “big-box” retailers. By posing as a shopper, taking pictures and jotting down notes, I familiarized myself with the various brands, performance standards, manufacturers, and dispensing mechanisms available. I began to “learn the language” associated with cleaning products, knowing that my preferences represented merely a fraction of what is available.

Following a week of “hanging around” in stores I bought unfamiliar products and incorporated them into my cleaning routine. I had never used the new Swiffer Sweeper or the popular “wipe” products, well liked among consumers. Trying these allowed me to appreciate users’ experiences with cleaning supplies that differed from the ones to which I was accustomed.

I extended this idea by ordering various foreign cleaning products.

My knowledge about housework has been shaped by living in the United States. I wanted to sensitize myself to how this shaped the products I used and familiarize myself with options available abroad. I learned that lavender scented cleaning solutions were most common
in Central and South America. European products were rarely sold in the “super sized” portions I was so accustomed to seeing. The opening mechanisms used on Dutch products were easier to use than ones on their US counterparts.

In addition to focusing on my personal cleaning habits, I delved into others. Informal interviews with anybody willing and interested to talk about housework and aging were useful. Asking friends and family how often they scrubbed the mildew in their shower, what did they most dislike about cleaning the toilet, and if they were as excited about the Swiffer floor mop as everyone else, elicited enlightening anecdotes that informed my perspective and helped me continue to sensitize myself to a variety of housework experiences.

It was important to bridge the generational gap that existed between me and older adults. Spending time in local restaurants frequented by elders, visiting aging relatives, and conducting expert interviews with gerontologists in Cornell’s Human Development Department provided additional insight into how older adults’ day-to-day lives differed from mine. People in their 70’s and 80’s typically ate dinner much earlier in the evening than I did, they discussed how their attitudes towards cleaning changed as their children grew up and left the house, and that housework was something they like to do once a week unlike me who performed it whenever I had a spare moment.

I learned how my 91-year old grandfather’s shopping experience differed from mine while “shadowing” him at Wal-Mart. Unlike my grandfather, I rarely felt frustrated or tired by the retailers’ enormous space and myriad of cleaning products. However, my grandfather found the options bewildering, as evidenced by him asking, “You go to buy these products today your Windex, your bleach, your detergent, anything, they’ve got this added, they’ve got that added, they have perfume added, which one do I want?”

If something was not directly related to housework I made it. Wanting to broaden my design horizon I found connections between my topic and seemingly unrelated events to create space for new ideas. While visiting a friend in Tennessee I took a trip to Elvis’ Graceland, in Memphis, and informally interviewed the museum staff about housework. Imagining how the shag carpet in the Jungle Room was vacuumed or thinking about how difficult it would be dust all those framed gold records and wondering if Elvis ever washed the dishes himself, encouraged wild ideas that were separated from my perceptions of housework.

Guerilla research requires designers to take in the world through the lens of their subject. It is a fast and effective way to increase awareness about assumptions they bring to their work and to broaden their understanding of users. Although not everything I did during this stage translated into a new product, the experience subtly shaped the process and results.

**Historical Analysis**

I began to understand housework today, but was curious to know how it changed over time. The cultural and historical themes that shaped elders’ lifetimes, affect how designers conceive of products. If designers incorporate historical awareness into the design process they can consciously choose those themes that bear

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1 Type “I love my Swiffer” into Google to understand.
repeating, and when to resist others [19].

I took advantage of Cornell Libraries’ vast home economics archives\(^2\) and delved into housework’s rich history. I browsed hundreds of Ladies’ Home Journal and Good Housekeeping magazines, and read prominent texts in the field, including Ruth Schwartz Cowan’s More Work for Mother and Never Done: A History of American Housework by Susan Strasser.

Three themes emerged as important to understanding the last 100 years of housework’s history in the US 1) the “labor saving” debate 2) housework as “women’s work” and 3) loss of sensual emotional qualities.

Designers often conceive of products thinking they will make tasks easier or faster to perform. However, domestic technologies which are proposed as labor saving and efficient historically have had a different impact. Research suggests new technologies may increase time spent doing housework rather than decreasing it [21, 22]. Household cleanliness standards rose during the twentieth century, thus creating higher expectation for women to produce clean bathtubs, sinks, and toilets. With the introduction of the electronic washer, laundering increased because there was greater demand for clean clothes. Indeed, novel cleaning approaches often divert time from one task to another, thus creating “more work for mother” [2].

Women are (to a lesser extent today) largely responsible for maintaining a home. The drawbacks of assuming housework is “women’s work” are well documented. Sweeping, washing, vacuuming, and tidying-up, arguably confine women to the “domestic sphere,” thus making it difficult for them to participate in the socially influential “public sphere.”

Despite housework becoming an increasingly shared activity, cleaning products are overwhelmingly targeted towards women, and during their design, the user is almost always configured as female. Men are rarely seen in advertisements touting new cleaning goods. Understanding the cultural themes embedded in domestic technology’s development can prompt designers to imagine users that are representative of today’s social trends.

Finally, as technology increasingly makes its way into our domestic lives, some of the emotional and sensual qualities that made up our everyday experiences become lost. During the past century, housework became an isolating event. Families no longer devote an entire day to cleaning their homes. Instead, it has typically become one person’s responsibility, and is performed when there is a spare minute or in preparation for guests visiting. Before dryers, women would hang laundry in their backyards where they would interact with neighbors, converse, and exchange gossip. Today, clothes dryers are confined to a laundry room or basement. Technology removed much of the drudgery associated with housework, but if efficiency continues to drive its conception, we risk losing the qualities that make experiences most human.

When designers become more perceptive of their action, and their cultural self, they can better empathize with users. Designers then have an additional set of resources upon which to draw when designing.

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\(^2\) For more information see: http://hearth.library.cornell.edu/
Guided Tours

In-context interviews and observation were the appropriate next step. I needed to dig deeper into elders’ desires, beliefs, habits, and motivations for cleaning. Anthropologists spend months looking for informants, building rapport, and developing social intimacy with groups under study. That was not a luxury I had during this abbreviated form of ethnography.

To quickly recruit participants, I asked friends and acquaintances if I could interview their parents or grandparents. Others were found by taking advantage of my social networks. I searched my undergraduate university’s alumni directory, contacted my sorority’s alumnae organization and even asked my relatives. Twenty elders were recruited (4 males and 16 females), ranging in age from 69 to 91. All interviewees had a human connection with me. This helped to overcome the social awkwardness that accompanies entering people’s homes to watch them clean. Within a month I generated a broad cross-section of the elderly population as possible. This included participants that were married, single, and widowed. Living situations varied, some lived with partners in single-family homes, others in one or two bedroom apartments. Three lived in retirement communities and two in assisted living facilities.

The process raised my awareness about the users to which I do not have access. There was only one non-white participant, two participants lacked a college degree, and most described themselves as middle to upper-middle class. Like me, most lived in rural upstate New York. Others lived in urban areas including Rochester, Syracuse, and New York City.

A guided tour in which participants show the researcher around their homes took place. Having access to the social and material aspects in elders’ lives enabled them to recall their intentions for doing something. I was able to get a descriptive narrative about how elders went about cleaning their bathroom when I was actually there. Peering inside cabinets prompted elders to articulate why they stored and organized products in particular ways and allowed me to determine which supplies they frequently used. I would ask elders to demonstrate how they washed windows or dusted picture frames. Observing these activities was important because mundane actions become so routine they may inadvertently be dismissed.

Following the tours, conversations usually veered from housework. Rather than redirecting the discussions I chose to listen to participants’ stories. Whether it was proudly telling about a grandchild’s accomplishments, reminiscing about deceased family members, or talking about the upcoming presidential election, I paid attention. Their stories provided a broader understanding of the context in which housework occurred, and shaped my knowledge and sensibilities about their experiences.

Following tours, I sat with participants and asked focused question about their routines. Then, they were asked to interact with tools aimed at eliciting stories about their past and present housework experiences.

Memory Scrapbook and Box of Products

Investigating a topic in hopes of finding design opportunities often requires developing new data gathering techniques. I created the “Memory
Scrapbook” (Figure 3) to elicit stories about how housework has changed over time and the “Store in a Box” (Figure 4) to observe elder’s reactions to and interactions with today’s cleaning products.

The tools were inspired by Gaver’s “cultural probes.” Similar to probes I wanted to overcome the officialdom or perceived authority that comes with being a researcher working on a well-funded project. Despite becoming increasingly knowledgeable about housework’s history, cleaning supplies, and aging, I was not an expert on the topic, rather the users were. Recognizing this, I developed tools aimed at tapping into their lived experiences.

The memory scrapbook is made up of various cleaning-related images from the past century. Advertisements from *Ladies Home Journal, Good Housekeeping*, and Sears and Roebuck catalogues dating from the turn of the century to the present were copied and pasted into a scrapbook. This was an attractive medium for provoking stories because of its informal nature and because it is synonymous with reminiscing.

The scrapbook proved to be an effective tool. Participants were delighted when examining the pages. They would sing old jingles and tell stories about extinct products. The book also revealed which brands and products had staying power in elder’s lives. For instance, Windex, Clorox, and Comet were favorites for many throughout their lifetimes.

I brought the straightforward “box of products” to each visit. The box contained unused and unopened cleaning supplies and I asked elders to demonstrate how they would use them. Most noticeable was how older adults’ reduced dexterity made opening packaging difficult. Unscrewing caps and removing wipes from canisters were effortless for me, but proved challenging for some participants.

![Figure 3. Memory Scrapbook](image)

**Figure 3. Memory Scrapbook**

*Results*

A collection of conceptual or speculative designs that were informed and inspired by the research process...
emerged. Speculative designs are conceptual products that suggest new applications for technology and are informed and inspired by users’ experiences [4]. Rather than being influenced by traditional metrics such as manufacturability, cost-effectiveness, and market penetration, these designs are meant to draw attention to changes that occur with aging and demonstrate how insight into those changes can fuel innovative design appropriate for all generations. Most importantly they are ideas that could not have emerged without distancing myself from my assumptions about housework, and becoming aware of a broad range of user experiences.

**Book Bottles**
Bending, stretching, and reaching are effortless for me, but for users twice my age these activities are strenuous. Cleaning products are usually stored in overhead cabinets or underneath sinks and accessing them becomes more difficult with encroaching age. This insight inspired “Book Bottle” (Figure 5). Instead of hiding cleaning supplies in hard to reach places, I suggest making them a seamless part of user’s everyday experience. I accomplish this by challenging the traditional spray bottle form factor and designing a bottle that looks like a book.

**Untouchables**
More than half of the participants received assistance with housework. When asked if there were items they did not want help with cleaning, three immediately pointed to their Hummel collections. Hummels are popular figurines created by a Bavarian nun in the early 1900’s. They represent themes of youth and love. The small porcelain sculptures are highly collectable. I never purchased a Hummel, and placing so much value on them struck me as peculiar. But participant highly prized them and described their collections as being “the one thing” they did not allow others to clean. Such precious and delicate objects needed an equally gently cleaning process. “Untouchables” (Figure 6) is a

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3 For more information see: http://www.mihummel.com/
process appropriate for prized possessions’ upkeep. Objects carefully soak in a padded tub full of specially formulated cleaning solution.

**Figure 6. Untouchables**

**Calorie Counting Spray Bottle**

When I exercise on a treadmill I receive feedback on the number of miles run and calories burned. Some older adults described housework as their daily exercise. What some elders experience while performing housework was similar to my experience at the gym, however they do not receive similar feedback. The "Calorie Counting Spray Bottle" (Figure 7) is a concept that maps the experiential properties found in exercise equipment onto cleaning supplies. Inside the bottle’s spraying mechanism is an odometer that changes every time the user pulls the trigger. If you were to apply seven squirts of glass cleaner to a surface, the odometer would read “7.” The bottle’s label has a chart to inform users how many calories they burn following each squirt. For example, 50 pulls may equal 5 calories burned. The idea is speculative and no research was conducted to determine the number of calories (if any) burned while spraying cleaner. The concept draws attention to the broader meaning user’s place onto products and activities.

**Figure 7. Calorie Counting Spray Bottle**

**“Pez” packaging**

Cleaning wipes are a new and popular way to clean surfaces. They are typically packaged in a canister or sealed plastic pouches. Accessing wipes proved to be difficult for users because the dispensing mechanism was not intuitive or required a range of motions difficult for users with arthritic hands (Figure 8). When asked to describe a simple way to open products, one study participant recalled the apparatus on a Pez candy dispenser. I reappropriated the Pez mechanism in this wipes packaging concept (Figure 9). The plastic box features a large opening which facilitates a wide-range of hand motions. Users place their hand in the roomy opening and pull-up; this activates a Pez-like spring mechanism which dispenses a wipe. The idea
demonstrates how listening to users unlike us can inspire user centered design.

**Figure 9. “Pez” Inspired Packaging**

**Bottle Monocle**
The labeling on commonly used cleaning products was too small for elders to read. This made it difficult for them to determine if the product was dangerous or appropriate to use for some tasks. The Bottle Monocle is a bendable monocle attachment that is inviting to touch and able to be positioned to wherever users need it, whether that is to read the label or magnify dirt and grime.

It’s an idea that speaks to people with decreased visual acuity and to users (unlike myself) who are fastidious and obsessive about making the surfaces in their homes spotless.

**Hands and Knees Polish**
“I was a hands-and-knees washer and still want to be, but I can’t get up and down like I used too. You have to be down on your hands and knees to really do the job.” This sentiment was echoed by nearly every participant. Elders miss the thoroughness and attention to detail that comes with being on the floor cleaning. “Hands and knees” floor polish responds to this in a playful way which prompts reflection about how elders would prefer to clean their homes. It is a powerful floor polish made with hand and knee-shaped action scrubbers. The fictitious product cleans as powerfully, thoroughly and effectively as a person down on their hands and knees.
Speculative designs are not intended to appear on store shelves; instead they raise issues about design’s role in everyday life. These concepts successfully demonstrate how novel ideas emerge when we look beyond our familiar ways of doing things. Also, they were well received in a business setting, where designers can become stymied by their familiarity with their company’s products. Conceptualizing products driven by themes other than market penetration, efficiency, and lowering costs enables corporate designers to look beyond the tunnel vision that is an inherent part of designing specific products for years.

**Conclusion**

The user population is as diverse, complicated, and multi-faceted as the products we design for them. Although we can never fully understand users’ varying interests, skills, motives, and behaviors, we can become more perceptive of our own. This process, like others, demonstrates how heightened self-awareness in compatibility with existing approaches to user center design.

Presented is a project examining aging and housework for the purpose of designing speculative products. What emerged was a thoughtful design process grounded in increasing my self-awareness, which in turn sensitized me to how users differed. A collection of innovative cleaning concepts, grounded in users’ experiences and which defy typical notion of how products are conceived of and users are presented. These concepts capture the variety of experience users have with cleaning products and provide a fresh perspective to industry. Although the process was geared towards a specific goal, I believe it can inspire and influence user-centered design by emphasizing the need to ground design in user’s experiences rather than those of the designer.
References


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