Making by Making Strange: Defamiliarization and the Design of Domestic Technologies

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This article argues that because the home is so familiar, it is necessary to make it strange, or defamiliarize it, in order to open its design space. Critical approaches to technology design are of both practical and social importance in the home. Home appliances are loaded with cultural associations such as the gendered division of domestic labor that are easy to overlook. Further, homes are not the same everywhere—even within a country. Peoples' aspirations and desires differ greatly across and between cultures. The target of western domestic technology design is often not the user, but the consumer. Web refrigerators that create shopping lists, garbage cans that let advertisers know what is thrown away, cabinets that monitor their contents and order more when supplies are low are central to current images of the wireless, digital home of the future. Drawing from our research in the United States, the United Kingdom, and Asia, we provide three different narratives of defamiliarization. A historical reading of American kitchens provides a lens with which to scrutinize new technologies of domesticity, an ethnographic account of an extended social unit in England problematizes taken-for-granted domestic technologies, and a comparative ethnography of the role of information and communication technologies in the daily lives of urban Asia's middle classes reveals the ways in which new technologies can be captured and domesticated in unexpected ways. In the final section of the article, we build on these moments of defamiliarization to suggest a broad set of challenges and strategies for design in the home.

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1. INTRODUCTION

Everyone is an expert on the home. Since our births, we have been immersed in, moved through, and made homes for ourselves. Across a range of locations and cultures, we have been bombarded with popular media imaginings of daily life and its literal and metaphorical trappings. The emotional meanings and symbolic resonances of the home find their way not only into our macropolitics, with gender, identity, and national politics revolving around our sense of what it means to be home, but also into our lifestyle decisions and into domestic technologies. Over the last 150 years, the process of industrialization has extended to the home and rationalized the kitchen as a site of production and consumption. As new technologies are adopted and adapted in the home, they both change and are changed by the social relations that they mediate, and thus, it may be useful to think of design for the home as, in some senses, a social and political act.

The home provides a large store of personal, cultural, and political assumptions that, if unexamined, can, on the one hand, unwittingly be built into and propagated through domestic technology design and, on the other, unnecessarily constrain its design space. The challenge for researchers and designers is to see beyond the naturalizing of devices and experiences to their cultural roots. In this article, we argue that "defamiliarization" is a useful tool for creating space for critical reflection and thereby for opening up new possibilities for the design of domestic technologies.Making domestic life and technologies strange provides designers with the opportunity to actively reflect on, rather than passively propagate, the existing politics and culture of home life and to develop new alternatives for design.

The article is divided into five sections. In the first section, we elaborate on the notion of defamiliarization, explaining how it offers an alternative approach to inspiring design from the scientific study of users. Drawing from our research in the United States, the United Kingdom, and Asia, we then provide three different narratives of defamiliarization. A cultural/historical reading of American kitchens provides a lens with which to scrutinize new technologies of domesticity, an ethnographic account of an extended social unit in the UK problematizes taken-for-granted domestic technologies, and a comparative ethnography of the role of information and communication technologies in the daily lives of urban Asia's middle classes reveals the ways in which new technologies are being captured and domesticated in unexpected ways. In the final section of the article, we build on these moments of defamiliarization to suggest a broad set of design challenges and guidelines that can help us to rethink the opportunities for domestic design.

2. DEFAMILIARIZATION

The term defamiliarization originates in literary theory and the work of the Russian formalists of the early twentieth century. Victor Shklovsky introduced it in an essay called "Art as Technique" and illustrated it with examples

from Tolstoy:

> In 'Shame' Tolstoy 'defamiliarizes' the idea of flogging people in this way: 'to strip people who have broken the law, to hurl them to the floor, and to rap on their bottoms with switches.' [Shklovsky 1917, 56]

Tolstoy suggests pricking the shoulders with needles as an alternative to flogging so that "the familiar act of flogging is made unfamiliar both by the description and by the proposal to change its form without changing its nature." [Shklovsky 1917]

Through this defamiliarization, Tolstoy asks if this form of punishment is acceptable, then why not another more extreme one? Shklovsky outlines a number of devices for achieving the effect of defamiliarization, arguing that "art removes objects from the automatism of perception" [Shklovsky 1917]. Defamiliarization, then, is a literary device that compels the reader to examine their automated perceptions of that which is so familiar that it seems natural and so unquestionable.

In the fantasy *That Hideous Strength,* C.S. Lewis [1942] achieves a provocative defamiliarization of twentieth century domestic life by describing it through the eyes of a character from Arthurian legend. Merlin is resurrected to become the guest of a twentieth century academic. He cannot understand the way his host lives, indeed it seems strange to him:

> You give me a bath such as the Emperor himself might envy, but no one attends me to it; a bed softer than sleep itself, but when I rise from it I find I must put on my own clothes with my own hands as if I were a peasant. I lie in a room with windows of pure crystal so that you can see the sky as clearly when they are shut as when they are open, and there is not wind enough within the room to blow out an unguarded taper, but I lie in it alone with no more honour than a prisoner in a dungeon. [. . .] You seem to me to live neither like a rich man nor a poor one: neither like a lord nor a hermit. [Lewis 1942, 286-287]

Soft beds, glass, round plates, central heating, single bedrooms: all are rendered strange because the character has never before come across them and the reader must confront them with new eyes. Lewis reminds us of the comparative luxury in which we live and the relative novelty of the technology we take for granted. The passage stresses our privileges but also suggests an impoverishment. Lewis is sometimes accused of yearning for a feudal society and there is, perhaps some evidence of that here. But, more interestingly, there is the suggestion that our servants are now mechanical and so, in some respects, ultimately inferior to the serfs they replaced. This connects to feminist critiques of domestic technology (e.g. Hardyment [1988] and Strasser [1982]). Although "mechanical servants" appear to have taken the drudgery out of housework and have certainly made the work less physically arduous, it remains dissatisfying and demoralizing because, Hardyment argues, mechanical servants privatize housework and isolate the houseworker (often a lone female) from the community [Hardyment 1988, 17]. An obvious application of this perspective to computing technology in the home is online shopping. Where someone might previously have gone to a local bricks and mortar store and met with a neighbour

or had a chat with a cashier, they can now shop for their weekly groceries without leaving the house or talking to anyone. Of course much is gained in the deployment of such technology, but there might also be losses. Our enthusiasm for the gains we can make in the deployment of computing technology in the home might make us overlook problems that would be obvious from other perspectives.

2.1 Defamiliarization and Anthropology

The passage from Lewis and other such defamiliarizations compel us to recognize our world as historically, geographically, and culturally contingent. It is therefore no surprise to find the device of defamiliarization in anthropological writing. Indeed it shares conceptual linkages with ethnographic practices, especially with ideas about naturalization—the way in which cultural phenomena gradually come to be seen as natural, the only possible way to do things, until their cultural roots are thoroughly obscured. In *Body Rituals Amongst the Nacirema,* anthropologist Horace Minor [1956] described attitudes toward the body in Nacirema society. Minor suggests that Nacirema beliefs and practices, though poorly understood, serve as an example of the extremes of human behavior:

> The fundamental belief underlying the whole system appears to be that the human body is ugly and that its natural tendency is to debility and disease. Incarcerated in such a body, man's only hope is to avert these characteristics through the use of ritual and ceremony. Every household has one or more shrines devoted to this purpose. [Minor 1956, 503]

It gradually becomes clear in the course of this essay that "Nacirema" should be read backwards and that what is being described (or rather defamiliarized) as a shrine is actually a bathroom cabinet. Although the tone of the piece is playful and ironic, it makes serious points about Westerners' alienation from their own bodies.

Reading ethnographic accounts of the UK can have a similarly dislocating effect on UK readers. For instance, in a recent study for Intel, Bell [2001] points out that people in the UK have to pay for local and national telephone calls by the second and part second. UK residents might respond to such an observation with "well of course, that's obvious, doesn't everyone?" The ethnographic description renders the practice strange and therefore questionable. This kind of observational work is part of the ethnographic tradition of unpacking and interrogating naturalizations of social practices and institutions. In this sense it is implicitly critical: "why should we pay by the second for local calls, no-one else does!" Such ethnographies invite us to look again at our public and private spaces, our social practices, ourselves, and notice, perhaps for the first time, how strange it might all look to other people.

2.2 Defamiliarization and Domestic Design

In analyzing trends in information appliances for the home, the design space currently seems unnecessarily constrained. Certain themes keep recurring; for example, the Microsoft Kitchen of the Future [Microsoft 2004], MIT Media

Lab's CounterActive, [Kaye et al 2000] and Sunbeam's mixer all track and support users in following recipes. Yet despite ongoing industrial interest, none of the new domestic appliances seem to catch on. Even in the absence of cultural concerns, we need to find strategies to identify and break out of the central metaphors dominating current domestic information appliance design. Critical approaches to technology design are therefore of both practical and political importance in the home.

Feminist studies of technology have long been critical of the design process and the means of gathering the data that informs design [Grint and Gill 1995]. Danielle Chabaud-Rychter [1995], for example, describes the design process for a new food processor developed by a French company. The account shows how domestic knowledge is incorporated into the design process via marketing, and it also shows the transition of one kind of knowledge to another: "Domestic practices are itemized, categorized and counted in order to define markets for the appliances" [Chabaud-Rychter 1995, 109]. Information handed down in tradition and recipes becomes translated in the design lab into the language of chemistry and physics. In this article, we want to suggest other ways of enabling and inspiring design solutions.

One such approach we have seen in HCI is ethnographic studies of the workplace, and recently ethnographic studies of the home have also become common [Venkatesh 1996; O'Brien and Rodden 1997; Hindus et al. 2001; Blythe and Monk 2002]. Most of these studies acknowledge that studying the home is a difficult endeavor. In "The structures of everyday life", Braudel points out that the aim of studying the everyday is an ambitious and complicated one. His groundbreaking history brought together marginal areas of study that were usually kept separate: "demography, food, costume, lodging, technology, money, towns" [Braudel 1981]. To study the home is to focus on a great many areas of human life and to focus on what might seem relatively insignificant. One of the difficulties of ethnographic studies of the home then is asking questions about what seems to be obvious. It can be difficult to articulate, for example, how we watch television, and in a sense the ethnographer must encourage the participant to talk about it as if s/he were talking to someone from Mars.

Ethnographies of domestic technologies cannot help but make them strange. The act of, for example, analyzing a kitchen sink in terms of its cultural or social significance would seem to many people like quite an odd thing to do. But it is by questioning the assumptions inherent in the design of everyday objects that HCI has always opened up design spaces, pointing towards better and more innovative designs. This is exactly what Norman [1988] did so memorably and so well in *The Psychology of Everyday Things*. Norman made us look again at things that we probably thought that we understood very well: door handles, faucets, filing cabinets. By asking seemingly simple questions, he makes something as everyday as glass, strange. What is glass for? What are the affordances of glass? "Glass is for seeing through and for breaking" [Norman 1988, 9]. In this way, Norman makes glass strange (glass is for breaking!), he defamiliarizes the familiar. In so doing, he popularized a spirit of critical inquiry that has become a standard method in usability studies.

3. DEFAMILIARIZATION AS INTERPRETATION: STORIES OF HOMES

Defamiliarization then is a literary technique and can be used as a method which calls into question our usual interpretations of everyday objects. In HCI, one example of defamiliarization is the use of extreme characters [Djajadiningrat et al. 2000] or designing applications for the viewpoint of a particular, idiosyncratic, and unusual user. Djajadiningrat et al. argue that such design strategies uncover and alter underlying assumptions about users built into applications, suggesting new options for design that may be useful or interesting even for normal users.

Defamiliarization is explicitly *not* a scientific method; it does not aim primarily to create a better understanding of actual users—Djajadiningrat et al. [2000], for example, simply made up the characters for whom they designed. Rather, it provides a lens to help us see our own design practices in a new light. Although C. S. Lewis's Merlin is a fictional character, his description of modern homes provides an alternative viewpoint from which we can reflect on our own lives, even if C. S. Lewis is wrong about details of the middle ages. In this article, we will argue that ethnography and history can both provide defamiliarizing narratives that help us to rethink assumptions built into domestic technologies.

It is important to note that this role differs from the one usually assigned to ethnography in HCI. Normally, it is used to better understand our target users and their practices so that our designs can better address their needs. In this article, we are instead suggesting that it can provide alternative viewpoints on assumptions in the design process itself. In the following sections, we provide such viewpoints from a political history of the American kitchen, an ethnographic account of an extended family in England, and finally a comparative ethnography of Asian families and homes. Each of the following sections is intended not to make broad claims about American, English, or Asian homes but to point out issues in specific stories of those homes that raise questions for design. We begin with the past, which as L.P Hartley once remarked, is a foreign country: they do things differently there.

3.1 A Story About American Homes

The American home forms a cultural anchor for much contemporary domestic technology design. In part, this is because a substantial component of IT research is driven by the US; in part, it is because, of all contemporary cultures, the US has most successfully placed itself as a global paradigm for aspiration. In this section, we uncover some of the assumptions behind current domestic design by placing the American home in its historical context. Historical accounts of technology are not a standard part of the HCI toolbox but could play a central role in defamiliarizing home technologies and thereby suggest alternatives to current approaches. New technologies for the home are often based on strong assumptions about natural behavior in the home, but the changing history of domestic technology can illuminate other options we may wish to consider.

In particular, in this section we draw on historical analyses of domestic technology in the kitchen in the developing American consumer society (e.g. Cowan [1983, 1997], [Strasser 1982, 1989], Horsfield [1988], Kline [2000]). The story

we develop here may itself be defamiliarizing to practitioners of HCI because historians concern themselves not only with the facts of technological change but also with its interpretation and politics, suggesting, for example, as Strasser does, that "industrial food preparation has controlled and distorted the central ritual of daily life by subordinating all of its values to profit" [Strasser 1983]. These politics are open to debate, and it is not the goal of this brief section to prove that interpretations like Strasser's are correct, rather, as outlined in the previous section, we wish to use this particular interpretation of the American home as a lens through which to defamiliarize assumptions that have found their way into current domestic design.

According to these historians, in the early 19th century, kitchen technology consisted of an icebox, a work table, a cupboard, and a wood stove. Recipes were handed down through a family, representing a family's unique history and ethnicity. They did not give the precise instructions we are used to today, but used approximate ingredients and measurements intended to be interpreted by a housewife with a lifelong experience in cooking. Women prepared food from their own produce. Store-bought goods were rare; when people bought them, they did so at a general store where they were personally served by someone they knew. There were no brands, and food like milk came fresh from the producer. Cooking and tending the stove was time-consuming and central to home life.

All these attributes were changed through industrialization and the rise of consumer culture. The equipment of the kitchen began to change in the late 19th century when women were introduced to the wonders of factory-made gadgets like apple peelers which helped replace the labor of the domestic servants who were simultaneously leaving the home to work in factories. The electric and gas stove and the refrigerator were developed in the teens, saving enormous amounts of labor. Industrialization and the vast improvements it made in the average standard of living inspired movements to use science to rethink all aspects of life, and the kitchen was no exception. The scientific cooking movement promoted by Fannie Farmer introduced diets, menus, and recipes based on newly-discovered nutrients, vitamins, and calories. Measurements were standardized, and the movement actively campaigned through schools and home economics education to eradicate ethnic cooking which was considered unscientific and unhealthy. In the process, the recipe was removed from the realm of the family and subsumed to scientific authority, and cooking processes became relatively standardized.

The teens and twenties saw the rise of commercial processing and convenience foods such as Wonder bread and Jello. Instead of making foods themselves, women saved time by buying prepared food at the newly developed self-service grocery store. This ease was bought through increasing dependence: corporations began to have an ever-increasing say over what appeared on American tables. In order to reach consumers directly, the concept of branding developed and gradually began to impact numerous aspects of everyday homelife.

During the last half of the 20th century, the cultural scene has clearly become more complex, yet many of these formative themes have remained current or

expanded. From factory farming to the microwave, the growth and preparation of food have become faster, more standardized, and more convenient. Unlike Fannie Farmer's day, homemade, ethnic food is now considered the height of hospitality and gourmet cooking is a popular hobby. But in our fast-paced culture, many people do not make the time to prepare their own food from scratch on a day-to-day basis, and with the advent of chain restaurants, even ethnic food has become standardized American fare [Ritzer 1993]. We continue to seek scientific expertise to tell us what to eat, what supplements to swallow, and how to lose weight.

If we look at the overall history of the kitchen over the last century-and-a-half, the following trends emerge. Cooking has increasingly been seen as an industrial process to be optimized. Science and technology have become authorities over how people cook in their homes. Although we eat healthier, unspoiled food in greater quantity then has ever been possible before, in domestic cooking technology there has been a strong emphasis on efficiency over quality—microwaves, for example, make food faster but not better. In contrast to earlier home production, food has now largely become a standardized commodity—"Every can is the same," as an early ad for Spry lard proudly touted. In moving from home-grown and prepared foods to industrialized ones, many people are alienated from food production. In our complex interdependent society, industry has a strong influence over what is cooked. Marketing has become central to American culture, gradually penetrating all aspects of the kitchen.

Of course, these overall trends do not describe everyone's experience; there are plenty of hobby cooks and slow food afficionados working hard to reverse these trends. But while these historical trends do not necessarily repeat themselves in all users' lives or desires, they *do* repeat themselves to a surprising extent in many current designs for new information-based domestic technology (see e.g. Achenbach [1999], Carlson [2001], Dolinar [1999], Kaye et al. [2000], Koopar [2004], Lee [2002], Spicer [2000]). From microwaves that know how to cook frozen food to ovens that can be turned on from the office, these gadgets often do not focus on improving the quality of cooking and meals produced, but instead on improving the efficiency of the cooking process or adding commodified fun that distracts from the presumed drudgery of cooking. Blenders, mixers, and counters that monitor users' actions and let them know when they have deviated from the "One Best Way" of the recipe continue to promote external control over cooking, leaving little free range for cooks' creativity. Refrigerators that automatically make shopping lists, order new products, and support target advertising to consumers in their homes continue the drive to penetrate every nook and cranny of the home with marketing. While these trends are clearly not all bad—for example, some users do not know how to cook and are happy to have computerized support—we believe that they unnecessarily constrain the design space and propagate values not all target users would choose to share. We suggest that identifying and resisting these trends can suggest new portions of the design space to explore, resulting in a range of products that will more fully address the range of possible lifestyles in the home. In the last section of this article, we will propose alternative design criteria for domestic technologies derived from resisting these apparently natural trends.

A historical and cultural analysis of American domestic technologies and ecologies is one way to defamiliarize the home—it offers a way of making sense of the kinds of interventions and inventions that have transformed that space. Another way to defamiliarize the domestic space is to move beyond the American setting. In the next section, and the one that follows it, we use more traditional ethnographic techniques to unpack the domestic spaces of some homes in England and Asia.

3.2 A Story About Some English Homes

In 2001, Blythe and Monk [2002] conducted an in-depth ethnographic study of an extended family in the north of England comprised of seven individuals in three households. The first household was that of a middle-aged couple and their youngest son; the other two households were those of their two eldest sons who were living in their own homes with their partners.[1] Although the small convenience sample here limited the scope of the study, the aim was not to produce a generalized picture of English domestic life, but rather to problematize taken-for-granted technologies in order to provoke or inspire the design team of the company that funded the research, Daewoo Electronics. Data was collected using the Technology Biography procedure [Blythe et al. 2002]. Some of the most interesting data collected arose during the personal history element of the technology biography where participants were invited to reflect on the ways in which home technologies have changed during the course of their lifetime. Questions on what technologies were used for housework and home entertainment in the past yielded rich data. There was often an appreciation of how drastically technologies had improved, but there was also some nostalgia for the past and critical reflection on current trends. Key findings are summarized in the next sections in terms of space, community, time, labor, and play.

3.2.1 *Space.* In a recent study identifying important themes which reflect the home as a distinct design environment, Hindus et al. [2001] argue that households are sanctuaries which provide a refuge from work where people can rest or play without scrutiny. But individuals who share domestic spaces are also subject to sometimes unwelcome scrutiny from the other members of the household. Charlie, a twenty-one year old living with his parents Fred and Beth, reported using the Internet for adult entertainment three times a week. Coronation Street is a popular UK soap opera, and Charlie headed for the net as soon as it started. Charlie hoped his parents did not know about this, but actually the whole family knew, as this drunken conversation with Charlie and his brothers Alex and Jake indicated: "We got a dose of the giggles when we started talking about the interviews and how Charlie did so little housework and used the PC room as his 'wanking room' and the PC as his 'wanking machine.' Alex impersonated Fred after dinner, saying, "No son, I'll clear the pots away, you'll be wanting to go and whack off". Much hilarity. Charlie thought, or said he thought, that no one knew. But Jake pinned him

[1]Throughout this article, we have changed the names of the household members with whom we worked to protect their privacy.

down to a 7.30 Coronation Street starting time. Then we were coming up with Coronation Street euphemisms for wanking like 'I'm off for a Deidre Barlow' (a Coronation Street character) and 'Looking forward to the omnibus edition are you?' And so on." [Field Notes]. Charlie's parents, Beth and Fred, were well aware that Charlie used the Internet to view adult material. Beth remarked, "I had noticed that he'd stopped buying his porno books and things, and I think that's because he's found a substitute on the Internet probably." However, this was never discussed with Charlie. Social convention and a respect for privacy ensured that this knowledge was not referred to directly. It was only in the context of a drunken and very humorous conversation that it could be openly discussed, and here the soap opera euphemism defamiliarized the act—"I'm off for a Deidre Barlow." Ordinarily, there was a kind of fiction of privacy around Charlie's use of the Internet or a willed suspension of disbelief.

Charlie's dilemma will be familiar to most adolescents and young adults still living with their parents and to many adults sharing their homes in one way or another with other people. In the micropublic of the home, particularly in the relatively small domestic spaces in England, we know too much about each other. Protecting the privacy of the individual in the home is often thought of in terms of protection from organizations outside of the home (e.g., the state). Big Brother is an important aspect of the politics of domestic technology, but so too is Little Brother.

3.2.2 *Community*. The personal history section of the technology biography often elicited reflections on social practices and technologies that have now disappeared. This kind of reflection on the past often defamiliarized the present. Beth, reflecting on her childhood described what she perceived as a "breakdown of community" where neighbors in her childhood had all worked in the same factories and drank in the same pubs it was "much more diverse now (. . .) I haven't had close contact with them (the neighbors) and we're not always in and out of each other's houses as you might have been years ago." In the last thirty years, the UK employment market has undergone major changes with notable trends including downsizing, delayering and outsourcing (all euphemisms for making people unemployed), with increases in temporary, shortterm contracts. Since the mid-1990s, graduates have been warned that the "job for life" is a thing of the past and to expect frequent relocations and periods of unemployment in ever less certain labor markets. Since graduating from University, Alex, Fred, and Beth's eldest son, had moved from the West Midlands to the Southeast and back again to the North of England, following work in all cases. Neither Jake (the second son) nor Tracey (his partner) worked in the same town that they lived in. Fred had worked in different countries for extended periods for most of his adult life.

After reflecting on his childhood during the technology biography, Fred had this to say: "I think society has become more and more or less and less social, it's more individual. There isn't the grouping together of—like you would all play marbles together, now everyone is in different rooms doing different things, some are playing games some are listening to music." Ulrich Beck argues that the social bonds of the nineteenth century such as class and the family are

breaking down. At the same time, such "group specific sources of meaning" as religion or faith in progress are disintegrating. Individuals must now confront alone the threats that would previously have been dealt with by recourse to kin or village groups [Beck et al. 1994]. Part of the appeal of Web sites like Friends Reunited that put school, college, and university alumni in touch with each other is that they allow us to refer back to lost peers and measure our own progress and decisions by theirs'. These sites restore some of the connections that we have lost.

Enhancing a sense of community, then, can be thought of as an increasingly important challenge for designers of domestic technologies. However, the home is a complex design domain with sometimes contradictory requirements. Fred, for instance, shared his wife's memories of neighbors being in and out of each other's houses when he was younger, but he thought this was "bloody awful" and added "thank God those days are gone". Although connecting to people is important, so too is avoiding them.

3.2.3 *Time.* Again, reflections in the technology biographies on how devices had changed over time provided insight into how routines and social practices have been shaped, though not determined by, new developments. Washing machines developed at a time when whole days would be devoted to a weekly wash. Beth reflected at length on the changes in wash day routines that she had witnessed in her lifetime: "with this [*her current drum washing machine*] you've got to have a whole different way of washing. These I think are better used when you pop washing in every day. You know, gone are the days when you had a separate day set aside for wash day (. . .) yes, you're not physically scrubbing, but you've got to wait for that wash to be done. OK, you can go off and do something else, but you know that basket sits in the kitchen the whole day." Clearly the development of household technologies such as the drum washing machine have had a tremendous impact on the lives of many women. Indeed Doris Lessing, noting the momentous impacts of contraception and labour saving devices, has argued that science has done more for the liberation of women than feminism.

One of the most rigorous and compelling studies on the use of time in the West makes the controversial finding that labor-saving devices do not save time [Robinson and Godbey 1997]. Potential time saved through household technology becomes increased output or improved quality, for example, more clean clothes in a bigger wardrobe [Robinson and Godbey 1997, 259]. While the gains made through labor-saving devices are undeniable, we must guard against raising standards and expectations to the point that though the work becomes easier, there is more of it to do.

3.2.4 *Labor.* Recent data from the Office for National Statistics demonstrates that there is no longer an unequal distribution of household chores between men and women in the UK. Men are not only doing their fair share of housework, they are now doing more than their share. In fact, men spend about twice as much time on housework as women. Men do nearly all of the household laundry and ironing, and they spend more than twice

as much time washing up, tidying, and looking after children. The only area where women do more household work than men is home improvement and decorating.

Of course, this is a defamiliarization of current statistics and the reverse is actually the case. Housework remains statistically female work and it is interesting to consider, in this light, the range of labor-saving technologies available and their use in UK homes. UK Government data reveals that there is a television in 99% of British households while just 23% own a dishwasher [ONS 2001]. Entertainment technologies appear to be a greater priority than task-based technologies. Although as previously noted technologies like dishwashing machines have made tremendous differences to the lives of many women, they are far from available in every home. And it is not the case that technologies are available for every, or even most, aspects of housework. There are currently no technologies commonly available for tidying up, for example, though perhaps there will be as robotics advance. Apart from monitoring technologies, there is little technological support for childcare. The relative paucity of tools for female work, coupled with the spread of ownership of existing technologies, perhaps indicates men's continuing economic power in the home and the lack of value placed on housework.

In 1959, just under fifty percent of women were in paid employment; in 1999, the proportion had risen to just under seventy percent [ONS 2001, 74]. Both Tracey and Katherine worked fulltime, and Jake and Alex were expected to do half of the housework although they resisted this. Jake did not object to gardening and home improvement. Both can be physically arduous tasks, and they are also traditionally associated with male activity, they are also statistically male work in the UK [ONS 2001]. But Jake resisted the more mundane, routine, and traditionally feminine tasks such as laundry and ironing. Patterns of gendered divisions of domestic labor may take more than one or two generations to die out but the process might be hastened by changes in design. As the labor market changes, product designers must consider changing patterns of use. Other products are targeted at men and exploit the culturally posited characteristics of masculinity—toughness, resilience, personal power [Jordon, 2000]. While, for example, "women's razors" are slim and generally white or pastel, male shavers are invariably chunkier and colored in black and silver. The connotations of the two styles of razor are rooted in common cultural representations of masculinity and femininity.

Imagine for a moment that men really did do twice as much housework as women. What would an iron look like if it were designed for a predominantly male market? Up until recently irons, food processors, refrigerators, and washing machines, like women's shavers, were rarely presented in the blacks and silvers of TVs, HIFIs, and DVDs. As Katherine noted, "All these sort of goods are in black and really how many people's living rooms are going to fit in with a black colour scheme? (. . .) That's bachelor pad.[. . .] There's the big bad boy speakers which go with the big bad boy stereo, which are horrid" Through aesthetic design choices, these technologies are gendered. To an extent, this is already changing, but if men's transition to domestic work is to be encouraged, then existing design legacies should be challenged.

3.2.5 *Play*. Recently a new danger sport has been invented, "Extreme Ironing", where people scale mountains and, once they've reached the top, do their ironing. What is remarkable about this is that they seem to have discovered a way of making ironing enjoyable. By, as Mihaly Csikszentmihalyi [1975] put it, changing the symbolic meaning of the act, they make it a pleasure. A redistribution of domestic labor is clearly one of the central social issues in the design of domestic technology. But redistribution would only be a partial solution: someone would still have to do it, and equally miserable men and women is a low goal to aim for. Whichever sex is engaged in housework, neither are likely to enjoy it. Housework is rated low in satisfaction scales across all groups in countless surveys. Making household tasks more enjoyable then is an increasingly important design challenge.

Csikszentmihalyi's (1975) study of flow is one of the few psychological models of pleasure available. After studying diverse groups, such as rock climbers, chess players, and dancers who were all engaged in activities that were their own reward, Csikszentmihalyi discovered a common characteristic of their experiences, flow. Flow was a term used by the participants themselves to describe a peak experience of total absorption in the activity. Csikszentmihalyi identified the conditions for flow as a close match between skill and challenge, clear goals, and constant feedback on performance. It was characterized by a decrease in self-consciousness and time distortion in that an hour could seem like a minute.

In housework, goals are clear, but part of an ongoing work pattern; there is control but little challenge. Some aspects of domestic tasks were enjoyable in particular contexts for the participants in this study. Indeed certain domestic activities feature some, though not all, of the characteristics of flow activities. Here Jake, reflected on the housework that he didn't mind doing: "Yeah, you know, you can instantly see some improvement [*when cutting the lawn*], the first cut that you take. And sort of looking forward to the rest of the lawn looking like that. [. . .] I don't mind hoovering, you can get a bit of feedback from hoovering, you know, you can see the carpet come to life." In these examples, there is constant feedback but little challenge. The design implication may then be to consider counterintuitive measures such as making domestic tasks more difficult and changing their symbolic meaning (as in extreme ironing). It would be possible, for example, to incorporate a digital game into the act of vacuuming a floor as participants at a workshop on fun imagined (Davenport et al. 1998).

We will return to the design challenges raised here in the final section. However, before we turn to design, we want to enact one further defamiliarization: that of using ethnography to unpack homes in urban Asia. This kind of ethnographic turn serves two distinct but interpolated purposes. First and most obvious is the fact that in order to design for non-Western contexts, it is good to understand what underlies those contexts no matter how partial one's understandings might be. Second, and more in line with our overall argument around defamiliarization, there is a long standing tradition of using ethnographic encounters with 'otherness' to help critically reflect on our own cultural practice. The value of doing ethnographic research is that it might evoke unexpected design opportunities at home.

3.3 A Story About Some Asian Homes

In December of 2003, Bell [2002] concluded a two-year multisited comparative ethnographic project to gain a better understanding of the ways in which cultural practices in urban Asia might be shaping relationships with and resistances to new technologies. This project included household interviews in 19 cities across seven Asian countries (i.e, India, Malaysia, Singapore, People's Republic of China, Indonesia, South Korea, and Australia) as well as broader ethnographic research. At the conclusion of the fieldwork, it was possible to identify some preliminary factors that impact the ways in which people occupy, utilize, and imagine their homes across a number of very different Asian urban centers.

In this section, Bell [2002] uses the daily lives of three very different Asian families to illustrate some of the project's key findings: (1) that the home is a cultural construct both in terms of its physical manifestations and its imaginings; (2) that the individual is not always the smallest unit of social meaning within the home; and (3) that domestic technologies support a range of experiences beyond usage models of productivity or entertainment. Bell's findings suggest a different set of constraints and challenges when designing domestic technologies suitable for Asian homes and cultures. In so doing, the work also suggests a kind of defamiliarization strategy for non-Asian homes—might these dimensions of Asian daily life also be present in other homes?

3.3.1 *Beyond the Single Family Dwelling.* The Mok family lives in two adjoining flats in one of Singapore's residential neighborhoods—it is an older neighborhood with well established and tamed green spaces. Three generations live together in two flats on the fourth floor of an older concrete apartment building; it is a walk-up/walk-down apartment. The whole family has been living in this apartment complex for the last sixteen years. Beng and Limpoh bought the flats when they got married and knocked down the walls separating the two kitchens to create a much bigger space for their extended family. Limpoh says, "we knocked down the wall in the kitchen to make one big flat. It is better for a big joint family, and it is means we can look after the old people better." Today, the family is considering moving to something a little more modern with an elevator that goes to every floor. A single-family dwelling, free-standing with a yard and individual control over (mostly) reliable resources inhabited by a small nuclear family, is not the home of urban Asia.

Across Asia, there is a strong trend towards increasing urbanization: more than 45% of Chinese households and more than 35% of Indian households are urban, and the numbers are growing. Compounding rates of urbanization, there has been an overall decline in the number of children born into most Asian families and an aging of the overall population. Living in cities is not just about the promise of employment, but also about a desirable location for many of Asia's growing middle classes. And as they move to cities, they move into apartments. Indeed unlike their American counterparts, urban Asian homes are rarely free-standing dwellings; they are far more likely to be apartments within larger buildings or complexes. In these dwellings, residents might share resources, including common areas and infrastructure. Unlike their American

counterparts, Asian urban dwellings are small and have fewer rooms, yet frequently more occupants. For example, less than 15% of urban Indian households have more than four rooms, (the average is slightly below 3 rooms), but the average urban Indian household has more than five members.[2] By sharp contrast, 91% of American households live in homes of more than four rooms where the average household has about 2.5 occupants.[3]

For the Moks, an apartment in a block of identical apartments is the dwelling of choice, if not of preference. Their apartment purchases were framed by a desire to create a space for family life. The same can be said for many other families in Singapore and other urban centers across Asia, especially those in India and China. These apartments are home to a striking diversity of family compositions—nuclear families, multiple generations of the same patriline, extended families, and families with live-in domestic servants, or dedicated household help. Gendered divisions of labor and space still exist within most Asian homes, though women retain significant informal authority within the domestic realm—this authority extends to acting as a gatekeeper or guardian of technology objects and monitoring usage and users—and the domestic realm is still valued as a complementary partner to the public arena. This construction of the domestic, interestingly, seems to have resulted in the consumption of adult content on the Web moving from domestic/private spaces to public/cyber cafes.

The livingrooms of Indian middle class homes are a center of social life, a place and space where people gather to talk, chatter, hang-out, gossip, and be together. For some families, the home might also be a space for simplicity and quiet. In many Muslim homes in both Malaysia and Indonesia, the home is also a separation from worldly concerns; here the threshold between the home and the broader world is constituted more formally and is less porous to new people and new technologies. In the Moks' case, family life also connects up a set of related households with the family convening on Friday nights for food and company. Home in this case might well exist across a number of dwellings.

In thinking about these Asian homes and in reflecting on the lives lived within them, it is clear that the (American) model of the atomized single-family dwelling does not have a lot of resonance. To design for these homes would mean embracing very different understandings of what we mean by home as a physical and cultural space especially when these understandings are read back against the kinds of resource scarcities that sometimes characterize daily life in urban Asia and may come to characterize life in the resource-intensive West as energy reserves are depleted.

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[2]Statistics on household size for India come from data collected in 1991. http://mospi.nic.in/comenv2000tab7.2.3.htm. For Malaysia: http://www.statistics.gov.my/English/pressdemo.htm.

[3]The most recent US census (2000), as well as a recent survey of American homeowners reveals that the average American home is between 1700 to 2000 square feet (185 sq. metres). http://www.census.gov/hhes/www/housing/ahs/ahs01/tab23.html. The average UK home, by contrast, is only 925 sq. feet (86 sq. meters), the number of bedrooms has been increasing in UK homes, up from one in 14 houses completed in 1971 with four or more bedrooms to almost three in ten by 1997. http://www.statistics.gov.uk/STATBASE/ssdataset.asp?vlnk=3614.

3.3.2 *Beyond the Efficiency/Entertainment Model.* Ratnasari and Misdan live with their children in a terrace house on the outskirts of Kuala Lumpur. In their mid-thirties, both Ratnasari and Misdan are longtime IT professionals. They describe themselves as a devout Muslim family; Misdan says, " there is no separation between life and religion." Ratnasari describes her house as a 'link house,' or an integrated house, as it shares a wall and a garden with her mother's house next door. This way the children are always supervised. The whole family, including several cousins, gathers to eat in Ratnasari's mother's kitchen every evening. Ratnasari and Misdan have five children (four girls and one boy), aged between sixteen months and eight years old. All of the children, except the baby, are in local schools. Misdan also has two older children from his first marriage, a son aged fourteen and a daughter aged eleven, who are in boarding school several hours away.

For Misdan and Ratnasari, contemporary technology devices have filtered into their daily lives—both own mobile phones and laptops—and also into their home. It is in this latter context, in particular, that these technologies are subjected to cultural and social demands: to support the education activities and aspirations of the children and to blend into a home defined by Islamic practices (which militate against bringing work and other secular concerns home). Elsewhere in Malaysia, the latest generation of mobile phones allows their users to find Mecca, via a "m-qiblat" service; the phone does cultural work almost unimaginable in a western context.[4] It orients its user to devout religious practices. This unfamiliar use of such a seemingly ubiquitous communication device has profound implications for the design of domestic technologies for the specifics of an Islamic market, and also for a broader question—what would it take to create domestic technologies that underwrote explicit religious practices, or that support more general spiritual habits [Muller et al. 2001]? Even the most ordinary domestic devices take on unexpected lives in new cultural contexts.

As previously noted, there is a long and historically grounded tradition of evaluating domestic technologies against a series of efficiency metrics: it saves time, it saves labor, it saves space. While it is the case that some of the existing technologies in Asian homes are used for work or entertainment, there is just as likely to be an educational usage or aspiration tied to the object especially with computers and the Internet. In several Asian countries, particularly India, new technologies are often linked to communication and community formation—instant messaging is used to recement familial ties across a far-flung *diaspaora*. And it is certainly the case in Malaysia that some new ICTs are being used to underwrite Islamic religious practices. Interestingly a lot of new technologies in Asian homes are also linked to e-government and nationalist projects—the cost of PC purchases in Malaysia were underwritten by the Malaysian government throughout the late 1990s. These domestic technologies that promote education, e-government, the extended family, or even enlightenment not only suggest opportunities for further development within the Asian context, but also challenge our own assumptions about what technology might or should do for us.

[4]For details about this service, http://www.maxis.com.my/islamic/solat_qiblat.asp.

3.3.3 *Beyond the Individual.* Xiao-Lan started school when she just turned six; this means that she is the youngest child in her second grade class in one of Guangzhou's large primary schools. Her parents placed her in a special program that exposes her to English lessons two grades before the rest of her peers. Her teachers recommended specific English languages VCDs to help with her spoken language skills, the same teachers sell those VCDs. She watches the programs every night while she is doing her homework. Her parents watch the programs too and supervise her homework. Her mother reflects, "Paying so much attention to our daughter isn't very good for her but we don't really have a choice, when we are not supervising her, she still finishes the work, but the quality is lower. And then the teacher scolds us, 'what kind of parents are you? Don't you check her work?' So we feel like we are losing face, so we have to supervise her. We are slaves to our daughter." In Chinese families like Xiao-Lan's, the impact of China's One Child policy has been to amplify the sense of responsibility that children feel to succeed—on their shoulders rests the weight not just of their own success, but the success of their parents, grandparents, and ultimately their deceased ancestors and their name.

Unlike American culture, most Asian cultures do not value the individual as the smallest unit of social organization, rather there are a range of other kinds of social units ranging from the extended family to the clan, surname, native place association, women's lending circle, lineage, or patriline. Xiao-Lan's parents have a strong sense of sacrifice and duty. Anthropologists and other social scientists have written extensively elsewhere about cultural values like filial piety and the strong role they play in shaping Chinese society. For Xiao-Lan's parents, it is not entirely about their daughter, rather it is about the success of the whole family, and as such, the computer is a domestic technology that might have individual users and delegated usages, but it fits into a larger set of household aspirations or familial dreams. In other Asian cultures too, there are units of social organization and significance beyond the individual. Thus a focus on individual users may be limiting. We may need to contemplate instead a different array of interactions between shifting complexes of individuals and agendas, users, and usages. This defamiliarization of usage models might allow for very different constructions of security, privacy and trust, as these all arise out of contemporary (American) civil society conceptions of the individual and individual rights.

Clearly, there are a number of important factors impacting the home in Asia ranging from cultural and social practices to political and environmental issues. Paying attention to this larger constellation of factors and the ways in which homes are embedded within these systems allows us to develop a different set of criteria to help situate and frame new domestic technologies. Bell's [2002] research highlights several domains in which daily domestic life differs sharply from that in Britain and America around issues of space, aspiration, and social organization. In turn, these factors have a significant impact on the ways in which we can defamiliarize the home in order to constitute culturally appropriate design interventions. In the next section, we want to build on these moments of defamiliarization to suggest a series of design interventions.

4. DESIGNING *STRANGE* HOMES

The previous sections used three different strategies—a cultural history of American kitchen technology, ethnography of some English homes, and comparative ethnography of some Asian homes—to defamiliarize the home and technologies designed for it. While each of these stories about homes is by no means a definitive account of use in those contexts, they raise a range of issues and suggest a set of vectors along which significant differences and variability might occur; places where it was possible to make the familiar strange. In this section, we suggest that this defamiliarization of the home can also inform design. Clearly, the approach we advocate is in dialog with other projects rethinking the assumptions that underlie technology (e.g., Agre [1997], Gaver and Martin [1999], Dunne and Raby [2001, 2002]).

In this section, we elaborate on our critical understanding of the social and cultural meanings of domestic technologies in twelve statements outlining challenges and strategies for design in the home. These strategies build on our research as well as the research and design of others who are interested in rethinking the assumptions that underlie technologies for the home. In addition, we also want to take up the challenge of moving domestic design beyond the Western context to a broader set of cultural milieus. The statements are intended to defamiliarize some of the more standard HCI design goals.

(1) *Efficiency is overrated.* In Western (especially American) culture, technology is designed to make us more efficient, both outside and inside the home. HCI is no exception to this drive for efficiency; the concept of usability, for example, tends to focus on issues that block efficiency, such as how hard it is learn to use a system, how frequently errors arise, and how long it takes to achieve tasks with the system. Focusing exclusively on efficiency unnecessarily limits the design space. More fundamentally, historians of technology have demonstrated that the efficiency we take to be synonymous with technology is often a myth (e.g., Cowan [1983]). Domestic technologies often trade one kind of task for another (cleaning for chopping in the case of the food processor), create work by raising standards, or make a variety of zero-sum tradeoffs between saving time and saving labor. Rituals in the home may be inefficient, but they should not be optimized away. In considering alternatives to efficiency, designers may be inspired by homes around the world where technology is used not only to save time, but also to provide new opportunities, to create new experiences, to connect with loved ones, and to enjoy new hobbies. As interest in the home as a design environment increases, many HCI researchers are exploring similar opportunities in domestic spaces, for example, Abowd et al. [2002], Gaver et al. [2002], Mynatt et al. [2000, 2001], Hutchinson et al. [2003]).

(2) *All tomatoes are not alike (and neither are users).* New computing applications for the kitchen are often based on the assumption that each instance of food is basically the same. While each tomato may have its own history, shape, color, and taste, the information appliance assumes that all that matters is its class, as connoted by its UPC code. As shoppers at farmer's markets and subscribers to small farms have already discovered, a richer and less standardized understanding of food in the home can enrich the cooking experience. For

example, as long as we are making food with codes, we could mark them not only with their abstract class in the supermarket framework but also with the history of that particular item's production. A Food Individualizer would be a handheld device with a small screen that could be used to scan and display the data associated with a particular piece of food. Scanning a tomato, we could see the field from which that tomato came, while scanning a can of Cheese Whiz might take us to the laboratory in which it was produced. Our food would not be just an abstract unit of consumption but a concrete object with its own story to tell. More generally, much domestic technology design is based on an ideal standardized user. Our ethnographies suggest that homes are very clearly not the same everywhere—even in the same country. Similarly, peoples' aspirations and desires differ greatly across and between cultures. Domestic design must take these things into account but not by the naïve scientific approach of identifying and neutralizing cultural differences. There can be no acultural domestic technology design. The traces of histories and specific cultural meanings should not be identified in order to be removed, but should instead be used to inform culturally rich designs.

(3) *I am not my wallet.* The target of domestic technology design is often not the user, but the consumer. Web refrigerators that create shopping lists, garbage cans that let advertisers know what is thrown away, cabinets that monitor their contents and order more when supplies are low are central to current industrial plans for the home of the future. These technologies follow a history of symbiosis between consumption and technology; technology helps us consume while consumption stimulates technology design. In a world of dwindling resources, there is a need for domestic devices that do not stimulate consumption but instead offer alternatives and raise awareness about it. For example, the Viridian design movement recently sponsored a contest to design an aesthetic electrical meter that would pleasurably inform consumers about their electricity use [Scanlon 2001]. The Robocrop project, developed by the MIT Media Lab's CounterIntelligence Project, combines hydroponic and robotic technology to create small, autonomous apartment gardens that can largely tend themselves, shifting users from consumers to producers [Bell and Kaye 2002].

(4) *Technology or user: Who's in charge?* New computational kitchen appliances often follow broader trends of history in which consumers gradually lose control over details of their everyday lives. This is particularly the case when they involve recipes which are often seen as programs that users should mindlessly follow. MIT Media Lab's counterActive and Microsoft's Kitchen of the Future, for example, both walk you through downloaded recipes, monitoring your actions, and correcting you if you have deviated from them. Similarly, Sunbeam's planned mixer of the future senses which buttons you push, checking against the recipe to see whether you are doing it correctly, and letting you know if it believes you are doing it wrong. While some users who are unfamiliar with cooking will undoubtedly appreciate this support, these devices share a problematic design philosophy that devices, not users, should be in charge of users' activity. The Sunbeam mixer, for example, is part of a suite of devices that can communicate with each other; the scale can tell the refrigerator you have

been gaining weight, stimulating the refrigerator to give you a lecture every time you open the door. We believe that users should be in control of their own activity. Domestic technologies should support, but not unnecessarily constrain, everyday activities especially those which have particular emotional meaning to users.

(5) *No Home is an Island.* Current technologies often portray the home as a sanctuary from a hostile outside world. Philips' Vision of the Future project, for example, uses cocooning as a design principle for home technology [Marzano 1997]. Asian homes are based on a different relationship between public and private for which home-and-cocoon designs would be irrelevant. Even in the West, actual home relationships are more complex, requiring one to consider ways of negotiating privacy and relationships within the home. Cocoon-based home design is subject to Dunne and Raby's [2001] critique that technology design often focuses on simplistic, positive images of people's emotions and relationships. Instead, they argue, design should explore a greater range of human experience; they design, for example, troubling devices for lonely men. By extension, domestic technology design should provide opportunities to reflect all aspects of home life not only those that seem unproblematic and optimistic.

(6) *Homes are in communities; homes resist communities.* Current technology design projects two complementary images of the relationship between homes and communities. At one end of the scale, a home is implicitly seen as decontextualized, that is, design often ignores the community in which the home is embedded. At the other end of the scale, communities and connectivity may be seen as positive (e.g., Battarbee et al. [2002]). The relationship between homes and communities is more complex. Communities can support households, but they can also interfere with them. Design must take communities into account, but it cannot assume that connectivity is necessarily positive.

(7) *Gendered design legacies may be past their sell by date.* Gender assumptions about labor may be built into technology and reinforce stereotypes about who in the home should do what (e.g., Oost [2003]). Designers have an opportunity to alter these built-in gender assumptions and thereby support different patterns of behavior. This strategy runs counter to user-centered design techniques because it proposes to design not for users' current needs and desires, but to shape alternative needs, desires, and behaviors through design.

(8) *The user is plural.* Western technology design often focuses on 'the user'—a single individual. Non-Western contexts make clear that the unit of design should not always be the user but can also be the household or larger, extended family units. The Home Health system [Gaver et al. 2003], for example, monitors and reflects the emotional climate of a whole household, not an individual user, through the occupants' (anonymous) use of everyday objects.

(9) *Not everyone has broadband.* Most of the new designs for the home assume not only always-on computing but also reliable sources of power (i.e., electricity) and a certain degree of environmental constancy. In non-Western contexts, we cannot assume always-on electricity, let alone networking. Innovative design solutions might encompass alternative sources of energy, intermittent connectivity, buffering and caching of data, a range of mechanisms for obtaining content, and the convergence of unexpected devices (i.e., mobile

phone and television). Solutions can be low tech, for instances, crank handles for technology appliances or using existing analog infrastructures to support new sorts of digital traffic. For example, Postnet offers connectivity to rural Indian villagers using wireless Internet transceivers installed on inter-village buses [Singh 2003].

(10) *There is an elephant in the room.* The production and consumption of pornography are some of the most popular and commercially successful applications of digital technology in the world. Porn and sex have been the most frequent Internet search terms since the Web became widely available. Pornography is frequently at the cutting edge of technology and has played important historical roles in the development of new media such as DVD. While media studies and sociology have turned their attention to this important cultural phenomenon, the Human Computer Interaction community has all but ignored it. It's the elephant in the room at every CHI conference: everyone knows it is there but since nobody wants to talk about it, we pretend that it's not. All of the usability and (increasingly) enjoyability issues that concern the HCI community apply to pornographic applications as well. While the subject matter may be unsavory to some, pornography is the reason that many people own home computers at all.

(11) *There is a ghost in the machine.* Spirituality is central to everyday life in Asian contexts; the same is true for many people in the West where organized religion is declining but alternative forms of spirituality are on the rise. Yet technology design rarely incorporates religion. Gaver and Martin [2000] argue that technology and spirituality do not need to contradict, demonstrating playful designs to support religion such as a device installed on public corners that broadcasts prayers into the sky. There is also room for less whimsical approaches—for many people, religion is a serious and central part of everyday life.

(12) *Play is not the same as entertainment.* Home should not be a site exclusively for efficient drudgery nor for its complement, passive entertainment [Sengers 2003]. Design for the home should also support a third possibility—serious play. One way of conceiving this is through Gaver's [2001] notion of ludic design, supporting people as they "explore, wonder, love, worship, and waste time." Many other approaches are available in the new HCI work on fun [Blythe et al. 2003].

5. HOW TO DEFAMILIARIZE

Making domestic life and technologies strange provides technology designers with the opportunity to actively reflect on, rather than passively propagate, the existing politics and culture of home life. This article has attempted to defamiliarize domestic technology by visiting some foreign countries like the past, England and Asia. However, it is not necessary to travel to defamiliarize. One can also travel in one's mind by consulting books that explore the activities for which one is designing or the technologies one is developing from the new perspective provided by history, politics, or anthropology.

Defamiliarization is first and foremost a literary device, a style of writing. It is therefore available as a strategy to anyone with access to a pen and paper, or

more likely, a keyboard and a monitor. Defamiliarization is not tremendously difficult to achieve and most of us have done it before. It is essentially a rich description which renders strange the familiar. There are probably very few academics in the HCI community who have not been asked to defamiliarize something at some point in their education. A standard assignment for school children is to describe something as if they were talking to someone from Mars. Another is to ask the children to imagine that they themselves are from Mars and are seeing our world for the very first time. These are exercises in defamiliarization. Like task analysis, it demands a certain degree of rigor and an attention to the details that we take for granted. In this way, it is a useful exercise for school children developing their writing skills but as we have argued, it can also be a useful exercise for designers generating new ideas and approaches to domestic technologies.

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