

Is to Nurture in Technology's Nature?

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ABSTRACT

What constitutes a nurturant technology? In this paper, we argue that it is neither defined by the designer or the user, but rather co-created. We define two categories of nurturant technologies: technologies that perform mundane domestic work and those that allow for monitoring. We then propose the construction of a third category that of technologies that explicitly attempt address social ills in the domestic environment. We look to the ideology of the home of the future as a way of understanding this co-creation process.

NUTURANT TECHNOLOGY, COUNTER EXAMPLES?

Mundane Domestic Work?

An English young couple receives an American bread maker as a wedding gift. The purchaser had gone to considerable effort to import a foreign bread maker because it was considered very high-end. Targeting American homes, the designers of the bread maker made assumptions about ambient household temperature that did not apply in England; since the English home was too cold, the bread did not rise [9]. To resolve this, the husband would steal downstairs in the middle of the night to add warm water by hand so that his wife could wake to freshly baked bread. This technology may have failed in automating the task of bread making, but has been highly successful as a nurturant technology. By going out of his way to bake his wife bread, he made her feel cherished and loved.

Monitoring?

A family is trying to set up their new DirecTiVo. Dad is on the roof trying to position the dish so that it sees the satellite. Mom is in the kitchen chatting with grandma, but is also supposed to keep an eye out if dad points the dish the right way. She isn't sure how she will know when this happens, but she monitors the television set to watch for a change. The baby is asleep upstairs, while the baby monitor is borrowed and repurposed as a walkie-talkie to communicate between the roof and the kitchen. Dad pans the dish in the sky looking for the satellite, and eventually finds it. The DirecTiVo starts beeping and visually indicating success, but mom and grandma are chatting with their backs to the TV so they don't notice this happening. They just hear the TiVo beep, and it sounds just like the

baby monitor. Panicked and confused by the similar sounds, they rush upstairs to check on the baby. The complex of technology evokes concern—albeit misdirected.

Pausing for Social Time?

One heavily-marketed feature of TiVo is a pause feature which lets the viewer pause the television for up to half an hour and pick up where the left off. TiVo advertisements claim viewers will never have to choose between catching the season finale of a favorite show, and a call for mom. In this way, TiVo is explicitly understood in terms of the social relationships around it, making it a nurturant technology. At the same time, owning a TiVo causes people to watch about an extra hour of TV a week, giving TiVo owners less time to interact with their family and friends than their TiVoless neighbors.

WHAT ARE NUTURANT TECHNOLOGIES?

Nurturant technologies are defined in the call as “technologies that support emotional relationships in the home, producing feelings of being comforted and cared about, technologies that help people thrive,” in domains of domestic concern such as healthcare, entertainment, education, spiritual practice, and communication. While this proposed set of activities contribute to nurturant technologies and domestic life, it is not an exhaustive list.

In this paper, we take a somewhat wider view of nurturant technologies. Our broader set is partially based on Yanagisako's extensive survey which draws attention to child bearing, child rearing, and food production as the central to the domestic realm [15]. Consequently, the technologies that contribute to them need to be considered as well.

We look at three other types of technologies in particular. The first are technologies that support everyday household work such as sewing machines, washing machines, ovens, lawn mowers, and power tools. These are remarkable for both their ubiquity and for their general *un*remarkedness. Second, we will discuss technologies that allow you to monitor those you care about. These include RFID kid-trackers, baby monitors, smart picture frames.

Our third category is that of technologies actively embroiled in domestic social relations, such as the cases of

Roombas (argued to turn the gendered nature of American housework on its head [4]), or TiVo's pause feature described above. This construction of technology is one that, we hope, can provide a way to talk about inverting traditional power and responsibility structures in the home in a constructive way. Gender roles, and parent-child-relationships can be inverted and still achieve nurturance. Similarly, nurturance can occur between individuals or social groups. Therefore nurturant technologies must take all of these alternatives into account.

Values associated with the home of the future

It helps to recognize the vision of technological utopianism which surrounds the conception of the "home of the future" for the last 100 years, and how it influences our conception of technology and nurturance [1, 12]. The rhetoric and methods of workplace efficiency have long been applied to the home. Originally developed in workplace settings, Frederick Taylor's theories were soon applied to domestic life, which in turn encouraged the development of the value of domestic efficiency. Christine Frederick applied his techniques to the domestic domain, timing and photographing women doing domestic tasks to advise on how housekeeping tasks could be more efficiently done. Similarly Lillian Gilbreth used Taylor's methods to adjust counter top heights, space plans, and create structured timelines for women to follow for maximum domestic efficiency. At the same time, domestic economists like Catherine and Harriet Beecher created new model houses to permit a housewife to maintain her home without the assistance of domestic servants [11]. These new house plans of homes represented a major re-conception of structure and use of space in the American home, and presented domestic work as something that could be done more efficiently.

Increasing efficiency motivated the design of early appliances and remains important in contemporary ubiquitous computing technologies [1]. Whether it is making homes more efficient for care of the elderly, supporting better communication within the family, keeping the power bill low, or programming your new home control system, these applications are all trying to reduce quantifiable metrics. While recent work attempts to displace efficiency with nurturance as a primary design criterion [1], these are not diametrically opposed. An efficient home in line with Gilbreth and the Beechers' teaching allows a woman to run her home herself, meaning she can raise her own children rather than needing to hire a nurse. Similarly, Schwartz-Cowan writes about how the development of the stove [11] increased the complexity of food to including a multitude of cooking methods and dishes. The nutritional requirements were satisfied with old-fashioned one-pot cooking, and yet the complexity of cooking proliferated anyway.

Why are mundane appliances nurturant?

Why are we arguing to include the mundane appliances of domestic work—like ovens and sewing machines? Just as Miller's "Theory of Shopping" showed shopping is not necessarily motivated purely by utility, but also provide a means of emotional expression, other forms of domestic work can express feeling of care, attention, and nurturance [7]. Just as someone can choose to buy a nice treat to show love, candlelight dinners and special desserts are also signs of affection.

Berk's diary study of domestic life provides a list of household activities ten pages long, and in reading it were are reminded of the complex and mundane nature of domestic work from fluffing pillows, to pre-soaking laundry, polishing the silver, clipping coupons, paying bills, preparing meals, and baking brownies for the kid's bake sale [2]. Domestic work consists of an exceptional variety of detail-oriented tasks.

The process of selecting which of these tasks to do suggests how a person identifies with the role of householder. Sheets and children's play-clothes do not *need* to be ironed but when they are it offers us interesting insights into the values of the household. The effort is justified if only for a moment a mother can demonstrate her love through care. Similarly, immaculately starched and ironed sheets demonstrate a consistency of care even in aspects of daily life that are quite literally under the covers. In Pink's study of housework some of her informants speak of trying to avoid their mother's obsessive routine, and instead discussed doing housework to the when and to a level it suited them [8]. Household caretakers make innumerable decision regarding the standards to which they keep house, this reflects on their priorities inside and outside the home. These priorities allow householders to demonstrate nurturant behaviors, so that we must consider these mundane housework technologies when asking about nurturant technologies.

Nurturant technologies and privacy?

A key area of nurturant technologies are those associated with childcare, which in turn implicates our attitudes towards privacy and autonomy. A range of new technologies incorporated into our homes are changing the boundaries between public and private. Many of these, like nanny cams and tracking technologies like GPS and RFID attached to cell phones and backpacks, allow us to track and maintain awareness of our family's members. Many of these are aspirational technologies; nanny cams and kids trackers reflect cultural emphases on appropriate parenting. These technologies are developed in response to social norms, but themselves create new norms of acceptable practice [10, 12].

Nurturant technologies with a social agenda?

Some technologies have an explicit social agenda; consider TiVo's claim that it puts social relationships into the foreground behind live TV. Can technologies be nurturant

and attempt to solve other problems like gender balance of domestic work?

Let us look briefly at the history of gender and domestic work. Historically, technological advances like indoor plumbing, advances in heating, and store-bought grain removed the tasks of fetching water, chopping firewood and milling grain. As these tasks had typically been carried out by men, the technologies decreased the level of male participation in domestic work, contributing to their leisure time. In contrast, it has been argued the amount of time American women spent each day on domestic work has been constant since before the industrial revolution despite these technological advances [11]. Domestic technology has raised standards and reduced the domestic work required of men and children, and this has implications for how roles are assigned with respect to new technologies.

However, in traditionally structured families, married women are doing a significant portion of domestic labor. Berk cites other work showing that women with the longest work weeks (paid and unpaid labor combined) tended to be married to men with the shortest work weeks [2]. Maushart claims that married women perform two-thirds to three-quarters of housework and take primary responsibility for child care [6]. Child-rearing dramatically increases the amount of housework that needs to be done, however while it nearly doubles the workload for women, the workload for men remains unchanged [6]. Maushart recounts the results of a study which showed that in dual-income families with children, husbands were likely to sleep later, watch more TV, spend 28% longer eating breakfast, 34% less time cooking, and 67% less time than women tending to the children's needs; women arrived home first 75% of the time to tend for their children and their husbands spent 25% more time in the evenings on leisure activities [6]. This disparity in work results in a dearth of female leisure time [3], and a lack of mental well being [14].

The solution to this problem is more likely social than technical, but technology may be able to contribute in part. There are suggestions that the balance of labor in the household is changing, such as Sullivan's 2002 study of the UK. Comparing survey data between 1975 and 1997, his work shows that men of lower-socio economic homes are closing this gap, and that there is a "clear reduction in gender inequality in the performance of some normatively feminine-associated tasks." [13, p 453]. A closer examination of his statistics show a rise of male participation in "cooking and cleaning tasks" and a corresponding drop in female participation, however, minutes spent with "child care" during the same period increased with a slight narrowing of the gender gap.

Technologies addressing the balance of domestic work might help make the harried housewife a relic of the past, and positively benefit the rest of the household. Technologies that address these issues could themselves be considered nurturant in an important way. As Schwartz-Cowan shows, however, it's easy for novel, seemingly

labor-saving technologies to reinforce – or even undermine – the existing domestic division of labor. [11] As she suggests further, however, recognizing the paradox of labor-saving appliances is at least a necessary if not sufficient step in the right direction.

DESIGNING NURTURANT TECHNOLOGIES

Still in play, though, is the fundamental question – what makes a technology nurturant in the first place?

The technologies in the vignettes at the beginning were all nurturant, but they were not intended to be nurturant in the fashions that they were designed. This opens up two sets of concerns for further research.

The first lies in the values that we instill into our technologies, and the images of domesticity, intimacy, and nurturance that technologies encode. The historical examples point to some of these. We need to be cognizant of the ways in which technologies embed these values and can be understood in terms of them [5]. How can we do appropriately value-centered evaluation of proposed nurturant technologies that recognizes the ways in which meaning is constructed in use?

The second is that we need to look not so much at nurturant technologies, but at the co-created moments of nurturance in which technologies and use come together. The focus of our research attention, then, lies not on how technologies might be nurturant, but rather how they might be used for nurturance. "Nurture" is not only a question of technology's nature, but rather an opportunity for co-construction.

MINI-BIOGRAPHIES

Jennifer Rode is a PhD candidate at University of California, Irvine, working with Paul Dourish to conduct ethnographic studies of domestic technologies. She previously worked as a usability engineer at TiVo evaluating its user interface and conducting ethnographic studies. Her research looks at gender differences in domestic appliances are programming, parenting practices surrounding VCRs, and cross cultural discussions of homes and appliance use.

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