

Nurturing Families by Augmenting Life Control

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Abstract. Much smart home research has produced work that chooses to enhance the home experience by providing more control over domestic devices. Our work with dual-income families suggests that more than devices, families want more control over their lives. We argue that a smart home might help provide that assistance to families in two ways: (1) by helping families navigate the complex network of activities in which they participate; and (2) by providing families more emotional satisfaction from the things they value – their time, their relationships, and their identity. In this position paper, we discuss these two service alternatives, and describe how life control provides a pathway to a nurturing home environment.

1 Introduction

For many years, researchers have promised a smart home that improves the quality of life of its inhabitants. Technology researchers often frame this problem space using the vocabulary of either home networking [14] or end user programming [10][17]. Both approaches focus on providing users with control of a dizzying assortment of potentially inter-operating devices. At the same time, a growing body of ethnographic fieldwork reveals that more than control of devices, families want to feel in control of their lives [2][4][7]. Our work attempts to bridge the divide between these two research communities by exploring the role a smart home can play in the life of a dual-income family. If we first understand the roles a smart home can play, we can then more appropriately choose how to provide families with the control they desire.

In exploring the issue of control and the smart home, we have chosen to focus on dual-income families, a large and growing segment of the population of the United States [9]. These families often feel out of control due to the complex and rapidly changing logistics that result from integrating and prioritizing work [7], school, family [4], and enrichment activities [2]. Our research uses ethnographic methods to understand the needs, goals, and desires of families. This approach includes contextual interviews and cultural probes with twelve dual-income families (for full details of the study, see [5]). This fieldwork then

inspired one hundred different design concepts, of which 21 were included in concept validation sessions with five families [12].

This work has resulted in two main insights into the role of the smart home. First, a smart home can help transition families from feeling out of control (1) by helping families navigate the complex network of activities in which they participate, and (2) by providing opportunities for family members to give “gifts of time and attention” to one another around activities that support the construction of a family identity. We describe each of these potential capabilities in more detail.

2 Smart Home Roles

2.1 Help families navigate the complex network of activities

Successfully preparing children for, and transporting them to and from school and all the enrichment activities in which they participate represents a major investment of time and resources for families. The logistics involved contributes a great source of challenge and stress to the lives of parents, and contributes substantially to families feeling less than ideal control over their lives. Families often develop routines to manage much of the complex choreography [16]. But even movement to and from simple routine activities is often sufficiently complex to flummox the potential control a routine might offer.

We can use an example of soccer practice, taken from our fieldwork, to illustrate. Substantial logistical complexity can be contained within a single event. Practices are held in one of two locations. Games are held in any number of locations. Locations are printed on the team schedule, which is kept on the family refrigerator. This sheet has no directions. Parents who carpool have to coordinate who picks up and who drops off. Practices start at consistent times, but games start at one of three times.

Kids also have to come prepared. If the event is on turf, kids will need to bring their flat shoes. If the event is on grass, they will need to bring their cleats. Kids always need to bring their shin guards and knee pads. Games require either the home or away uniform. Practices require practice jerseys. All clothes need to be laundered, which often means washing them the night before so that they are clean for the day of use.

Even parents have homework for soccer games. Three families bring refreshments to each game – juice for thirsty players during the game, juice for after the game, and oranges for halftime. This information is also encoded on the schedule on the fridge.

Forgetting comes with a high social cost. Either the team goes thirsty, and the child is embarrassed, or the parent has to face the panic and stress of racing to get kids to the field on time while running to the store to buy drinks and fruit.

We believe a smart home could provide instrumental support in choreographing family logistics, helping the various moving parts.

Reminders during deviations from routine. Mom usually takes the kids to soccer, but she's away this week on a business trip. It's Dad's job to get the kids there and back, and make sure they come prepared. Dad now has an unfamiliar set of responsibilities, and forgetting any one can affect everyone in the family. For example, by forgetting to remind the kids to take their shin guards to school, Dad might have to drive them into school, applying pressure to his already tight schedule.

A smart home might be able to help Dad remember everything he needs. Such a system could help parents feel they are regaining control of their lives both by reducing the chance of a breakdown occurring, and by providing a safety net, lowering parental stress level about the possibility of a breakdown.

Alerts of unscheduled deviations. Even when families have carefully planned their days, external forces can cause unexpected deviations. Occurrences like changes in weather, unplanned meetings, traffic, or a sick child can cause families to begin to improvise workarounds on the fly. Many times there simply is no plan at all, and a family is largely improvising. When improvising, family members work on potentially flawed assumptions of each other's behavior.

In these circumstances, a smart home might provide some visualization of an agreed-upon plan, helping both to concretize assumptions and clarify any ambiguity. The smart home could then illustrate sensed deviations from the plan, providing family members with more awareness of where everybody they depend on is, and what they're doing. This service could play a role in reducing the stress that occurs during these situations.

2.2 Provide opportunities for the gift of time and attention

While a smart home might help remove the complexity and mystery from household logistics, the concept of control also extends into domain of social relationships.

Make parents feel like good parents. Due to the myriad of activities families are involved in, parents in dual-income families often find it hard to spend time with their children and complete the myriad of tasks they have assigned themselves. This imbalance can make parents feel compromised in their parenting.

While a natural intervention strategy might be to automate tasks that challenge parents and cause stress, our concept validation sessions suggested that blanket automation of home activity would be unwise and unwanted. Our fieldwork revealed that food preparation often is a stressful time. So we were not surprised to see help with a grocery list test as the single highest and most wanted feature (see Figure 1). But our fieldwork also showed waking kids as a stressful event. But parents expressed a strong dislike of systems that automatically woke children. When probing further, parents explained that the difficulty of the task was balanced with the intimacy of interaction the activity affords. Simply put, when a "task" can lead to nurturing moments, technological intervention may be unwelcome.

Parents also expressed a desire to be more involved with their children's schooling. We tested a service that connected what kids are studying at school with their parents' schedules, and helped parents find exercises they might do with their kids to reinforce the lessons they were learning at school. This service tested very positively.

What's the difference between the two scenarios? It might be better for a smart home to avoid trying to coach more socially appropriate behavior, and instead focus on creating more opportunities for meaningful interaction between parents and children. In this way, the smart home might be able to facilitate nurturing family interaction.

This suggests that automating carefully-selected mundane tasks might help remove some of the overhead from family life. While automating cooking might remove an opportunity for parents to express their care for their family, an automated shopping list could cut preparation time or remind families to buy essential ingredients. This potentially creates a "gift of time," opening the possibility for parents to focus their attention on more meaningful parenting activities.

3. Conclusion

Families want more control over their lives. By providing control in the form of carefully-selected logistics, a smart home might be able to create a house that fosters more emotional connections, and participates positively in the lives of its inhabitants.

In our research we are looking to build an interaction framework that builds on our fieldwork, and supports families in taking control over their lives. In doing so, we are trying to address questions like these, and create smart homes that choose to improve the lives of their inhabitants by nurturing them.

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