

## Notes on Fridge Surfaces

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### ABSTRACT

Drawing on ongoing ethnographic investigations into home life, this paper presents detailed findings from a preliminary examination of refrigerator surfaces. The use and organization of items on fridge surfaces are shown to be closely tied to the material properties of both fridges and their surroundings. Emphasis is placed on the importance of fridge magnets as they are seen to contribute to a fluidity and reconfigurability that make fridge surfaces unique. Building on this, it is argued that the negotiation of family relations is afforded by the presented properties of the fridge and of magnets. To conclude, we introduce some general points to consider in designing interactive surfaces for the home.

### Author Keywords

Home life, ethnography, interactive surfaces, refrigerators, magnets.

### ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

### INTRODUCTION

In interactive systems design, much talk has been bandied about concerning the importance of refrigerators in home life. Refrigerators are commonly referred to as hubs or repositories, mediating the flow of household information, or presented as key in the discourses of the-kitchen-as-hearth. These depictions have, in turn, contributed to various technological imaginings. Projects, for example, have turned their attention to the contents of fridges and examined how technologies might track the quantities and expiry dates of various products or suggest possible recipes [4]. Moving out of the box, so to speak, home appliance companies such as LG and GE have targeted the fridge door specifically, and marketed “networked” fridges that capitalize on the door as a central and shared surface in the home.

The trouble is that a good deal of this work appears to have been based on assumptions and anecdotal evidence that sometimes misjudge how an augmented fridge might play a role in our everyday routines. For instance, at first sight an indication of out of date milk might seem useful in managing a household’s shopping needs. It is questionable, however, whether home carers consider the presence of out-dated milk to warrant an automated (and potentially annoy-

ing) reminder. Similarly, feature-rich interactive panels on fridge doors offering portals to current events, recipes or online encyclopedias (often no more than vertically mounted PCs), come across as unwieldy attempts at combining information technologies and household appliances without properly considering people’s real-world practices.

To a lesser extent, there is evidence of more detailed investigations into fridge use; however, these works appear as minor points in more general discussions of household technologies. For example, Crabtree [1] and Graves Marksen and Grønbaek [2] touch on the qualities of the fridge door as a display surface, alluding to its place in the coordinated efforts and temporal orderings of a household’s organization. And yet these references to the fridge are only to its role as one of an assemblage of ‘coordinate displays’ and interactive surfaces in the home, and do not succeed in articulating its particular properties or why it has the status it does in the home.

With these points in mind, we have sought to examine the use of fridge surfaces in detail. Specifically, our attention has been drawn to just how fridge surfaces are enlisted in everyday routines and how particular properties of the fridge lend themselves to distinctive uses. The presented work draws on an ongoing series of interviews and observations being conducted in twelve households. This research has applied an ethnographic sensibility to investigating family life (limited to contemporary British homes). In the following, we present some preliminary findings from this fieldwork. We also introduce some general considerations in designing home-based interactive surfaces.

### PRELIMINARY FINDINGS

#### Space and Form

It is the fridge’s physical properties and its location that immediately distinguish its exterior from other surfaces in the home. Specifically, their physical design and placement mean the surfaces of a fridge lend themselves to being shared and used in a variety of ways. Usually flat, large and tall, refrigerators’ exteriors are easily appropriated for the display of multiple and varied items. Placed within a common area, the kitchen, they also provide a surface that is readily available to all household members.

The *use* of the fridge also contributes to its success as a shared surface. Unlike a bulletin board or diary, for instance, no regimental system has to be instituted to look at it. The routine use of the fridge—to store and retrieve foods

over the course of a day—means that its surfaces are seen on a regular, and nearly continual basis. Indeed, it would be fair to assume that the fridge's surfaces are amongst the most visited in everyday home-life.

Two examples from our field studies nicely capture how families capitalize on these features of the fridge. In the first example, we see how the regular use of a family schedule relies on its placement on the fridge door. The schedule, divided into days of the week, is meant to remind family members of routine, recurring activities. In practice, it is the mother in the family, Aimee, who commonly refers to the schedule—usually in the mornings, when preparing breakfast. Notably, it is the very activity of breakfast preparation that draws attention to the schedule, reminding Aimee she must have her eldest daughter's dance outfit ready or that her sons should have their swimsuits for swimming lessons, for example. The sight of the schedule is an unavoidable consequence of the use of the fridge.

In the second example, the expanse of space and the orientation of a fridge's surfaces are used to give some order to what is attached. Affixed to the fridge's sides (Fig. 1) are an assortment of letters, notes, lists, invitations, train tickets, etc. all placed in and amongst a scattering of magnets of various shapes and sizes. In this particular case, the retro-styled door of the fridge is kept clear in part because it is made of molded plastic (i.e., non-magnetic), but also perhaps to retain and exhibit its distinctive aesthetic.



**Figure 1.** Left and right side of Olivia's family fridge.

In describing the arrangement of the attached materials, the mother of the family, Olivia, explains there is a “theoretical” order to the surfaces. The top left of the fridge is designated for things associated with the children's school and family's social activities, as well as other home-related chores such as grocery shopping. The family's two daughters, primarily due to their height, are given reign over the lower areas, and have covered their sections with a magnetic Barbie and her extensive wardrobe. The father, David, has assigned himself a space, albeit limited in size, on the top right side of the fridge. Again, what is key is that this shared and multi-purposed use of the surface is afforded, in part, because of the fridge's size. Likewise the location of the fridge has a bearing on what is attached to its surface;

its location and use by all family members immediately assigns its content the status of “public” and thus shared.

### Function

This last example, in which an area is given over to school and family arrangements and home related chores, hints at what might be termed ‘working’ fridge surfaces, where a surface or region of a fridge is enlisted for the express purpose of supporting the practical matters of organizing home life. To operate in some orderly fashion, these working surfaces again rely on specific material features. In another of the households visited, we found the side of the fridge to contain items associated with practical matters such as cooking, shopping, school-related activities, etc. In contrast, the fridge's upper and lower doors are decorated with pictures, postcards, family memorabilia, etc—operating more as a display than an interactive surface. This delineation is made clear through a party invitation that now sits on the upper door of the fridge. With attendance to the party confirmed, the invitation has been moved from its original position on the “working” surface; in doing so it has been transformed from an item that requires action to a material reminder of the upcoming event.

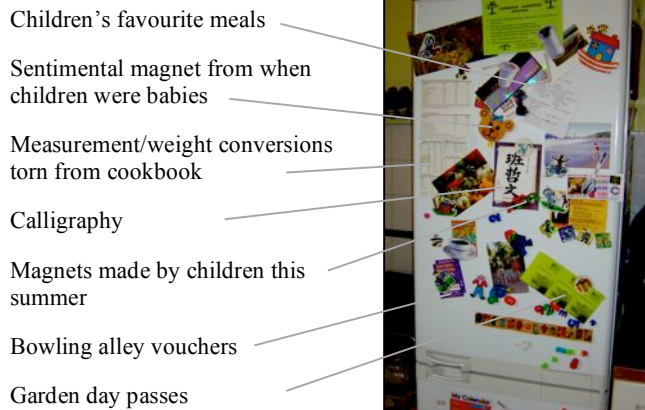
As well as relying on the relations between the fridge's surfaces, what we see here is that the fridge has been appropriated with respect to its surroundings. The “working” side of the fridge adjoins a kitchen counter, effectively combining the horizontal and vertical surfaces, extending the functional possibilities as well as the dimensions of the entire workspace. In a similar way, the fact that the fridge faces the kitchen table makes its display available, as a matter of course, during activities such as eating and homework.

This apparent coordination of surfaces parallels the relations between the items on the fridge and other household artifacts. For instance, the shifting party invitation (above) is tied to the use of the phone; once the invitation has been accepted over the phone its place is altered, as is its function. Likewise, on other fridges we find displayed items which are also noted in household calendars or diaries. Rather than being redundant, these distributed records serve multiple purposes; for example, a notation in a calendar reserves a timeslot for the family member who manages such things, whereas the event's record attached to the fridge stands as a visual reminder to all family members.

In sum, a fridge's surfaces can come to make up and/or be assembled into a home's organizing systems. Particular features of the fridge make it successful for some aspects of this organizational work and not others. Because of its expansive surfaces and its central location, we see that items on a fridge can be configured in visible ways to express their purpose or to be clearly associated with surrounding objects and activities. However, where items are linked to entries in calendars and diaries, for example, the relations are less apparent, even opaque. This limits the effectiveness to the instituted relations between objects; the relations are only readily available to their inventor and even then they must, with no visible help from the system, be remembered.

### Temporality

In some respects, that fridge surfaces have this sort of ‘working’ information affixed to them is not surprising; indeed, from a functional perspective it seems commonsensical. More curious is the juxtaposition of items that are not ordinarily placed with one another. Whether a fridge’s surface is intended to serve a specific function or not, we find that working items are often set against photos, postcards, magnets from holidays, children’s artwork and various other memorabilia.



**Figure 2.** Assembled collection of items.

Interesting here is why fridge surfaces lend themselves to such mixtures of materials. People do not typically affix appliance manuals into their photo albums, nor put party invitations in toolboxes, but on the fridge functionality and everyday routine mixes with sentimentality with no apparent contradiction (Fig. 2). It would seem that fridge surfaces behave as a catchall for household miscellany when there is no other obvious place or where something might be forgotten if stored or filed. An illustration of this is evident in the following excerpt from a mother, Nicola, referring to a piece of Chinese calligraphy of her son’s name that is prominently displayed in the middle of her family’s fridge.

Every so often I do think about taking stuff off this fridge and there are things here that, you know, every so often I do a sort of mental clearout, or more than a mental, I do a clean out and I say ok we don’t need this anymore, that voucher isn’t valid or whatever but for some reason this one always stays, because I can never think of anywhere else to put it. It’s so crumpled but I feel like I can’t really throw it away.

Remarkably, the calligraphy she is referring to has been on her fridge door for *seven years*, which leads us to another quality of items on fridge doors, i.e. their temporal variability. Examples from our data and other studies [5] show that some items on fridge doors can linger for years, whilst other items can be up for a day or less. Thus, a school trip notice will be discarded after the trip, a school’s term dates will stay up for the semester, and a piece of children’s artwork or postcard may remain indefinitely. This range of lifespans, as it were, further contributes to the incongruity of the items on the fridge door and underlines another key point; that is, the piecemeal creation of the display. Al-

though the presentation of what is on the fridge door may appear all of a piece, (or not, in some cases), it typically has been created bit by bit, over time, and each item that goes up is not necessarily meant to go with whatever else is already residing on the fridge. This heterogeneity of materials jostling for space and attention, and differing in their age (as well as physical form, function, aesthetic, etc.), stands in marked contrast to the ways in which electronic information can be affixed and displayed to surfaces. The fridge’s exterior is thus more an assemblage than a preconceived collection; more a collage pieced together over time than a static canvas.

### Fluidity, Informality and Reconfigurability

In examining the surfaces of a fridge, then, we find a location where practical, sentimental, historical, functional and playful items come together. The myriad items overlap and interleave with one another, competing for attention, sometimes having their functions and interrelations transformed over time. Probing further though, one is compelled to ask, *why the fridge?* Yes, the fridge offers a relatively large surface available to all and, yes, its surfaces provide a space for the haphazard arrangement of multi-functioning and ever changing items, but still, *why the fridge?* There are bulletin boards, doors or even walls that can be equally expansive and allow for things to be affixed to them using thumbtacks or tape.

Missing in these surfaces is, of course, a magnetic quality. It is this that allows fridge surfaces, with their handy counterparts, magnets, to be inordinately easy to interact with. Although attraction is achieved because of the material properties of the magnet, the sense to the human is of ultimate simplicity. Critically, it is the distinctive qualities of the magnet that afford a fluidity and informality that characterize the assemblage of items on fridge surfaces. Magnets allow both a persistence in display (like the bulletin board), but also an easy and somehow compelling means of continuously reorienting and reconfiguring what is attached.

Instructively, magnets are decidedly different to thumbtacks or tape. Thumbtacks require a piercing of the surface and a slight effort—both suggesting more permanence—as well as a lasting damage to the surface in the form of a hole. Although in the larger scheme of things both the effort and damage are fairly minimal, they nonetheless instill just a bit more thought before placement than the magnet. Tape is slightly different. Although its initial placement has a similar ease to magnets, it can be hard to remove and leaves a residue. Thus, when something is taped, it is, by tape’s nature, meant to stay.

By contrast, magnets lend themselves to being put up, taken off, reconfigured—on the fly, by virtually anyone. Their magical quality and sheer simplicity promote the shared sense of fridge surfaces. In short, magnets bring specific qualities to the fridge surface, transforming it into a surface *par excellence* for accommodating the heterogeneous miscellany of things that typify the home.

### Social Organization

Building on this characterization of the fridge and the importance of the magnet in its use as an interactive surface, we now wish to turn to one final point. We would like to suggest that the very features of the fridge discussed and the ongoing movement and ordering of items on its surfaces make it a site where the relations within a family can be played out and (re)negotiated. Returning to our earlier example of Olivia and David's fridge (Fig. 1), we see that the overall order to the divided surfaces can be contested. For example, Barbie and her assorted items of detachable clothing have migrated upwards; postcards and photos find their way in amongst organizational matters; and even David's tie-clad magnetic man and an event's leaflet it attaches to the fridge have been wrongly placed. It is through these signs of insurrection that we begin to see the possibility of something more to fridges; the fridge, so often described as central in a household's physical geography, can also be fashioned as a central player in a family's social relations. This possibility is made plain in Olivia's recount of David's well-intended contribution to the home's organization:

He's put it this side bless him, but I think that's quite... At least he's put it somewhere. I think he thought that's his [points to the magnetic man], so he kind of thought he was to put that there [points to the leaflet attached and laughs]... I think he's trying to get in on the... Cause I must say the one and only thing that has appeared more than once as a point of friction within our marriage has been him not paying any attention to the family diary... The fact that he doesn't refer to it, so I think this is his attempt at... [cut short]

So, over and above its use in the ordinary affairs of house-keeping, the fridge is transformed into a location where Olivia and David's one point of friction is to be worked out. Whether intentional or not, David's efforts are seen as an initial *forée* into participating in the family's organizational matters.

For our purposes, the interesting question, again, is why the fridge? The answer would seem to hinge on a point we have already made concerning the fridge's central location and the fact that, because of its frequent use by all, it acts as a display. Any item on the fridge must therefore be immediately accounted for; the act of changing or attaching something is unavoidably one to be held to account. Whether we speculate that David's efforts are a public gesture of *détente* or simply an indication that he wishes to David out family time to attend an event, the fact remains that his actions are bound up in the practical workings of the home; they are the constituents, no less, of *realpolitik* in the home.

Crucially, it is not just the fridge's location and orientation of its surfaces that make it so successful in this regard. The sheer simplicity of the magnet makes the mechanics of interaction trivial. The fluidity and reconfigurability afforded by magnets—due to this simplicity—are what allow for this expressive quality. Moreover, the iconic character assigned to magnets enable family members' actions on the fridge to be immediately recognized. It is telling that although Olivia cites the diary as the point of contention for her and David,

it is the far more visible magnet-friendly fridge and, specifically, the use and positioning of the tie-wearing figure that is where the action is.

### CONCLUSIONS

Discernable from our accounts of fridge surfaces and magnets is that the properties of both point towards some clear design implications. The relatively large surface provided by the fridge; its location with respect to the movements of household members; and the interactions afforded by magnets indicate that designers should be sensitive to how a technological solution's location, routine use and material form can support the fluid and informal arrangement of household things. The location of and relations between such things, whether they take electronic or material form, should be easily reconfigurable and allow for the artfulness people apply in designing their own surroundings.

Fridge magnets offer a case in point by opening up the play of possibilities for people in managing their household affairs on fridges. Rather than specifying interactions, magnets' simple but compelling properties (and limitations) afford a crafting of solutions well-suited to the interleaving of "working", functional, emotional and sentimental aspects of home life. This might seem to be stating the obvious, but if so, why do we continue to see the development and marketing of fridges that offer heavyweight solutions? Indeed, our suggestions stand in stark contrast to the so-called 'smart' fridge concepts, that all too often prescribe and enforce pre-specified functioning.

Our own design work in this area is exploring how magnets might be augmented to further support the artful blending of home-life's flotsam and jetsam, so to speak. Our aim so far has been to build on the tangible qualities of objects like magnets [see 3], but in such a way that the opportunities are increased for interactions with and between the fridge surface, the attached items and surrounding artifacts. A central design tenet has been to implement simple design features in a highly visible way, so that a magnet's material properties clearly lend themselves to (re)configuring the temporal and spatial orderings of fridge surfaces.

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