Making Place for Clutter and Other Ideas of Home

LAUREL SWAN, ALEX S. TAYLOR, and RICHARD HARPER
Brunel University, Microsoft Research

In this article, we examine the containment of clutter in family homes and, from this, outline considerations for design. Selected materials from an ethnographically informed study of home life are used to detail the ways in which families contain their clutter in bowls and drawers. Clutter, within these containers, is found to be made up of a heterogeneous collection of things that, for all manner of reasons, hold an ambiguous status in the home. It is shown that bowls and drawers provide a "safe" site of containment for clutter, giving the miscellany of content the "space" to be properly dealt with and classified, or to be left unresolved. The shared but idiosyncratic practices families use to contain their clutter are seen to be one of the ways in which the home, or at least the *idea* of home, is collectively produced. It is also part of the means by which families come to make their homes distinct and unique. These findings are used to consider what it might mean to design for the home, and to do so in ways that are sensitive to the idiosyncratic systems of household organization. In conclusion, thought is given to how we design for people's ideas of home, and how we might build sites of uncertainty into homes, where physical as well as digital things might coalesce.

Categories and Subject Descriptors: J.4 [**Computer applications**]: Social and behavioral sciences—*Sociology*; H.5.3 [**Information Interfaces and Presentation**]: Group and organisation interfaces—*Computer-supported cooperative work, Organizational design*; H.1.2 [**Models and Principles**]: User/Machine Systems—*Human factors*; K.4.m [**Computers in Society**]: Miscellaneous

General Terms: Design, Human Factors

Additional Key Words and Phrases: Clutter, home life, sacred, domestic technology, ethnography

ACM Reference Format:

Swan, L., Taylor, A. S., and Harper, R. 2008. Making place for clutter and other ideas of home. ACM Trans. Comput.-Hum. Interact. 15, 2, Article 9 (July 2008), 24 pages. DOI = 10.1145/1375761.1375764 http://doi.acm.org/10.1145/1375761.1375764

Authors' addresses: L. Swan, Information Systems, Computing and Mathematics, Brunel University, Uxbridge, Middlesex UB8 3PH, United Kingdom; email: laurel.swan@brunel.ac.uk; A. S. Taylor, R. Harper, Socio-Digital Systems Group, Microsoft Research, Cambridge, CB3 0FB, United Kingdom; email: {ast,r.harper}@microsoft.com.

1. INTRODUCTION

In much of the research surrounding the home in HCI and its related design fields, little if any attention has been given to mess or clutter. In some sense this is understandable—clutter and mess are, one might say, the less appealing residues of living, the stuff that has to be dealt with but often never is. It is not surprising, therefore, that the domestic environment appears to have been cleansed of clutter and mess when it comes to the design of computer systems.

By way of illustration, consider the ongoing and widely dispersed Smart Home Programme and closely associated research into ubiquitous computing. Both give attention to things such as the use of and interaction with sensors [Mungiatapia et al. 2004], networked appliances [Chung et al. 2003]; home automation [Spinellis 2003]; and monitoring, both for security [Covington et al. 2001] and of the health of a home's inhabitants [Mynatt et al. 2000], to list just a few examples. While laudable for many reasons, much of this work is vulnerable to the oft-made ethnomethodological criticism that holds that the "work" routinely undertaken in places like the home—work like caring for loved ones, planning their days, and even cleaning up after them—is often trivialized and thus somehow rendered invisible by dint of being "taken for granted" [Suchman 1994]. Frequently overlooked are, for example, the considerable efforts that are required to keep the home in order [Berg 1999; Taylor and Swan 2005] and, relevant to the evidence presented here, manage its seemingly endless mess and clutter.

More detailed investigations of home life have partially addressed such failings in what one might call this 'technology-agenda-led' research (see Crabtree and Rodden [2004]; O'Brien et al. [1999]; Tolmie et al. [2002]). These investigations have given careful attention to the mundane aspects of dealing-with-things-at-home, ranging from studies of the prosaic and seen but unnoticed elements of TV watching [O'Brien et al. 1999; Taylor and Harper 2003], and photo sharing [Frolich 2004; Crabtree 2004] to dealing with paper mail [Crabtree et al. 2002; Harper et al. 2000]. Related to the presented work, thought has also been given to the role of "stuff" as an important component of designing technology for domestic settings, where the material in question consists of "a range of artefacts and media, such as phones, address books, calendars, letters, emails, etc." [Rodden et al. 2004, p. 72]. As Rodden et al. [2004] explain: "Ethnographic studies inform us that the Stuff of the home is dynamic, coalescing around different sites at different times for the practical purposes of the activities to hand." [ibid.]

This research notwithstanding, the stuff we will reflect on below has yet to be thoroughly examined (at least with respect to the home). The stuff we are concerned with tends to coalesce around the same sites as those that Rodden et al. describe, but, while occasionally dynamic, is much more likely to be static, even stagnant. Thus, while Rodden et al. and others have done an admirable job of mapping out the topology of interaction with active and practical artifacts in the home, their approach has not addressed what we would argue are the equally important things that fall betwixt and between, somewhere between useful and dynamic on the one hand and mere rubbish on the other. This is

the stuff that slips beneath the woodwork, so to speak, the things that elicit little more than indifference from the householder—or so it might seem. By attending to this stuff, then, we hope to show that the home's intimate residue may indeed be a residue, but that its management might be illustrative of, if not fundamental to, how people transform built spaces into "homes." Thus, though they may avow indifference or annoyance to stuff and clutter in particular, we suggest a home's members deal with clutter in particular ways and with particular means, and that those ways and means stand as testament to and a measure of how their homes are "theirs."

Surprisingly, perhaps, it is the workplace rather than the home where clutter, in its various forms, has been given the most consideration. Research examining people's management of electronic as well as paper-based documents and correspondence has occasionally touched on the features of clutter or something closely related to it. For example, Malone's [1983] early observations on people's desk organization ties into the issues we will raise. What Malone did so well was to highlight how the material arrangement of things can have organising characteristics. The laying out of documents 'just so' on a desk is suggestive, he explained, of a work practice and document flow. He discussed how the messy or cluttered desk can be a consequence of people's problems with categorising their materials and suggested that because of this, desks serve as loose catchalls for things that have yet to have a final place. Since Malone's early anthropological forays into the office, more subtle and developed themes have been explored between the material locale of piles and documents and organisational action. For instance, Sharrock and Anderson's [1992] paper on the affordances of organizational knowledge as well as the work of Heath and Luff [1996] on the practices associated with medical records offer exemplary illustrations of how the management of material things plays a role in "practical organisational reason."

The empirical research we will present supports the points from Malone and others, revealing some commonality between the workplace and home, as far as clutter or mess is concerned. The point of departure we offer in this paper is to go beyond what might be considered the cognitive processes involved in organizing things and the part things play in organizational reason. By focusing on the home, we hope to demonstrate that the material organization of things can contribute in more or less significant ways to the differences we feel towards particular places. As we will elaborate on, the ways in which we organize our things (and sometimes choose not to) speaks not just of whether we wish to remind ourselves of something or trigger some action, but also of how we attribute meaning to our surroundings—how we give importance to things and come to see some things as special and others as less so. In other words, we aim to demonstrate that, intentionally or not, we make moral judgments by placing things "here" or "there" that say something not just of our practical intentions but also of how we want places like home (and work) to be. By focusing on the ways clutter is organized, our intention is not to suggest that the home or workplace (or anywhere else routinely inhabited) are especially different because they must be materially organized, but rather that our particular arrangements unavoidably make them the different places they so observably are. It is in this sense that we see homes as places made special.

1.1 Clutter and the Family Home

So what exactly is clutter, this stuff we are concerned with? Paradoxically, it is difficult to define, though this very difficulty is part of its quiddity. Not only does clutter consist of different things across cultures [e.g., Daniels 1999], it means, as we shall see, different things to people under the same roof. Indeed, in seeking to define clutter, one finds it to be just the sort of thing that people find hard to pin down.

To offer a starting point for the following materials, however, we briefly describe a broad conception of clutter that we have come to in our work. Rather than one concrete thing (or many specific things), we have come to think of clutter as something that is understood in relation to other categories—that is, it is made up of things that are not easily classed by their unique features but rather by virtue of falling outside of other categories of things. In other words, clutter is defined not by what it is, but in part by what it is not. One might say that clutter is a residual category, in Zerubavel's terms [1992]. There can be a range of reasons for this ambiguous status. The things might not be something we feel able to throw away, they might lack a definite place, they might be on their way to somewhere, and so on. The broad idea, though, is that there are groupings of things we class as clutter because they are out of place, in need of some classification and, for some reason, resistant to being sorted. Of course, at any one time these same things might be classed as something else (possibly by someone else), but, because of their ambiguous status, we can see and treat them as clutter. Clutter as an idea is a convenient catchall, and by this we don't mean for us as researchers; but for the people who live with it.

As an initial foray into these loose ideas of clutter, our article focuses, specifically, on the curious role of clutter bowls and junk drawers found in family homes. We begin by detailing the seeming detritus that goes into, remains within or comes out of these containers. We will also detail how the persistent presence of clutter can be unsettling and a source of disquiet to household members. Order in these forms of containment would appear to be a sought-for goal, and one that has moral underpinnings: it appears to be not simply tidiness versus messiness, but rather clean versus dirty, right versus wrong, even, we will say, a question of the sacred versus the profane. In this regard, the sorting and organizing of clutter is not simply a question of classifying things and keeping the home tidy. It is also, and perhaps more fundamentally, a question of making the home a uniquely organized place, a place that is distinctly different from all that is out there beyond the boundaries of what we see to be safe. Casting an analytical lens over the materials we will present, we thus aim to consider three general points associated with home and specifically family life:

—*The Moral Persistence of Clutter in the Home*. Clutter is at once a manifest physical, real (as opposed to moral) feature of the home and the source of moral trouble and toil. The very fact that the home must be organized and that this is a chronic, never-ending requirement means that home is a place where there will always be things that cannot be neatly classified, or that need some time and thought to be sorted out; clutter is never done with either as a hope or a fact.

—*The Site of Liminality for Containment*. Another feature we wish to highlight is that there are sites where clutter is permitted to reside in the home, as it were, and places where it cannot go. All homes may have clutter but not just anywhere; a pressure is exerted to enforce order/disorder in the right places. Where clutter is allowed to reside, the patterns of orderliness are weak and arbitrary, if existent at all. This is *liminality*, using the term as it was developed in relation to ritual by van Gennep (1960).

—*The Social Organization of Home*. We also aim to assert the significance of the ongoing accomplishment of the home as a organized place. Contents in the home, including clutter, are—as a result of the above points—subject to a regular and ongoing process of classification; it is through these doings with things that particular orderings of the home get made and remade. We wish to reemphasize, however, at the risk of belabouring the point, that it is not the fact that homes are regularly organized and classified that makes them unique. Rather it is the particular, personal and idiosyncratic ways in which this organization is accomplished that serves to further distinguish a home as a distinctive place. We do not use the terms *special* or *unique* to suggest that homes are inherently lovely, appealing or wonderful places, rather we simply contend that one home feels different to another, and that part of what makes homes special in this way is how things are arranged and classified, including clutter.

To conclude this article, we aim to reflect on the design of domestic technology and to demonstrate how the position we have presented has important implications, albeit seemingly unlikely at first glance. Specifically, we apply our thoughts to what it might mean to design technologies that are sensitive to the ways we organize our homes, materially and socially. Focusing on design, thought is given to what it is to classify things in the home and to have containers or sites that sit outside our more formal systems of classification.

2. FIELDWORK FINDINGS

2.1 Method and Analysis

The data presented below are drawn from an ongoing study of family life and have been chosen from a larger corpus of extended field investigations undertaken with twelve households living in London, UK. Four of the families make up a core group that have been visited since the study's inception. The other families have been introduced to us by this core group, or were met through chance encounter. The only real criterion for inclusion has been that there be adults with children living in the participating households.

The twelve families come from a range of social and economic backgrounds. As of the writing of this article, all but one of the families included two parents with children (with one to three children per home between the ages of less than a year to 13 years old). Eight of the twelve families had one or more parent working in a white-collar profession such as law, banking, journalism, or commerce. The fathers in two families worked in design, one in graphic design and the other in fashion. In one household the father worked as a window

cleaner and the mother as an office cleaner (working evening shifts). Another home comprised an elderly widow living with her two grandchildren. Eight of the mothers were stay-at-home carers; none of the fathers were although some adopted flexible working hours to increase their contribution to child and home care.

Over the last 18 months, two of the article's authors have visited these families' homes on a regular basis, where they have observed, interviewed, and in some cases participated in everyday family routines such as dinner, play, and the school run. With no specific agendas (other than studying home and family life), a range of research topics have emerged from this period in the field, including list making, the use of fridge surfaces, photo arrangement, general household organization, and more. Unsurprisingly, many of these topics were brought up by the families in question in such a way that their values were made manifest; topics were raised as "performatives," in other words, techniques, if you will, for instructing us—as researchers—how to see. For example, in the case of clutter, we had been interviewing a household about the things on their fridge door when a household member said: " ... oh, and you must see our bowls!" Our fumblings with the litany of materials attached to fridges were thus directed towards bowls as containers of a household's miscellany and their part in a home's social as well as material ordering. From there we went onto visiting and re-visiting other homes where we inquired into similar possibilities, and finally onto the containment of clutter as a general topic.

Excerpts taken from interviews and observations with three mothers, in which they confront their family's containers of clutter, constitute the core of the materials used in this paper. In using this limited but focused explication, we want to address four points that we feel deserve explanation:

First, we want to note that our intention here has been to orient our fieldwork to matters of design, but importantly not to produce concrete designs. Like Dourish [2006] and other more long-standing works that have reflected on the role of ethnography informing design, e.g., Anderson [1997], our hope is that ethnographic fieldwork be used to broaden and sensitise design concerns. Crucially, though, our approach has been one that is careful not to take on ethnography's problems, as they are taken on in say anthropology (as well as sociology). It thus builds on a notion of an *ethnography for design*, one that's foci are distinct, tropes particular, the balance between description and analytic concerns unique [Randall et al. 2007]. The lookings presented in the remainder of this article do not, then, constitute what one might think of as the ethnography that anthropologists do. They are ways of looking suffused with a sensitivity for what we might design for. The modesty of our reflections and suggestions is an indication, we believe, that designing for how people constitute their homes is not straightforward or easy. Our efforts have been to contribute to the established corpus of research surrounding domestic technology and to sensitize future design—and perhaps unsettle it a little—to what it really is to live in and organize a home. To borrow Anderson's now well-worn phrase [1997], our goal has been, in some small but hopefully meaningful way, to open up "the play of possibilities" for design.

Our second point addresses what might be seen as the small number of examples we have used to develop our ideas. As we have noted, the presented excerpts, chosen from interviews and observations with three family homes, are drawn from a range of materials we gathered in the participating households. They are limited, however, to examples we felt would best illustrate aspects that were both curious and promisingly provocative for design (as we hope to make clear). That is, they help bring to the fore the transformative effects of families' dealings with clutter and point towards a particularly interesting relationship between the material qualities of clutter containers and families' social orderings. Other matters could have been pursued with the data we present, and indeed may have been easier to substantiate with our larger corpus. Our intention in presenting these materials has not been one of producing a proof, per se, nor a comprehensive account of family life and clutter's containment writ large (both of which ethnographic fieldwork of any persuasion would arguably be ill-suited for). Rather, the analysis should be seen as an attempt to introduce and explore a set of observable practices in three family homes, practices we imagine raise important consequences for design.

Thirdly, and related to this last point, we address what must seem a significant omission in our analysis. A noticeable theme that will not be developed in this paper is that of gender, and specifically the differences between women's and men's roles in home and child care. In general, the authors are acutely aware of the division of housework and the implications it may have for design; indeed, our prior work has attempted to draw attention to just this and how design might, in some cases, seek to address the attendant inequalities [Taylor and Swan 2005]. By raising a topic like clutter and its management, and having three women speak of their household's practices, our decision not to attend to gender might at first glance appear both an oversight and negligent. It is evident, in reading through some of our informant's accounts, that the management of the home—even of household clutter—is a matter fraught with issues of power and control. There are even hints of Martin's thesis (in her article "Mother Wouldn't Like It!" [1984]) that to manage mess and its tidying is to control the symbolic currency of home. Be that as it may, our omission should not be taken as an insensitivity to the inequalities in domestic work and care, but rather as a purposeful focus on the categorical problem of clutter and how it is routinely dealt with using specified sites of containment in the home. It is with this sensitivity to the *how*, that we and hopefully others might go onto study the who.

A fourth point is a somewhat related caveat with regard to our analysis. As will become clear, the data we present has, in parts, been subject to a loosely positioned analytical orientation that not only is design oriented but also, in its essentials, borrows on the established and sometimes controversial work of sociologist Emile Durkheim and his successors in sociology and anthropology. We refer here most specifically to Mary Douglas, who has written what might be considered the anthropological treatise on dirt and pollution [Douglas 2002]. We adopt this orientation not to recapitulate the structuralism that Durkheim played such a key role in founding nor, indeed, to offer something novel to anthropology on this topic. Instead, we use the orientation as a device to help

Fig. 1. Nicola's three bowls.

reflect on the practices of clutter and its containment, and to thicken our interpretative accounts in this vein with regards to opening up design considerations. We are aware that in adopting this orientation, like any other position, we draw attention to some features and not others. We do not, for instance, give any sort of comprehensive attention to the different and changing meanings of clutter for specific family members, or to the part clutter plays in influencing family relations, or, as we have noted, power and its relation to gender. Nor will we address the full range of places that clutter can exist in the home. Broadly, and to reiterate, we have chosen one of many orientations to open up possible avenues of investigation and to hopefully explore new ways of thinking about the novel technologies we might live with.

2.2 Clutter on Display

To introduce some basic features of containers for clutter, we begin by presenting some fieldwork material from an interview with Nicola, a mother in a household of four (two sons, 6 and 9; Nicola; and her husband). For Nicola, "junk bowls" figure prominently in the family home. In the open plan kitchen/dinning area, three stacks of bowls sit on a waist-high shelf facing the entrance to the room. Located not far from the kitchen table and near to the work surfaces, the bowls are placed to be used, it appears, for the preparation or serving of food. It is immediately apparent, however, that they have been appropriated to act as repositories for an assortment of bits and pieces.

A bowl sat in the middle of two others (Figure 1), and stacked on top of another five, contains, in Nicola's words, "what's on at local galleries [pamphlets]; ... a lock that one day will be put on the front door, but that I promise you has probably been in this bowl for about three years; various electronic things, chequebook stubs, that sort of thing ... " Nicola refers to this as her redundant bowl. To the right is her "working" bowl, holding the front door keys, the mobile phone, chequebook, suntan lotion, and other things to be "grabbed" on the way

out. Describing how these bowls come to take on their respective roles, Nicola puts it like this:

> I think what happens is you start using a new bowl at some point and then the old bowl becomes- [laughs] you know, it's crying out for a clear out and probably doesn't have much in it that's much use.

Nicola's three bowls contain a collection of paraphernalia, a seemingly haphazard mixture combining suntan lotion with mobile phones, and door locks with check stubs. Likewise, the divisions between the bowls can seem arbitrary; new working bowls appear when others become redundant or simply full. Considering these bowls more carefully, however, it emerges that there is a reasoning to their use and how they function. Nicola explains the role of bowls in what she earlier describes as the home's "systems" for organizing:

> I suppose it's because you have stuff [said with emphasis in a pejorative tone] and you need to put it somewhere and bowls seem quite a good receptacle in that they just swallow everything up. Ummm, . . . [pauses] completely without any thinking or planning . . .

She continues, describing her husband's use of the bowls:

> . . . sometimes he'll plug into them. So he knows for example that—it's never talked about, but he'll know that batteries go in that bowl, keys go in that bowl and, if you have paper work that needs sorting, it'll go in that little pile. So I guess he tunes into it almost subconsciously. They are my systems, but they become the home systems I suppose. And they're really not—it's rather a grand word to call them systems actually.

On the face of it, then, we see that bowls are considered useful in a home's organization because, they are, quite simply, ready to-hand. This to-handedness is twofold. For one, they are readily available receptacles for "stuff"; their shape and form lend themselves to having things placed in them without thinking or planning. Second, their function is openly available to those in the home; once established as part of a system of organization, their use and operation are obvious—with little to no forethought they are plugged or tuned into. Situated in immediate view of what is probably the most frequented room in the house, the bowls have become quite simply a taken-for-granted feature of organization in the home.

There is, though, a less evident feature to this to-handedness; by being ever-present and on display, these bowls function as reminders. Like things we leave out to trip over lest we forget them [Norman 1988], the bowls summons our attention. The very reason they are used to begin with—their form and visible placement—give the bowls this quality. What is interesting here is that this reminding elicits an irritation in Nicola, almost an angst. Although she refers to piles in the following excerpt, her remarks are directed at the general clutter on show in her house, including the household's bowls:

> I think a file, somehow, would just get forgotten about more than a visible pile that's actually irritating me. That's part of it. Part of it is that I don't like clutter, even though you wouldn't know it [gestures around house]. I don't like

Fig. 2. An out-of-sight bowl.

> all these piles of things everywhere so if I deliberately make a pile then it's sort of a motivation to get rid of it as well.

Unlike things that are filed away, visible piles attract attention and motivate action; the deliberate making and display of piles, as with the overt clutter placed in bowls, operates as a signal to sort through them. The effectiveness of this appears to hinge on the irritation caused by having things openly cluttered—the uneasiness with having things visibly out of place.

Another of Nicola's bowls, this one tucked out of sight behind the kitchen door (Figure 2), reveals there is some discretion as to what goes into different bowls and how visible the contents are. Pointing to the less noticeable bowl, Nicola runs through its contents:

> This is old mobile phones that we're going to chuck out but I think actually I'll get them recycled somehow. Film for the camera, batteries—the inevitable batteries because if you have kids all their toys need batteries, the A-to-Z. You know, sort of bits and pieces but if you dig down to the bottom I'm sure there are things in there that I have long since forgotten about. So it isn't very organized in that respect. The things on the surface are important, but in some sense it's like geology.

This bowl has contents with a longer than intended half-life, so to speak, and Nicola's suggestion that there are things long since forgotten about under the surface reiterates this. Similarly, her reference to geology conjures up a sense that excavation might be required to access the low-lying sediment. The contents, however, all hold the potential to be of use somehow, possibly at some unanticipated time in the future. In contrast to Nicola's other bowls, there is no immediacy to the items, but there remains a similar sense that there is no obvious place for the contents. This latter type of bowl, then, is less about motivating immediate action but rather functions more as a catchall for things that have no specific place. Salient here is the relatively secluded and

out-of-sight positioning of such a bowl; as a container it still affords having things placed in it, but kept out of sight, it no longer acts as an active prompt or reminder.

In Nicola's junk bowls then, we are given insight into the close relationship between the form of the container, its location and its content. All three intersect, so bowls placed on display, for example, lend themselves to some classes of clutter and not others. The placement of this clutter, in turn, recasts the character of the containers, transforming them from food receptacles into memory joggers, longer-term storage devices, etc. The nub of this point is that, even though one person—namely Nicola—administers the management of clutter, the roles of the containers are, by their very design, available to and utilized by all. The bowls, their location, and their content imbricate and come to be used in the ways we see because they are made materially available in an ongoing fashion, not just to Nicola, but also to her husband and presumably her two boys. Their success for the family (in Nicola's eyes at least) hinges on the visible and known-about features of the containers, where they are located and the things placed in them.

Let us, at this point, push a little further on this seeming balance to be struck between making things visible, on the one hand, and hidden, or out of sight, on the other. In the case of the grouped bowls in Nicola's family kitchen, we have noted an intentional effort put into placing some types of clutter on display. The items have been purposefully located to draw attention to themselves—to be to-hand, stand as embodied reminders, signal future action, and so on. Nicola's triptych of bowls and their contents perform their role because of their presence. The importance of this performative function becomes more interesting, and perhaps more illuminating, when we consider the less conspicuous out-of-sight bowl, behind the kitchen door. With this receptacle, the performance is achieved through the absence of clutter. The very fact that the contents deserved being tidied away, placed out of sight, and must be seen as such, hints at something more. This bowl and the purposeful hiding of its contents is bound by and stands out against an idea, a schema if you will: that order is special, necessary, something to work at and even worry about. Something more than mere tidiness is at stake.

What we would like to suggest is that this distinction between making things visible versus making them hidden is not merely physical; it has symbolic, even emotional properties. We would like to suggest that to be made the special kind of place that it is, the home must be worked on, so to speak. A specialness is achieved through tidying and all the attendant processes, tasks and even battles this entails. By displaying, tidying away, and making decisions about those things that might sit in-between visible and hidden, the home is suffused with judgments, ideals, even a moral fabric. Sociology and anthropology have addressed such matters, considering the home directly, and also what, at first blush, might appear to be the far less related juxtaposition of the sacred and profane. Martin, for example, sets out a provocative argument in this respect by paying heed to Durkheim and Douglas, and their sensitivity to what they call the pure or sacred, and their antitheses, the dirty or profane. As a housewife, she writes:

Fig. 3. Emma's junk drawer.

> . . . the world seen through the traditional housewife's eyes is a place in perpetual need of taming and tidying . . . We are the guardians of that vital ingredient in taken-for-granted meaning which depends on the 'rightness' of the way things are disposed in the intimate world of the home. [Martin 1984, pp. 23–24]

The ongoing marshalling of clutter is thus an elementary part of the business of making the home "right." By tidying, taming and disposing of clutter, as Douglas herself writes, "[w]e are separating, placing boundaries, making visible statements about the home that we are intending to create out of the material house" [Douglas 2002, p. 85]. The irritation felt by Nicola is, on some level, due to what she sees as her inabilities to keep clutter at bay and by association, her failing to succeed in her role, as a 'good' home-keeper, of taming and tidying.

2.3 Hidden Clutter

In this section, we continue along these lines by considering the different methods of containing clutter afforded by other containers, but this time looking more specifically at hidden clutter.

Emma, a mother of two sons aged five and nine, has a junk drawer located among the kitchen cabinets (Figure 3). In contrast to Nicola's bowls, Emma's drawer is not particularly visible; when closed, it looks like any drawer, save for its broken front. Inside the drawer, there is no explicit system of separation or organization; it appears to be simply clutter, in all its magnificence. However, the description Emma gives of its function indicates that there is some form of order to the drawer, albeit a loose one.

> This is where I just put things where I- you know where you think you really want to throw it away but you don't feel that you can. so it's a combination of those things and little things that I don't have a home for but I should have a home for, like the tape measure, and the rulers, and the paper clips, and things.

Emma captures that familiar quality of junk drawers and what we put in them; the junk drawer as a holding place for the things "you think you really want to throw away but don't feel that you can." In Emma's drawer, we find a jumble

of string, spare plugs, cards, sunglasses, bicycle lights, etc. While discussing its content, Emma begins to pull out items and make small piles, separating out the tape measures, rulers, paper clips, etc. Although it is clearly a collection of mundane, unremarkable things, Emma gives a sense of their special status in the household; her use of the word "home" and the fact that they "should" have one says much. She next pulls out several small string bags (the kind used to hold laundry tablets when put in the washing machine) that she has reappropriated to keep fridge poetry and magnetic chess pieces together in the drawer. The mixing of laundry accessories with magnets and chess pieces has a playful, slightly absurd quality, but when they are placed in and amongst all the other miscellaneous things in the drawer, the makeshift orderings are in some way more acceptable.

Continuing to rummage through the contents, Emma makes several discrete piles on the table across from the drawer, as well as two large piles above the drawer on the worktop. In the piles on the table, there are amongst other things groupings of marbles, notebooks, Legos, and dice. When asked about the different piles, she explains that the items on the table "go" places.

> Those are dice, but again they should go- there's a little bag we have upstairs for dice so that should be, they should all be in the dice bag—Lego, that needs to go in the Lego box—more dice, they should all go in the dice bit . . .

We see that these items are part of Emma's systems of organization; that is, in this household, marbles, notebooks Legos, and dice have a designated spot where they belong. Thus, when found in the junk drawer, they are plucked out and set aside, to be reunited with their marble, notebook Legos, and dice brethren. The important aspect here is that these groupings are parts of various larger collections, stored elsewhere in the house, which mean the items have a home within the home. This then is a very particular type of clutter; it is "matter out of place" [for more on this phrase, see Douglas 2002] but the defining feature is that this matter has a place; it is simply not in it, for a variety of reasons. Emma's description of items "going places" is interesting on another level, because these items are in fact in transit, albeit perhaps temporarily on a stopover in the junk drawer. Junk drawers, it seems, can serve as resting places for things that have been used but have not yet been put back where they belong, or have yet to find their way "home."

Emma also invokes the word "go" for one of the large piles on the worktop, but uses the phrase "that can go," as in rubbish to be thrown out. As she throws some trading cards onto the rubbish pile, she explains they were from the last Harry Potter movie and "were terribly precious for a short period of time." An inevitable aspect of sorting through junk drawers is finding things to be thrown away, which is, upon reflection, noteworthy. The fact that a sizable proportion of things in junk drawers can be disposed of suggests that items can go into the drawer with one status and come out with another, that something "terribly precious" can transform into rubbish within the drawer. The following excerpt, this time involving a Yughio trading card, shows us something more complex occurring:

> . . . torn-up Yughio cards [tossing what looks like part of a card into a to-throw-away pile]. I think there are torn up Yughio cards because when sometimes the boys fight and they tear up each other's cards and I have to say: "don't worry I'll fix it!" which of course I can't do, but I'll say that [laughs] . . . and then I'll put it in there [the drawer] and it gets forgotten about and then it's all alright because nobody cares and they won't remember.

Here we see an example of the "magical" powers that parents hold for their children. When Emma places a torn Yughio card into the drawer to mollify her battling sons, the card transforms over time from a point of friction to an opportunity for reconciliation and finally into rubbish. In this case, the out-of-sight property of the drawer's contents and its weakness at enforcing classification both aid in the transformations. Relying on the out-of-sight-out-of-mind tendency of children, the torn card can waver between cherished and destroyed until, once safely forgotten about, its status no longer matters.

As Emma continues to empty out her drawer, we see yet another role that junk drawers can assume:

> . . . bicycle clip, children's sun glasses, ever so useful, elastic bands, in no particular order—if I wanted elastic bands this is where I would look for them—that is an air freshener for a car that [smells the wooden apple shaped object]—err, smells horrible, but it was in the car when we bought it so we've hung onto it for sentimental reasons . . . when we bought our car that we have now it was new and for some reason it was in there. I don't know why it was just-I think the kids thought it was exciting that it came with an apple as well. You know "new car and wooden apple!" [laughing] so for some reason we still have that.

Here the drawer acts as a repository of a bit of sentimentality and family history. Items such as the wooden-apple air freshener occupy an uneasy space, being at one and the same time junk but also valued. It is unclear when the wooden apple took on this value, but the unclassified nature of the drawer allows the coexistence of junk and sentimentality, embodied in the same object.

Emma, after spending considerable time going through her drawer, eventually stops reaching in to pull things out, peering into the drawer instead. She explains that she has reached the "bottom layer" of the drawer, and that these things never get sorted out, regardless of how determined she is. This use of the word "layer" echoes Nicola's reference to "geology," and suggests some things have a sort of persistence in remaining uncategorized and unorganized. Loose change from foreign countries, undeveloped rolls of film, a type of string to be used when catching crabs and the back panel of the television remote control linger in this bottom layer.

Emma later shows us a different, and rather remarkable example of this sort of persistence in the form of an embroidered badge from Powderham Castle, the sort found in souvenir shops. She explains that she visited Powderham Castle with her sons, and that she mentioned this to her mother-in-law in conversation. Her mother-in-law then went and unearthed an embroidered badge depicting Powderham Castle, purchased there thirty years before. The idea that this badge had been floating around various drawers/bowls/boxes for thirty years, besides being somewhat mind-boggling, gives us a sense of the longevity of this unclassified state. When Emma is asked whether she plans to do something

with the badge, such as sew it onto something, she laughs and says "Of course not!" and drops it back into the drawer, where it may presumably stay for another thirty years.

In a drawer in Emma's family kitchen, what we have then is a place where stuff—clutter—can sit unperturbed. The drawer is ordered, but only just so. The status of the contents may not be terminal, may transform from the mundane to rubbish or useful matter, but, whatever the case, in this receptacle, stuff is given leeway. The drawer, with its marked place in the home, is given the status of a place of respite for those things to be cast out, causing disorder, or threatening household peace—respite from what Douglas [2002] calls the threat of "danger." The drawer, and other places that have a similar status conferred upon them (like Nicola's bowls), might be thought of as—to borrow from the anthropology of ritual [Turner 1977; van Gennep 1960]—*liminal* places that:

> . . . are seen as being outside of everyday place—they are a type of special place where everyday rules of life are seen as being held in abeyance. [Smith 1999 p. 16]

The unclassifiable—the wooden apple, torn Yughio card, and so on—are thus placed into the drawer, set precariously in a liminal state between treasured items and refuse, between, if you like, things that are sacred, because they have earned that right, and those things that are profane, a threat to the worked-on order that binds the home and its inhabitants.

2.4 Battling Clutter

For our final example, we turn to Olivia, mother to two girls, aged six and nine. Olivia's house is especially tidy and aesthetically pleasing, and is acknowledged by her friends as such. During our observational fieldwork, for example, Emma comments, "Olivia would never have a drawer like this!" In the interest of looking at diverse households and different instantiations of contained clutter, we decide to see if this is the case.

On first glance, Olivia's house does not seem to be a promising arena for studying clutter. There is none visible, and Olivia herself claims that she does not keep "stuff" and that she throws away as much as she can. Delving further, however, we are able to find little hints of clutter, and more interestingly, Olivia's efforts to keep them at bay. Tucked into the corner of a cupboard of wine glasses is a small bottle of homeopathic drops. The bottle of ointment, a gift from her daughter to help unwind, presents a small problem of classification for Olivia:

> I thought well—I couldn't think where to put it actually, and you can't see it when you close the door—I mean really it could be put in another drawer. But this is me, I think to myself "Why is that out? Put it away." So it may not be in the right place but I put it away because I can't stand stuff lying about.

Although Olivia's gift is placed out of sight in a cupboard, we discover it does in fact have its right and proper place in another drawer. The overriding criterion, though, appears to be that stuff cannot be left lying around and thus a bottle meant for a drawer is put away, elsewhere. Olivia solves this problem by

reclassifying her homeopathic remedy. Unbeknownst to her daughter, stress is relieved not by using its content but by hiding the bottle from view.

Olivia's reference in the previous excerpt to "another drawer" is notable because of the number of drawers she has at her disposal. She has recently had her kitchen and adjoining utility room redesigned with banks of closets, cupboards, and drawers, and feels that she now has "places to put stuff." Looking in several drawers, we find collections of like things, neatly separated by containers, dividers, trays, plastic bags, etc. Indeed, the drawers are the epitome of organization, and it does seem as if Olivia has perhaps eradicated the spectre of clutter by categorizing it to the nth degree in all its minutiae. Thus, we find a drawer for table mats, and all things table-associated, such as napkin rings, place holders, etc., another drawer for pens, scissors, tape, paperclips, and glue, all neatly separated by dividers, and another drawer for sewing paraphernalia, which is again neatly compartmentalized. In a drawer of tools and household implements, however, we get a glimpse that all is not as it seems. This drawer has, besides a tray full of tools and a case of socket wrenches, a biscuit tin of batteries and a plastic tub of keys. Olivia explains that the tub is specifically for keys, separated out into a plastic bag, and key rings. When the number of keys is remarked upon, she replies: "I have no idea what they're for, but I've kept them because that's where they go."

Olivia has thus taken something of uncertain status that we would suggest is found in nearly every household—that is, keys to unknown locks—and has given them a home. In doing so, she has not resolved their status; through her explanations to us it becomes clear that she has no more idea of their rightful destination than either Nicola or Emma would, but by giving them a designated place "where they go" she has organized them and attended to them, compartmentalizing and thereby minimizing their ambiguity.

Encouraged by this chink in the organizational system, we dig further into the key tub and find further breakdowns in classifications. Underneath the plastic bag of keys we find several un-key-like items. Olivia's response is illuminating:

> They're just things, aren't they? I don't know what to do with them so I put them in here . . . [pointing to a glass sphere]. That's a ball off the garden swing. It's of absolutely no use but it's beautiful so I couldn't throw it away, could I? So I've put it in here.

Here then we see the bottom layer that Emma referred to, the things that Olivia doesn't know what to do with. In the glass ball off the garden swing, there are echoes of Emma's wooden apple car freshener, of an item having the dual status of being junk and sentimental at the same time. Even though Olivia tackles the business of classifying the miscellany of the household with fervour, and has closets, cupboards, drawers and dividers to help her, ultimately she too ends up with a small tub somewhere full of "just thing."

Continuing our rummage through her key tub, we unearth an Allen wrench, or Allen key, used to assemble furniture. Olivia's response when we hold up the item is defiant: "That's a key!" This is notable not because of its semantic play on words, but rather because it illustrates a feature found throughout Olivia's

Fig. 4. Tubs with Pinocchio key rings (top of picture).

organizing systems, and that is their inherent flexibility. The following excerpt is presented in full because it gives a nice example of this flexibility, as well as the reasoning behind it. The items under discussion are two key rings of Pinocchio's head, both the same (Figure 4).

> Now really these are broken key rings, so they should be in there [places them into small jar for broken things]. But I know that I shall never fix them, so actually I shall throw them in the bin [laughs]. They were there because they were special. They're obviously flawed because that's why they've broken; we bought them on our way to Italy as a keepsake. I suppose, I suppose- if I ran out of things to do, I might, you know, find a—go to the other drawer, find a ring and put them on, you know—And meanwhile, they could go in here [opens drawer with pens]. See, this is the thing, they could go in here [gestures to the tray of pens in drawer], and they could go in that one, [points to drawer across the kitchen] and they could go in there [points to jar]. They're a bit big for that jar, aren't they? Really, key things should be in that one [points across kitchen], but then they could be here [points to tray of pens] because there's a ring here, and I could one day fix the ring onto here, you see, so, I think I'll leave them in here [places them in drawer with tray of pens and shuts drawer].

Here, Olivia is grappling with the problem of the right and proper place for a quintessential piece of clutter, broken keepsake key rings. Interesting is that she allows herself several possibilities for where these key rings should go. Although caring terribly about organization, hers is not a rigid classification scheme; it is much more fluid, which lends itself to the sometimes unorthodox nature of household miscellany. For example, in a story remarkably reminiscent of Emma's drawer, she tells us of having the severed ankle of a Barbie doll in her jar for broken things for several months, because her daughters believed she would someday fix it. This sort of reasoning reflects the personal and idiosyncratic character of household systems, and the flexibility allows them to withstand the changing needs of families.

Even for Olivia, then, the classification of things is to be negotiated, worked on, according to how Olivia sees fit. In a larger sense, this can be applied to the idea of home, and the idea of family [see Douglas 1991]. Once again, we see that the groupings and categories of things—material things—and the ways people go about sorting them out in an ongoing fashion are particular to each and every family, and as such, are elemental in the very business of making a home distinct and particular. If it is the principle of classification—of which the practices of containing clutter are constitutive—that homes have in common, so too is it that which enables them to be made places that are singular, unique. All homes have clutter and seek to classify it, but each home has a distinctive set of rituals and rites, and an individual *texture* to their classification schemes [see Bowker and Star 2002]. Clutter's containment, in this way, gives us an example par excellence of how the material and social are terminally in union, conjoining the physical, social and even moral. Durkheim had it right in his seemingly unrelated comments on matters of religion:

> . . . because collective feelings can become conscious of themselves only by fixing onto external objects, those forces could not be constituted without taking some of their features from things. Thus they have acquired a kind of physical nature; as such they came to be mingled with the life of the material world, and it is through them that people thought they could explain what happens in that world. [Durkheim 2001 p. 314]

3. THOUGHTS ON DESIGN

Reflecting on some of the ideas we have presented above, we would now like to consider what relevance they have for design, and particularly the design of technology for the home. There are two main points that we want to develop in this section that we believe raise significant matters under this theme. The first relates to the notion that householders, and specifically our informants, are engaged the production of an idea of home though their organization and classification of things. We want to suggest that this should impact on how we design for the classification of things in the digital realm. The second ties back to the practices of containing clutter, suggesting that the containers or sites used for testing out the classification of things are illustrative of and fundamental to the ongoing production of the home as an idea, wherever home is being sought. Here, too, we conjecture on the prospects for technology.

3.1 Making Place

In recent years, several notable projects have sought to address the fluid and often idiosyncratic ways in which we classify our electronic data. Xerox PARC's Placeless Documents project [Dourish et al. 2000], for instance, explored various mechanisms allowing users to categorise their electronic content based on those active properties relevant to the user, rather than the rigid and in some ways arbitrary structures insisted upon with file-folder hierarchies. Using the Placeless system, documents could become entities with multiple classifications. Thus, they could exist and be grouped together in different ways, simultaneously. Some of the apparent limitations of the physical world, which

the file-folder metaphor was originally built on top, were accordingly done away with.

The developments made in the Placeless Documents project, and the progress in data indexing and computer performance, have contributed to research and latterly commercial projects that do away with a need for manual classification altogether, at least in principle. The work of Dumais and her colleagues at Microsoft Research is illustrative of this [Dumais et al. 2003]. Their Stuff I've Seen system offers an almost real-time indexing of anything viewed by a user, enabling content to be retrieved using a single interface; the computer's file-folder hierarchies are made redundant. Emails, calendar events, Web sites, word processing documents, spreadsheets, and so on can all be searched by entering a search string into a single field. In this way, all documents are treated equally, all seemingly placeless.

Solutions like the Placeless Documents system and Stuff I've Seen have, of course, been designed for the personal computer (PC) and in this case we can imagine numerous benefits over the limitations of traditional desktop computing. The trouble arises, though, as we move to distribute computing, embedding it into our physical environments and around our homes in everyday appliances, a piecemeal technologisation of the home that now seems inevitable [Edwards and Grinter 2001].

What we have posited through our fieldwork is the notion that by configuring classifications, at least in a social/material realm, we are in fact producing place. Place—and more especially our idea of it—is a by-product of how we group things in the world, where we put them, and which things fall between and betwixt. Particularly relevant in the domestic realm, our ways of classifying things are integral to what our homes look and feel like, and how they become special to us. For design, what is interesting about this possibility is that it conjoins the processes of classification and our shared and negotiated ideas of place. Somewhat counter to the premise of organizing around placeless documents, it would seem that in the physical world, classification and place are irrevocably bound.

When designing for computing beyond the desktop computer, then, it appears it may be imprudent to remove from our influence the judgements and decisions we make to classify and categorise things. In the home at least, we should be wary of embracing technological visions that promise complete classification for us, or worse yet, no classification at all. Electronic sensors and tags that inform us as to where things go, and even where things are, are technologies to be designed with sensitivity and judgement. Similarly, we must be careful of how space is oriented to. Having information stored in one central place, displayed throughout the home, and smartly following us from room to room begins to disassemble the choices we have made in where to put things. As we have been at pains to suggest, it is these kinds of classification practices that constitute what it is to make a home, and to which we give such importance in doing ourselves. After all, we take trouble and care in choosing sites for prompting and reminding, as well as sites for forgetting.

The broad lesson to be taken from this first point is that if, as we have suggested, our processes of classification are integral to producing our ideas of

home, we should not be looking to do away with the possibility of place in our digital solutions. Instead, we should be investigating how we might more easily assign our digital, usually disembodied, content to specific sites—to drawers, bowls, and all the other places we give over to material things. We should be considering how we might somehow give the digital those physical attributes so that it can be grouped, displayed, hidden, and so on in our material homes.

3.2 Places for Uncertainty

Bowker and Star, in their book *Sorting Things Out* [1999], have mirrored much of Douglas's and consequently Durkheim's foundational work on classification. Examining organizational practices, particularly medical, they give critical thought to what they call technologies of classification. They suggest that classification schemes, by their nature, are made up of the inexorable layering of structures—structures that are material, technological, informational, organizational, social, political and so on—and that these structures continually fold back on themselves to sustain their old relations and also to create new ones in their own image. A primary lesson they draw out of their field materials is that unorthodox, "dirty" solutions are sometimes necessary in organizational life because they disrupt assumed conventions. They suggest that the structures we inhabit are, at times, organizationally, socially and morally counterproductive and that we must build for "open spaces" that enable the emergence of alternative classification schemes.

In quite a different language, and with quite a different subject matter, we thus find a similar line of reasoning to the points we have been making: that in ordering things, materially, we unavoidably order ourselves; our systems of classification in the home keep sacred, if you will, a certain idea of order (whether you call it informational, organizational, social, political or all of the above). As Bowker and Star would have it, the domestic "structures" are self-sustaining through our "powerful technologies" of classification.

Crucial, in this, are our mechanisms for allowing things to remain loosely classified. By allowing for loose classifications in chosen drawers and bowls, we build in mechanisms to keep our social structures intact. Our sites of clutter demark the boundaries between structured and unstructured, ordered and disordered, sacred and profane. Key here, though, is that these open spaces—ones we have referred to as liminal—provide a measured tolerance to disorder. They give leeway, in a fashion, from what Bowker and Star see as the forces of conformity. What we have then is quite literally the dirty solution: in clutter bowls and junk drawers we see systems of counter-classification in action. Moreover, we find this practice, no matter how immersed in the social and moral, inexorably tied to the material. Once again, Durkheim's aphorism is apt.

If these points are of any value for design, they are in raising questions around how we enable such leeway in technology, how we provide material space for uncertainty and nonconformity. Work from London's Royal College of Art (RCA) has addressed this particular question in their ideas around *designing for ambiguity* and specifically, *ambiguity of context* [Gaver et al. 2003]. Gaver and his colleagues on the UK-based multisite project, Equator, put forward a case for

design that serves to unsettle our commonsense assumptions about things and how we neatly compartmentalize them. Writing about the ambiguity of context, they use examples from recent artistic movements (i.e., Dadaism) to reveal how the placement of objects in unexpected and sometimes unsettling contexts can disturb our ordinary preconceptions and provoke new ways of thinking. Ambiguity is thus one way in which we might think of designing technologies to test out and revitalise our tired schemes of classification. Through ambiguity, the sites where we materialise the digital, might, on occasion, also hint at or blatantly exhibit the possibilities of fracture, of things being out of place—just as we have argued containers like clutter bowls and junk drawers can do.

There are other design possibilities as well that we might learn from our use of bowls and drawers (ones that have not been so elegantly articulated). For one, we know that a balance is continuously being struck between order and disorder at chosen sites. It is as though drawers and bowls, as solutions for destabilising known classifications, allow for a movement between states. As we saw with Emma's drawer, this juxtaposition is, in part, what gives rise to the possibility of things moving between categories—how an object can move from questionable to sentimental value, or vice versa, merely by dint of its physical placement. Similarly, this transformative power is enabled in giving things the time and place to sit out of sight. So we have material sites where things of different or uncertain classification rub up against each other, awkwardly, and are unstable as a result. In addition, these sites can allow for things to sit in waiting, concealed and of little or no immediate interest. Like ambiguity, these ideas of instability, concealment, and disinterest are things we do not ordinarily think about in designing computers. Indeed, they are antithetical to the design of PCs and see little traction in the more progressive projects of ubiquitous or pervasive computing. In the domestic setting, more often than not, computing machines are built for consistency, visibility and engagement.

Something else found in the placement of clutter containers, is that they are often situated to facilitate minimal effort and thought on a family's part. Things go into entranceway bowls and kitchen drawers, because that is where the clutter amasses: "stick it in a bowl or drawer to deal with later—much later!" The classification scheme afforded here is not one of formal structure, but, something on a more casual, less conscious level. We are not suggesting that household members give no thought whatsoever to where and how these containers are situated—rather, that such apparently mundane choices are part of the making of a home. We see that bowls, drawers, and other likely receptacles are immediately useful in a home because they help family members achieve, in an offhand, lightweight manner, some semblance of order. We might consider this as another starting point for design. How is it that we can design computing to be treated in a *casual*, even capricious, fashion?

In designing technologies for uncertainty, dirty technologies where we are able to (re)produce our ideas of place, time and again, we thus have some basic tenets. The possibility of building technologies for ambiguity, instability, concealment, and disinterest, and to be treated casually, hopefully gives us a position from which to rethink our design for homes that is somehow more true to how we live in them.

4. CONCLUSIONS

In this article, we have sought to make initial inroads into discussions on clutter and to illustrate how these discussions might help inform design. By examining the particular forms and containment of clutter, we hope to have addressed one of the family home's integral features; our intention has been to foreground a way that homes are managed and organized that make them discernibly different from almost anywhere else, and that makes each home unique.

Our efforts, thus far, have been to consider clutter's containment in the form of bowls and drawers. Most decidedly, clutter takes shape in all manner of ways in the home, sometimes organized into neatly stacked piles, sometimes verging on the profane—mess, dirt, or pollution. Our focus has been shaped, in part, by our interest in the varied possibilities that lend themselves to being considered in design and to push, to some extent, what directions technological research in the domestic realm might go. We have, however, in no way been complete in this. In fact, we have no doubt raised more questions than answers, which has indeed been our intention. By teasing out what it is to contain clutter in our homes, and reflecting on the practices of classification that come to constitute our ideas of home, we hope to have laid the groundwork for further research in this area and more detailed explications of the peculiar properties of matter out of (as well as in) place.

The general approach to the presented research has been to report on the findings of ethnographic fieldwork and examine these findings at a fine level of detail—similar, at one level, to the ethnomethodologically informed studies popularized many years ago in HCI and CSCW [see Button 1993; Hughes et al. 1992]. As a point of departure from these established fieldwork practices, the presented findings have also emerged through an interpretive reading of the fieldwork data, an approach heavily influenced by the modern ethnographic sensibility in design [Randall et al.]. We see this general approach as complimentary to the more technology-focused and measurement-based methods commonly administered to elicit user requirements in CS-related fields. Indeed, even here, where we have veered clear of technology *per se* and written of the seemingly removed matters of clutter containment and family order, we aim to have demonstrated how the essential features of the family home, along with its clutter, can be a subject of preeminent concern for design in domestic settings.

ACKNOWLEDGMENTS

We are hugely grateful to the fieldwork participants who contributed to the findings presented above. Our ideas would have been greatly impoverished without their contributions. Much thanks must also go to Shahram Izadi, Kenton O'Hara, Mark Perry, Eric Laurier, and Alison Woodruff for their continued support and encouragement, despite our sometimes wavering confidence in this work.

REFERENCES

ANDERSON, B. 1997. Work, ethnography and system design. In *The Encyclopaedia of Microcomputers*, A. Kent and J. G. Williams, Eds. Marcel Dekker, New York, 159–183.

ANDERSON, R. AND SHARROCK, W. 1992. Can organisations afford knowledge? *Comput. Supp. Coop. Work*, *1*, 3, 143–161.

BERG, A.-J. 1999. A gendered socio-technical construction: The smart house. In *The Social Shaping of Technology*, D. MacKenzie and J. Wajcman, Eds. Open University Press, Buckingham, 301–313.

BOWKER, G. C. AND STAR, S. L. 1999. *Sorting Things Out: Classification and its Consequences.* MIT Press, Cambridge, MA.

BUTTON, G. (ed). 1993. *Technology in Working Order: Studies of Work, Interaction, and Technology*. Routledge, New York, NY.

CHUNG, K. H., OH, K. S., LEE, C. H., PARK, J. H., KIM, S., KIM, S. H., LORING, B., AND HASS, C. 2003. A user-centered approach to designing home network interfaces. *Proceedings of the Conference on Human Factors in Computing Systems, (CHI"03)*. ACM Press, Ft., 648–649.

COVINGTON, M. J., LONG, W., SRINIVASAN, S., DEY, A. K., AHAMAD, M., AND ABOWD, G. D. 2001. Securing context-aware applications using environment roles. *Proceedings of the 6th ACM Symposium on Access Control Models and Technologies, Workshop on Role Based Access Control*. ACM Press, 10–20.

CRABTREE, A., HEMMINGS, T., AND RODDEN, T. 2002. Coordinate displays in the home. *Proceedings of the Conference on Computer Supported Collaborative Work (CSCW'02), Workshop on Public, Community and Situated Displays*. ACM Press.

CRABTREE, A. AND RODDEN, T. 2004. Domestic routines and design for the home. *J. CSCW 13*, 191–220.

CRABTREE, A., RODDEN, T., AND MARIANI, J. 2004. Collaborating around collections: informing the continued development of photoware. *Proceedings of the Conference on Computer Supported Collaborative Work (CSCW'04)*. ACM Press, IL, 396–405.

DANIELS, I. Japanese material culture and consumerism: A review of recent work. 1999. *J. Mat. Cul. 4*, 2, 231–240.

DOUGLAS, M. 2002. *Purity and Danger.* Routledge, London, UK.

DOUGLAS, M. 1991. The idea of a home: A kind of space. *Soc. Resear*, 58, 1, 287–307.

DOURISH, P. Design implications. 2006. *Proceedings of the Conference on Human Factors in Computing Systems (CHI'06)*. ACM Press, 541–550.

DOURISH, P., EDWARDS, W. K., LAMARCA, A., LAMPING, J., PETERSEN, K., SALISBURY, M., TERRY, D. B., AND THORNTON, J. 2000. Extending document management systems with user-specific active properties. *ACM Trans. Inform. Syst. 18*, 140–170.

DUMAIS, S., CUTRELL, E., CADIZ, J. J., JANCKE, G., SARIN, R., AND ROBBINS, D. C. 2003. Stuff I've seen: A system for personal information retrieval and re-use. *Proceedings of the Conference on Research and Development in Information Retrieval, (SIGIR'03)*. Toronto, Canada, 72–79.

DURKHEIM, E. 2001. *The Elementary Forms of Religious Life.* Oxford University Press, Oxford, UK.

EDWARDS, K. AND GRINTER, R. 2001. At home with ubiquitous computing: seven challenges. *Proceedings of the 3rd International Conference on Ubiquitous Computing*. Springer, Atlanta, GA, 256–272.

FROHLICH, D. M. *Audiophotography: Bringing Photos to Life with Sounds.* Kluwer Academic.

GAVER, W., W., BEAVER, J., AND BENFORD, S. 2003. Ambiguity as a resource for design. *Proceedings of the Conference on Human Factors in Computing Systems, (CHI'03)*. ACM Press, 233–240.

HARPER, R. (ed). 2003. *Inside the Smart Home*. Springer, Berlin, Germany.

HARPER, R., EVERGETI, V., HAMILL, L., AND STRAIN, J. 2000. Paper-mail in the home of the 21st Century. Tech. rep. Digital World Research Centre, University of Surrey.

HEATH, C. AND LUFF, P. Documents and professional practice: 'Bad' organizational reasons for 'good' clinical records work & records. 1996. *Proceedings of the Conference on Computer-Supported Cooperative Work, (CSCW'96)*. ACM Press, New York, NY, 354–363.

HUGHES, J. A., RANDALL, D., AND SHAPIRO, D. 1992. Faltering from ethnography to design. *Proceedings of the Conference on Computer Supported Cooperative Work (CSCW'92)*. ACM Press, 115–122.

MALONE, T. W. 1983. How do people organize their desks? Implications for the Design of office information systems. *ACM Tran. Office Inform. Syst. 1*, 1, 99–112.

MARTIN, B. Mother wouldn't like It!: Housework as magic. 1984. *Theory, Culture Soc. 2*, 19–35.

MUNGIATAPIA, E., INTILLE, S. S., AND LARSON, K. 2004. Activity recognition in the home setting using simple and ubiquitious sensors. *Proceedings of the Coneference on Pervasive Computing*. Springer-Verlag, 158–175.

MYNATT, E. D., ESSA, I., AND ROGERS, W. 2000. Increasing the opportunities for aging in place. *Proceedings of the Conference on Universal Usability*. ACM Press, 65–71.

NORMAN, D. A. 1988. *The Psychology of Everyday Things.* Basic Books, New York, NY.

O'BRIEN, J., RODDEN, T., ROUNCEFIELD, M., AND HUGHES, J. 1999. At home with technology: An ethnographic study of a set-top-box trial. *ACM Trans. Comput.-Hum. Interact. 6*, 282–308.

RANDALL, D., HARPER, R., AND ROUNCEFIELD, M. 2007. *Fieldwork for Design: Theory and Practice*. Springer-Verlag, Berlin, Germany.

RODDEN, T., CRABTREE, A., HEMMINGS, T., KOLEVA, B., HUMBLE, J., ÅKESSON, K.-P., AND HANSSON, P. 2004. Between the dazzle of a new building and its eventual corpse: Assembling the ubiquitous home. *Proceedings of the Conference on Designing Interactive Systems, (DIS'04)*. ACM Press, 71–80.

SMITH, P. 1999. The elementary forms of place and their transformations: A Durkheimian Model. *Qual. Sociol.*, *22*, 13–36.

SPINELLIS, D. D. 2003. The information furnace: consolidated home control. *Pers. Ubiq. Comput. 7*, 53–69.

SUCHMAN, L. 1994. Working relations of technology production and use. *J. Comput.-Supp. Coop. Work 2*, 21–39.

TAYLOR, A. S. AND HARPER, R. 2003. Switching On to Switch Off. In *Inside the Smart Home*, Harper, R. Ed., Springer-Verlag, Berlin, Germany, 115–126.

TAYLOR, A. S. AND SWAN, L. 2005. Artful systems in the home. In *Proceedings of the Conference on Human Factors and Computing systems, (CHI'05)*. ACM Press, 641–650.

TOLMIE, P., PYCOCK, J., DIGGINS, T., MACLEAN, A., AND KARSENTY, A. 2002. Unremarkable computing. In *Proceedings of the Conference on Human Factors in Computing Systems, (CHI 2002)*. ACM Press, 399–406.

TURNER, V. 1977. Variations on a theme of liminality. In *Secular Ritual* Moore, S. and Meyerhoff, B. Eds. Van Gorcum, Amsterdam, Netherlands, 48.

VAN GENNEP, A. 1960. *The Rites of Passage.* Routledge, London, UK.

ZERUBAVEL, E. 1992. *Hidden Rhythms: Schedules and Calendars in Social Life*. University of California Press.

Received July 2006; revised September 2007; accepted April 2008