

Designing Family Photo Displays

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Abstract. We present efforts to explore the relatively underdeveloped area of digital photo display. Using examples from two empirical studies with family homes, we develop our results around three broad themes related to the display of photos and their arrangement. The first theme highlights the collaborative as well as individual work that goes into preparing photos for display. The second attends to the obligations families have to put particular photos on display. The third introduces the notion of curatorial control and the tensions that arise from one person controlling a home's photo displays. Drawing on these themes, we go on to describe how we have used a critical design approach to open up the possibilities for future display innovations. Three critical design proposals are presented as sketches to illustrate the development of our ideas to date.

Introduction

This paper presents some of our ongoing efforts to think innovatively about digital photographic displays. We present materials based on two empirical studies of photographic displays in family homes. We then go on to describe our use of critical design practice for developing these materials in an exploration of new design possibilities.

In both our empirical studies, our intention was to investigate how families display photographs in their homes and to use the gathered findings as a means of informing the design of situated digital displays. Taking an exploratory stance, we wanted to avoid making any definitive statements about the display of photos in family homes. The purpose of the research was rather to open up new possibilities for display design in an area that appears to have received little attention in CSCW (as well as HCI). Positioned as an early foray, our aim has thus been to draw on a small set of our empirical materials in order to provide an interesting perspective from which to consider the collaborative aspects to family portrayal.

In the following, we give specific attention to three themes associated with photo displays that emerged during our investigations. The first considers the work involved in the co-construction of family photo displays. In particular, we discuss the coordination of activities that can occur in the preparation of photos for display, describing how different family members as well as distant relatives can contribute to a display's content. The second and third themes relate to this collaborative workflow, so to speak. The second attends to the sense of *social obligation* family members can feel in displaying photos of particular people (usually family members), and how this sense of obligation is played out within different families. The third gives heed to the observation that although, as noted above, the processes associated with photo displays can be collaborative, there appears to be a centralized control over a home's displays, or at least some of them. We came to think of this as a form of *curatorial control* whereby one person fashions the final appearance of their home's various displays.

Critical design and qualitative methods of inquiry

Introduced to HCI in the last decade, largely through research undertaken at the Royal College of Art in the UK, critical design has built a niche following, one for the most part involved in proposing *provocative* concepts in order to critically examine technology and people's everyday interactions with it (see, for example, Dunne (1999) and Martin and Gaver (2000)). Broadly speaking, this form of critical design (drawing from *critical* approaches in the arts and humanities) serves an *inquiring* function. Unlike product-oriented design that is directed towards producing complete and ideally marketable results, critical design is aimed at provoking questions, reflecting on design and thus shaping future possible directions. The result is not merely a physical product, but also a way of thinking about and articulating a conceptual space for design.

In the latter sections of this paper, we present three proposals—taken from several ideas inspired by our fieldwork—that draw on this notion of critical design. What we wish to demonstrate is how the concepts, in sketched form, have enabled us to further our thinking on the subject of domestic display and to think innovatively about display design.

By presenting three critical design proposals in conjunction with materials from our empirical studies, this paper also incorporates a secondary, methodological component. Several notable publications in both the CSCW and HCI literature have highlighted a disparity between design and qualitative and specifically ethnographic methods of inquiry (e.g. Button and Dourish, 1996; Plowman, Rogers and Ramage, 1995). Put simply, the general consensus is that the descriptive character of qualitative investigations presents something of a mismatch *vis-à-vis* design; design, largely aiming to be prescriptive, is seen to run counter to the product of qualitative methods of inquiry, namely, description. In light of this apparent problem, proposals for re-casting ethnography's contribution to design have been written by such notables as Anderson (1994) and Dourish (2006). Presenting similar arguments, but drawing on different subject matter, these two authors suggest that ethnography has its place in *opening up the play of possibilities* for design (to borrow on Anderson's oft-used phrase). That is, some forms of qualitative inquiry in systems design are considered not to be in the business of eliciting design requirements or even the vaguely termed 'implications for design', but rather provide opportunities for re-thinking ordinary, everyday practices that might be the subject of design.

It is this position that our use of critical design aims to build on. Attempting to take the contribution of empirical inquiries a step further, we investigate the use of critical design to refine the play of possibilities. Our hope is that this will enable us to attend not only to the observable features in everyday practice, but also provide scope for innovation. We consider this last point key, as it is aimed at over-coming a common criticism of qualitative methods, one suggesting that methods like ethnography give extraordinary privilege to people's existing methods, without sufficient thought to what might be. As Dourish writes (citing the anthropologist Geertz), there is "a certain ethnographic tendency to operate as 'merchants of astonishment'" (2006, pp. 3-4). In using critical design, our aim has been to further explore the conjoining of qualitative methods of inquiry and design, and specifically how the innovation of photo display design might result from such a combination. The turn to design practice, more broadly, is seen as a means to engage with the creative ways photo displays are made in homes and the very tangible ways they are interacted with. By combining empirical and critical design approaches, our hope is thus to explore research methodologies for better understanding home life and specifically CSCW in the home.

On a related point, we also believe such an investigation to be particularly relevant in designing for the home. The home presents a difficult set of challenges for innovative design, challenges that contrast with many of the problems faced in designing for the work place. The home incorporates many different motivations and practices that cannot be simply optimized through technological support. Actions are not always purposeful, sometimes fleeting and regularly bound up with

the unremarkable aspects of home making. Indeed, in setting an agenda for systems design in the home, O'Brien and Rodden (1997) give early emphasis to this:

The home is at different times a place of escape, a place of work, a place of privacy and a place of public exhibition of the tastes and values of the householders living there. (p. 257)

The coordination of activities in the home are not merely, then, about getting somewhere, finishing this, or sharing that; they are also about making a house feel like home. As we hope our materials will demonstrate, even the seemingly banal reasons for organizing, displaying and viewing photos are tightly interwoven with a family's sense of itself and its ongoing social organization.

Related Literature

A significant motivation for this research emerges from an apparent disparity. Currently, we are witnessing an unparalleled proliferation of capture devices capable of producing still-picture and video content. With digital cameras now outselling their analogue counterparts (Chute, 2003), and the increased incorporation of cameras in devices such as personal computers, PDAs, music players and, of course, mobile phones, it seems reasonable to assume that the quantity of digital photographs will only increase—and considerably so. Moreover, various research projects including work from Martin and Gaver (2000) have speculated on proposals relating to emerging practices of digital photography, with emphasis on capture.

What is somewhat surprising is that this growth in both products and research has not been matched with a parallel output in novel photo display technologies. If anything, the options for photo display have remained fairly limited (see Kim and Zimmerman 2006b for similar discussion). This is particularly true in homes, where we largely remain tied to our tried and tested paper-based displays. There are, not surprisingly, good reasons why paper-printed photos remain prolific; as more general research into work-practice reminds us, paper has affordances that are often hard to beat in the digital realm (Sellen and Harper, 2002). What's more, the distinctive qualities of a paper-printed photo appear to exhibit certain 'instructions' that shape how we think about and recall the photographed moment (Chalfen, 1998). Indeed, the conventional framing practices associated with paper photos appear so well established that it seems difficult to imagine how they might be minimally adjusted, never mind supplemented with innovative alternatives. Drazin and Frohlich (2007), for example, write of the deeply expressive qualities associated with conventional framed photos in family homes and detail how established 'framing activities' serve to materialize memories and intentions (foreshadowing a number of points we have discovered in our empirical studies).

Given families' well-established practices with framing, it is perhaps not surprising that research in CSCW and CHI concerned with photo displays has tended to focus on the distribution of media between and within households rather than the redesign of the displays themselves. Kim and Zimmerman's (2006a/b) work

on smart digital photo frames uses interviews with families to map out the different locations of photos displayed in homes and broadly characterises different spaces for photos as formal or informal. Their findings also explain how households display photos to share narratives and prompt social interactions. They purposefully avoid, however, altering the interactional properties of the frame or how we relate to its displayed content, focusing instead on novel methods for managing and distributing photos to electronic frames.

Work from Mynatt et al. (2001) is perhaps the most comprehensive and complete in terms of display design. They implement a picture frame designed to support remote presence with an eye to enhancing the links between families and their distant, aging relations. Their work though is understandably more concerned with the issues of awareness rather than the arrangement or inherent properties of the frame itself. The CareNet display is of a similar nature, using a technologically augmented display that looks similar to a photo frame to support the relations between an elderly person and the network of people involved in their care (Consolvo, Roessler and Shelton 2004).

Beyond physical photo displays, there are several examples of what could be seen as research into the practices of looking at photos. A number of studies, for example, have focused on the sharing of photos; i.e. looking at them together, between people who are physically collocated (Balabanovic, Chu and Wolff, 2000; Frohlich et al.; 2002; Crabtree, Rodden and Mariani, 2004), as well as distributed (Counts and Fellheimer, 2004; Kindberg et al., 2005; Van House et al., 2005; Voida and Mynatt, 2005). Looking at photos, in this sense, has been seen to be something that mediates social relations, whether between family and friends perusing a paper-based photo album or online communities navigating large electronic collections (Kapoor, Konstan and Terveen, 2005). Frohlich et al. (2002), for example, have given close attention to the ways in which people talk about photos when looking at them, both remotely and when co-located, and in doing so describe different forms of what they refer to as *photo-talk*. Relevant to the materials in this paper, they demonstrate how memories are jointly produced in the sharing of photos, and how our ways of looking and understanding are shaped by some of the common social and material practices involving photos.

Research focused on *photowork* (Kirk et al., 2006) is less immediately relevant to photo displays, but has strong implications for the ideas we will present. Kirk et al. set out the common practices associated with digital and paper-based photos and reveal that although people manage their photos in idiosyncratic ways, the workflow, or what they call photowork, broadly follows a number of possible trajectories. They describe the activities performed to get photos from the device of capture to prepare them to be archived, shared, put on display, and so on. Kirk and his colleagues do not address collaboration around photowork directly, but do lay the groundwork for what we will go onto describe as the coordinated efforts of getting photos to a place of display and the subsequent tensions that can arise.

Fieldwork findings

In the following empirical section of this paper, we present a number of examples drawn from interviews and observations conducted with fifteen households in London and Hertfordshire, U.K. Two qualitative studies have contributed to this corpus. One, an ongoing field study of home life, has been running for nearly three years, involving extended engagements with eight family households and several one-off visits to homes that have been introduced along the way. A range of topics and practices has been addressed in this study, identified and guided in large part by issues raised by the participants and their observable routines. The attention given to photos in this paper, for example, came from recurring discussions in several of the participating homes around family photos and their display.

Of the households visited in this first study, seven were two-parent families with children, ranging in age from less than a year to twelve years old. One household was composed of an elderly widow living with two grandchildren. As well as the observations and interviews, three of the participants also videotaped themselves for extended periods. Due to the nature of what we were looking at, i.e. photo displays, all the households also ended up giving us tours of their homes in one fashion or another.

The second empirical study also involved visits to eight family households, but was structured differently with one teenager and one parent participating from each household. Participants were invited to identify photo displays in their home in response to tasks set by the researcher. Responses were subsequently discussed, first with participants, individually, and then between the two family members. Discussion took the form of semi-structured interviews and home tours.

The points raised in the empirical sections came about through informal discussions between the paper's authors and more structured workshops with members of the research group the authors participate in. Both discussions and workshops focused on the transcripts, video and photographs gathered during the home visits and involved working up this data into broad thematic groupings. Particular focus in the presented research was given to the material features of photo displays and how they interleave with the ways families are collectively organised.

The three design proposals we will present—part of a significantly larger collection—were generated with involvement from numerous researchers with different backgrounds, e.g., computer science, hardware engineering, sociology, psychology and interaction design. Two design workshops were held with these researchers, the first brainstorming design ideas related to the empirical materials and the second discussing and critiquing a number of design proposals outlined by two of the papers authors. Between the first and second workshop, the proposals and reasonings for them were added to an online blog, allowing the workshop participants to gain an early sense of the designs and the thought processes behind them, and to add preliminary comments. As we shall elaborate on later, only three

proposals from this process are presented here in order to pay closer attention to the issues raised in the empirical sections and highlight their critical contribution.

Collaborative photowork

In the first example from our fieldwork, we want to draw attention to the collaborative efforts involved in *photowork*. Before presenting this material, worth noting is our broad definition of photo displays, including those photos arranged to be seen in albums, frames and wall-mounted assemblages, and even casually distributed around a home, on pin-boards, fridge doors, etc.

Jim and Karin are an American couple living in London with their three small children. Both parents have digital cameras and regularly take photos. Karin describes their photo displays as a ‘joint effort’ but adds that Jim “takes the lead on digital photo management”. As Karin explains, Jim spends more time on the computer with the photos, taking it upon himself to sort through photos on a monthly basis, deleting certain pictures, editing others, removing red-eye or altering the brightness, etc., and then choosing which photos to print. Karin, on the other hand, is mostly in charge of how photos are displayed and has constructed various photo arrangements or displays throughout the house. As she describes it, she is more involved with displaying and archiving paper photos.

On further inspection, we found this division between paper and digital not to be hard and fast. Observing video they recorded of themselves, we found Karin spending considerable time on the computer looking through digital photos, while Jim can be seen combing through storage boxes of printed photos to find one for a particular frame. Of interest to us in this apparent contradiction is not whether Karin and Jim do what they say, but rather that the joint work around the photos, whether in paper or digital form, is performed more or less unproblematically. For the most part, the coordination work appears to go unnoticed, accomplished as a matter of course in getting photos from digital cameras, onto computers, to print and ready for display. The coordinated efforts are often asynchronous and usually not co-located but there are, it seems, systems in place for the work to be successfully accomplished. The dedicated place for photowork (their home’s attic), the single PC, its systematic arrangement of folders and files, the storage boxes of paper-photos, and the photo albums on shelves all have their part in making the workflow visible and enabling the photowork to be performed collaboratively.

Turning our attention to a particular display in Jim and Karin’s house we see the result of an ongoing collaborative activity. In the hallway leading to Jim and Karin’s sitting room, there is an impressive collection of black and white photos of past and present family members. Pictures are added once or twice a year, and rarely, if ever, removed. All the pictures are either black and white or sepia-tone, and they are all framed in black, white or gold frames (Fig. 1). This assembly has come about through the combined efforts of Karin and Jim, and also includes contributions from friends and extended family. For the most part, Karin arranges the

pictures, although both she and Jim choose which pictures to use and a friend, Lawrence, takes family photos once a year that have been framed and added to the wall. Extended family participate remotely. During one of our interviews, Karin explains how some of the pictures have been sent by family members in the post or sometimes brought from the US in person. Lately, distant family members have also started to create digital copies and send them by email. Karin recounts how her mother contributes: “And my mom is always sending photos and saying ‘oh I thought this might be good for the wall’”. She also draws attention to a long picture with white crease marks, placed prominently in the bottom row of the framed photos. The picture is of a family reunion held by Jim’s family in the early 1900’s, sent by his mother. The picture, it emerges, has been copied and sent via email (with creases and all).



Figure 1. Family wall.

The transition from paper to digital and back to paper again, and the re-rendering of the picture’s physical features (i.e., its creases), raises questions concerning the preservation of age and authenticity, and of the methods for invoking history. Relevant to our argument here, however, is how the movement of media from person to person and transitions between digital and paper formats seem completely unremarkable to Karin and Jim, and no doubt to their extended family as well. That Karin and Jim, and their families and friends might participate in assembling the pictures for the family wall and using a variety of means to do so is, if anything, an assumed feature of family relations.

Obligations

In the following, we consider another simple but interesting feature of collaboration around family photo displays: the idea of obligation. In our studies, we found photographs of certain people were placed on display because they were needed to be seen to be on display. We found this intriguing on two fronts. The first was the tacit understanding that pictures of certain family members must be displayed, unquestioningly. The second was the ingenuity in reconciling the sometimes opposing claims of needing to display family members but not necessarily wanting to. Two examples, one relating again to the family wall and a second to

to. Two examples, one relating again to the family wall and a second to family wedding photos illustrate this role of obligation.

When Karin is asked if all the photos sent by the collective grandmothers as “good for the wall” end up on the wall, she says no, that she effectively fineses anything she doesn’t want up there. However, certain situations override this; she gives an example, explaining how a photo of her sister has ended up where it is.

Well, I did get a little bit of grief from my sister. The reason we did this photo shoot with my sister before she left London was because she was like “There aren’t any photos of me on your wall!”, you know, and so I was like [*sotto voce*] ‘oh you know, that’s true’ so I scrambled, we had this present for her done, and we had those photos done and I put the one of her and me as kids up on the wall. I definitely made sure that was up before her last visit.

Karin’s explanation reveals how her family is accountable for her sister’s absence on the wall. Completely unnecessary, however, is any explanation of why this should be the case. It is taken for granted that *all* family members should be on display and any exclusion is a form of disloyalty.

Turning to two wedding photos on display in another household, we see that this obligation to family can be achieved in ways that are less elaborate, but nonetheless inventive and that still reflect the tensions of displaying particular family members. In a household of three (mother: Trish, father: Des, and daughter: Tina), we find something as simple as a frame placed in light and another in shadow can cast emphasis on one photo over another. The two frames in question both contain posed photos from different family weddings and both are of Trish, Des and Tina. They are placed near to one another, one on the living room sideboard and the other on top of a shelving unit holding CDs (Fig. 2).



Figure 2. Wedding portraits on CD rack in shadows (far left) and on sideboard (left of centre).

Explaining why the frames have been arranged as they are, Trish, Des and Tina produce an elaborate story behind the two pictures. Talking, first, about posing for the framed photo placed in the shadows and then about the photo placed in the light, Trish recalls the circumstances under which they were taken:

Yeah this one [picks up frame from shadows], which is really quite funny, because it shows you the difference in the weddings... My second youngest brother, it was his wedding in April

and everybody was kinda of like: ‘hmmm, let’s make an effort’ you know, ‘it’s a wedding.’ Whereas this one [points to photo on sideboard in light] you can see people were actually happy and they enjoyed it more. You know it’s not being nasty but [looks back to frame she’s holding]... but nobody kinda liked his partner and it was all like, ‘oh, let’s make an effort’. You know it’s his choice of who he marries and we just have to kinda lump it. So everybody’s like, ‘hmm, yeah smile’ [said with sarcasm]. Whereas that one [points to frame on sideboard again], because it was a really nice day and people enjoyed the wedding, it kind of comes across more in the photo.

To the undiscerning eye, there is little difference between the two framed pictures and certainly no visible difference in how happy (or unhappy) the family are on each occasion. Salient though is the display of both pictures so that one is given visual prominence over the other. We are cautious about making any strong claim about the intended meanings of photo display arrangements and, in this example, the relative positioning of the framed photos. Trish and her family are clearly involved in producing an account for us as part of our fieldwork exercise; in fact, when returning the frame she has removed from the shelving unit, Trish swiftly retracts the lengthy explanation given for the photo arrangement. Jokingly, she retorts “... but that’s mainly cause there’s no backing” to offer an alternative explanation for the frame’s placement in the shadows, against the back wall.

Whatever the reasoning, plainly visible is that both photos are on show despite the family’s ambivalent feelings towards one of the weddings. This suggests that like the addition of Karin’s sister to the family wall, this inclusion comes down (at least to an extent) to obligation. One can easily imagine the offence caused if Trish and Des chose to display one wedding picture but not the other. No doubt most of us, upon reflection, have photos or other objects in our homes not because we want them there, but because we feel obliged to. What seems crucial to this is that the photos are seen to be on display, day in day out. It wouldn’t do for Karin to have an obviously temporary photo of her sister amongst the framed photos on the wall or if, somehow, Trish’s brother was able to detect his wedding photo being placed on display only for his visits. There appears then, to be a sensitivity to the ways in which photo arrangements are viewed jointly in households and that this sensitivity has, as it were, a demonstrable quality—that households have to be seen to be putting certain sorts of photos on display of and for others. In some sense, the idea, or even the fiction, of family needs to be maintained, and displaying photos of particular people is one way of doing this.

Curatorial Control

In this last section of empirical materials, we address what we saw as a tension that can arise in the movement of photos through the processes of photowork to their eventual display. We’ve suggested that both aspects of photo display—that is, the processes of getting photos to a display on the one hand, and the viewing of the display on the other—involve forms of collaboration or at least shared involvement. A recurring theme we found in our fieldwork, however, was that often

one particular family member took overall control of a household's display of photos. Having what we've come to call *curatorial control*, this family member would make decisions around how the processes of photowork fed into the display of photos and how the obligations of display were met (for further evidence of this see Drazin and Frohlich, 2007). Even where we saw effort put into distributing this decision making, the curatorial control often ended up in one person's hands. Tension arose over shifting from, one, the collaborative elements of photowork to photo display and, two, the display to the shared viewing of the photos. To elaborate on the first of these issues we present an example from another household and the negotiations played out through digital and conventional, paper-based photowork. To address the second, we consider the tensions that arise between a mother and daughter over a photograph displayed in their bathroom.

The first example centres around a household made up of Charlotte, Hamish and their three children. During one of our visits, Charlotte and Hamish discuss what each of them does with photographs. Charlotte explains how she organizes her family photo albums, describing the activity as "making decisions about what you keep as a kind of 'family thing'". Characterizing the selection process, she explains how she sorts through various types of family memorabilia to determine what should be put away in a box in the attic and what can be thrown out, taking into account factors such as whether elderly grandparents are involved, whether the occasion was particularly memorable, etc. As with the family wall and wedding photos above, a strong sense of obligation motivates this selection procedure. Charlotte goes on to describe how she physically divides the photos that go into albums: the albums are kept in a cupboard in the sitting room, with the day-to-day albums on the top shelf and the 'special' albums on the bottom shelf. She is fairly assiduous about keeping up with putting photos in her albums, not liking to have photos piled up. Charlotte reveals how she approaches this preparation of photos with zeal:

Charlotte: So I'll wait till there's a quiet evening, and my, my big investment is my guillotine, because I used to spend hours drawing straight lines on them and then cutting them with scissors...

Interviewer: To get them to fit into certain...?

Charlotte: Well, so that if it's a nice photograph but there's somebody's thumb, or there's somebody, you know,..., somebody in the background...

Hamish: It's Stalinism! It beats airbrushing them out.

Charlotte: ... (laughing) a bit of, a bit of a doorframe, you know, or someone's nose, you know, ...you just *chop it off!*! (makes slicing sound with paper-cutter)

With Charlotte's photo albums, we see how family histories can be filtered and fashioned. Although this particular excerpt runs the risk of sounding vaguely Machiavellian (thanks to Hamish's comment about Stalinism), it does capture how an influence over the processes that make up photowork can produce a certain rendering of family, one 'designed', intentionally or not, by the family member with curatorial control.

A revealing point to examine further relates to Charlotte's choice of the guillotine, enabling her to act out her curatorial control rather viscerally. On investigation, we find a seeming division in Charlotte and Hamish's family between digital versus conventional paper-based photowork. Charlotte operates in the paper-based realm, continuing to use a conventional film camera, to have her pictures printed and to give the prints a definitive chop when necessary. Hamish, meanwhile, uses a digital camera; he views, manages and edits many of his photos on his personal laptop and the household computer, as well as having some of them printed to paper. Interesting for this study is how this division in practice relates to photo display; to illustrate this point, we consider some photos Hamish has taken with his digital camera during a family trip to Canada that have since been printed onto paper. When asked about what happens with digital photos, they answer the following:

Charlotte: I don't have anything to do with those. There's a whole bag of digital photographs from Canada sitting in the bedroom that we've done nothing with, which we keep saying, oh we must do something. But we're never going to get down to doing anything with them.

Hamish: The only time we look at them is because they're on the screen saver.

Interviewer: Yes, I saw them on the screensaver and I was curious...

Hamish: They've never made it to an album... You see, it's funny, because Charlotte, you take pictures yourself, and they're the ones that go in the album. I take the digital ones and they never go in the album.

As Hamish points out, it is Charlotte's photos that end up in albums. Even though Hamish's digital photographs have now assumed physical form, they remain excluded, nominally due to the fact that they began life digitally. When Charlotte says "We're never going to get down to doing anything with them" we get the sense that this isn't so much about *how*, technologically, the photowork is performed but arguably more about *who* takes and processes the pictures. In short, the tension arises around the control of photos to the possible sites of display. In this case, the digital divide has come to be the resource for determining control; although the material differences between digital and paper photographs can certainly affect how they are used, in some instances the use of the distinction can mask something altogether different, e.g., how it is one delimits control.

In our final example, we consider how representations of individual family members can be 'curated' by one member, and how photographs can privilege certain portrayals of family, whilst excluding others. Yvonne has created a permanent home display in her family bathroom by printing photographic images on bathroom tiles, making a conscious effort to include representations of each member of her immediate family. Here, we focus on one photo in particular, that of her daughter, Cat (Fig. 3). Yvonne describes what the photo means for her:

I got Cat to pose. I never force stuff because- I mean it works two ways- they [the household members] also know I remove photos that are bad: I don't see why anyone should have a photo on display that they hate; and that's partly because he [her husband], also a photographer, keeps every photo, every bad one, and I just think life's too short! I believe in editing. So, I

just look at that and I think of Liv Tyler: there's a neat film called Stealing Beauty, which I love, I really love; I play it when I need to get energy when I'm cooking. But I think it's provocative. Fathers don't like that film if they have daughters, because they think of their daughter losing her virginity. But I just think she looks – not even Rock Star, but just stunning there. It surprises me how beautiful and grown up she is. Surprises me and makes me proud! And she's not embarrassed by it, fortunately.

In fact, Cat is embarrassed by the photograph: "everyone puts too much importance on it". Cat's mother has emphasised a certain representation of her daughter, creating a tension that is captured in Cat's description of the T-shirt she is wearing in the photo:

Yeah, I suppose it surprises me, how they got me to do that. What you can't see is that the t-shirt is actually, erm, splattered with fake blood saying: 'no one's perfect', [laughs] which I, which always amuses me as well cause I don't think Maman remembers that: it was a T-shirt that she absolutely loathed. But, yeah, I can't remember how she persuaded me to stand in lavender field like that.

But Cat is resigned to its display, saying: "I've got no choice". Paradoxically, further discussion reveals that she finds a certain comfort in knowing that she is displayed alongside the rest of her family. Despite the photo's content and its location, she says that being included makes her feel 'like one of the family'.



Figure 3. (a) Tiled bathroom and (b) tile with picture of Cat.

Yvonne's bathroom photo arrangement and Cat's ambiguous feelings towards it illustrate the tensions that can arise with one person as family curator. It appears that Yvonne is asserting a certain idea of her family, despite the fact that her idea is not one held in common by all her family members. The fact that Cat is actually embarrassed by the photo, and that Yvonne's husband might be uncomfortable with the photo, suggests that Yvonne is representing the 'family' as interpreted by Yvonne, rather than as a collaborative endeavour.

Overall, both examples above demonstrate not just that one person has curatorial control in the display of family photos, but that tensions over displays get played out in an ongoing fashion. Interestingly, these tensions are not solely between household members, but can also be within an individual. Despite her discomfort with the photo, the fact that being excluded from the bathroom shower grouping would be worse for Cat than her present embarrassment illustrates tension, this time from an individual perspective.

Designing domestic photo displays

The materials above hopefully foreground a number of issues we found to be of particular interest in studying photo displays in family homes. Of course, the materials do not address the entire range of practices families engage in when preparing and displaying their photos, nor do they cover the entire set of results from our larger corpus of data. Rather than aim to address breadth of coverage, we've attempted to work through specific points raised in our empirical studies in order to consider spaces for novel digital display design. To recap, the three themes we've focused on are (i) how family's collaborate around the practices associated with getting photos to a point of display; (ii) how social obligation influences the kinds of photos placed on display and the material arrangement of displays; and (iii) the how one person's curatorial control in a household raises tensions around the organization and presentation of family. We've also sought to reveal that a collaborative process can be seen to underlie most of these practices, yet not always in obvious ways. Though the task of placing a photo on display is often performed by just one person, the journey of the photo into that person's hands might have involved the joint intent of others and certainly involves viewings from household members as well outsiders. As we've implied earlier, these less visible forms of collaboration around photo displays have been seemingly overlooked in CSCW and HCI. Indeed, we would take this a step further and suggest the very idea of such collaboration may well be constrained by the lack of existing technologies to support it: 'framing' activities are generally designed for individual use and, to date, collaborative display technologies are rare (if they exist at all).

We've seen this seemingly under-explored design space to present interesting methodological and analytic challenges for CSCW and HCI. Clearly, it is hard to design for practices that do not yet exist. Insights from empirical studies can sensitize the researcher to a new design space, but engagement with a 'fictional' set of new experiences on the basis of studies like ours pose an on-going challenge for inter-disciplinary fields (hence the long-standing discussions about empirical studies and their relationship to design, as reviewed in the introduction).

In this section, we present a strategy that we have been investigating for opening up the possibilities for display design, aiming, in particular, to build upon the themes discussed above. To illustrate our use of this strategy, we present three design sketches positioned not as design *solutions* to issues surrounding the themes, but as concepts enabling further, empirically grounded investigations. The strategy we have adopted, incorporating a critical perspective, is thus aimed at promoting grounded exploration, offering a point of departure from the *problem-solving* or stylistic concerns that can preoccupy design (Dunne, 1999).

We specifically aim for the sketches to give a degree of form to our thematic tensions so that they provide a tangible basis for inquiry. Also to facilitate the probing of the issues, the design concepts have been purposefully left simple in

terms of functionality and technical detail. Broadly, for the purposes of our inquiry, sketching was chosen because it was seen to have a particular strength in facilitating the generation of ideas and the exploration of design spaces whilst avoiding the need for commitment to detailed specifications that could be distracting or convey resolution. To use Tabor's terms (2002), sketching offers "a space for half-formed thoughts".

Photo Mesh



Figure 4. Photo Mesh.

The first of our concepts, *Photo Mesh* (Fig. 4), plays with the possibility of making a digital media archive visible in a shared domestic space. It is envisaged that the family's archival content would be open to contributions from an entire family. Here, Photo Mesh takes the form of a circular, wall-mounted screen for displaying many photographs simultaneously. In its default state, it behaves as an ambient or peripheral surface, with its displayed content (randomly) cycling through the associated archive. However, it also allows a 'walk-up' set of interactions: a user or group of users can make intuitive gestures to navigate through the archive in a temporal fashion. A specific photo can also be selected from the collage to fill the entire surface. As such, Photo Mesh experiments with how displays may support a shift in engagement, from periphery to foreground, and from a multiple to single image-viewing platform. In this way, it offers a novel kind of flexibility in a shared domestic space. Importantly, through the collaborative interactions afforded, this simple system also probes the notion of a 'shared display' and the possible tensions that this creates between family members.

Let us briefly expand upon the inquiring function of this sketch. Although the technology that Photo Mesh comprises is not in itself innovative, we believe its *configuration* to be. The display enables an exploration of the themes above—particularly collaborative workflow and curatorial control—by enabling the serendipitous discovery of photographs and the immediate selection of a given photo to display in a shared space. Photo Mesh condenses some of the aspects of workflow with the actual display of a photo, allowing both to be achieved with a simple and easily performed set of interactions. Of interest in the context of the presented work, Photo Mesh sets up hypothetical conditions for a dynamic family

display which is openly accessible and jointly editable. Because the preparation and physical display of a photo is achieved with ease and potentially in collaboration, the display offers no inherent hierarchy of control to any member. In practice, we'd expect rules to be imposed on its use within a household, perhaps around the inclusion of content in the archive or what is displayed when, and by whom. It is this, in part, that we see contributing to the critical character of the design. The concept encourages us as designers (and potentially as users) to attend to the activities associated with workflow collaboration and control and, through *provocation*, draws attention to the ways in which the features of the digital artefact can interleave with these.

Photo Switch

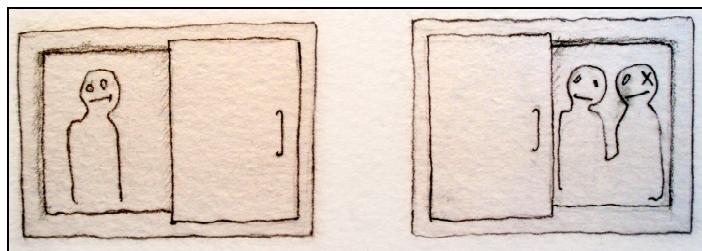


Figure 5. Photo Switch.

A second concept, entitled *Photo Switch*, again proposes the installation of a situated display in a family household (Fig. 5). This second design has, in contrast to Photo Mesh, significantly reduced functionality. Photo Switch comprises a wall-mounted casement for two display surfaces and a sliding door that constrains viewing to no more than one photograph at a time. In its most basic form, Photo Switch does not need to incorporate digital technology; other iterations of the design, however, are connected to a digital archive.

As an interventional artefact, Photo Switch provokes questions around the curatorial control (or distribution of control) of family representations. This is because, as with Photo Mesh, household members would have to make choices and engage in negotiations around what to display and when. By forcing a choice to be made over the photo displayed, Photo Switch immediately demands one to question how particular representations are obscured whereas others are privileged. Perhaps unexpectedly, the design reveals the relationship between choice over physical form, on the one hand, and social judgment on the other; shown is that choice in display arrangement and social obligation can rub up against each other, sometimes in uncomfortable ways. This in turn raises questions concerning the family curator and the ways in which one person comes to physically fashion family photo displays to meet the obligations of their idea of family. The immediate, visible tensions that can arise with Photo Switch offer the opportunity for such curatorial authority to be openly contested.

Photo Illume

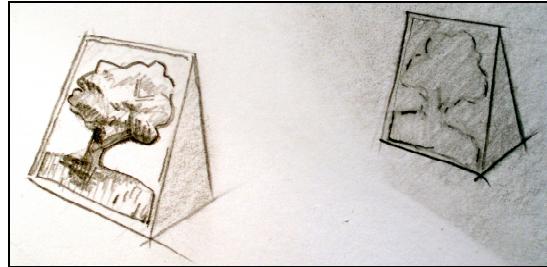


Figure 6. Photo Illume.

The final design idea to be presented here is *Photo Illume*, which differs from the other two proposals because it takes the form of a portable display frame for single image-viewing (Fig. 6). This display comprises an LCD screen that fades to black if the displayed photo doesn't receive sunlight; it behaves as if solar-powered. Photo Illume artefacts are networked to a digital archive, and, once faded to black, another image from the archive automatically replaces the current one. It is envisioned that Photo Illumes could be moved around for certain effects, literally 'illuminating' the handling of content.

There are obvious parallels between Photo Illume and the arrangement of the wedding photos in Trish and Des's home. Photo Illume offers a provocative position, however, as it associates the 'handling' of the display with a photo's form (i.e., its brightness) and the duration of the photo's display. In effect, a responsibility of sorts is bound up with the sense of obligation because one must actively attend to Photo Illume to ensure it shows what it should. At the same time, the need for particular placement of the display in light and the need to repeatedly interact with it makes one accountable for the control they have. Yvonne's choice of photo in the bathroom would no longer be quite so set in stone, so to speak, but instead demand an active accountability for its location and persistent display.

This need for active engagement with the display also raises issues around photowork. Photo Illume can distribute photowork to the system in that the photos change as a result of the system's own measurement of time. This confounds the purposeful 'framing' of photos that we have seen families engage in, but rather than reducing responsibility, it reconfigures the 'framing' work to be more tightly interwoven with the physical act of display. The action, as it were, shifts from the preparatory shared workflows to some negotiated activity around 'display-making' itself.

Conclusions

Above, we've illustrated how we've used critical design practice to think innovatively about photo displays and their shared use in family households. We've made a particular effort to show how empirical studies can serve to ground criti-

cal design, and how critical design proposals can, in turn, build on descriptive empirical accounts by providing direction and form to the play of possibilities.

Three broad themes drawn from our empirical studies have been the main impetus for this design work. In short, we've highlighted the collaborative as well as individual practices associated with photowork. We've described how there are obligatory social pressures that influence what families put on display and how they compose their photo arrangements. Lastly, we've suggested it is one person in a household that often takes control of many of the home's photo displays. This curatorial control can, we've shown, raise tensions in households, tensions associated with the social organization and presentation of family. The three concepts above, Photo Mesh, Photo Switch and Photo Illume, have been presented to show how each of these themes can be developed while sensitizing them towards design concerns. In our concluding remarks, we want to briefly detail several possibilities for further design exploration that we've found useful from this use of critical design. For purposes of clarity, we list these:

- Photo Mesh opens up questions around photo displays designed to merge the collaborative aspects of photowork and the act of display. It opens up possibilities for where the collaboration might lie and how it can be reconfigured by a set of design interactions.
- Photo Switch raises the association between choice and obligation. A choice in the photo displayed binds one to a single representation at the cost of another. This opens up design possibilities around making visible or hidden the choices made in arranging photos. Importantly, it does not dictate whether a display should promote one or the other. Rather, it suggests that thought should go into how a display might be designed to suggest either.
- Photo Switch also draws attention to how choices in photo display are likely to demand negotiation between family members around where and when to display photos. It thus provokes inquiry into design's role in engaging family members in active and sometimes playful participation around photo display.
- Photo Illume draws attention to the 'display-making' activity itself because one is repeatedly made accountable for the choice of photo displayed. Possibilities exist here for photo displays that make visible the ongoing engagement with display-making, revealing not only the process of getting a photo to a display but also the act of keeping it there.
- All the designs highlight the dynamic qualities afforded by digital displays, either in the changing photos or in the physical arrangement of the display itself. Possibilities here are vast, but hopefully one value of the three proposals is in how they exemplify particular directions to explore in this respect.

In sum, at this exploratory stage of design, the sketches and the possibilities they've provoked hopefully draw attention to several simple but what we see to be important areas in designing photo displays for the home. Broadly, we've raised questions around collaboration both in the processes of preparing photos

for display and with the displays themselves. Through our sketches, we've highlighted how collaboration can be afforded in different ways and at different stages of preparation and display. By foregrounding some of the collaborative features involved in photo display, we've also aimed to encourage a sensitivity in display design towards the negotiations, obligations and accountabilities that families play out in displaying their photos. We've chosen not to prescribe the ways in which these issues should be addressed. Instead, we've aimed to show how they can be further examined, sometimes provocatively, through specific designs.

To further the work presented, we are currently building working artefacts based on the proposals above (as well as others) with the intention of situating the, in family households. This notion of locating artefacts 'in the wild' draws from Hutchinson et al.'s (2003) use of Technology Probes. However, unlike Technology Probes, our designs do not explicitly pursue the goal of assessing a technology in use. In keeping with our particular design sensibility, the designs are framed as critical interventions into family homes. Their presence attempts to catalyze some of the tensions we have highlighted with the aim of provoking idiosyncratic reflection on our themes *by* family members themselves and in the context of their everyday lives. In this respect, we draw on Gaver et al.'s (2006) contribution to the Equator project. Essentially, our ambition is to use these designs to encourage households to think about their photo displays in new ways.

We imagine that output from such interventions would form qualitative accounts of people's encounters with the designs. These accounts may offer us design inspiration. In parallel, they may enrich our understanding of how members of a family household collectively use displays to create, constrain and control their shared representations, and the challenges presented by digital technology for doing so.

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