On Human Remains: Values and Practice in the Home Archiving of Cherished Objects

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Creating digital archives of personal and family artifacts is an area of growing interest, but which seemingly is often not supported by a thorough understanding of current home archiving practice. In this article we seek to excavate the home archive, exploring those things that people choose to keep rather than simply accumulate. Based on extensive field research in family homes we present an investigation of the kinds of sentimental objects, both physical and digital, to be found in homes, and through in-depth interviews with family members we explore the values behind archiving practices, explaining why and how sentimental artefacts are kept. In doing this we wish to highlight the polysemous nature of things and to argue that archiving practice in the home is not solely concerned with the invocation of memory. In support of this we show how sentimental artifacts are also used to connect with others, to define the self and the family, to fulfill obligations and, quite conversely to efforts of remembering, to safely forget. Such values are fundamental to family life where archiving takes place and consequently we explore how home archiving is achieved as a familial practice in the negotiated spaces of the home. From this grounded understanding of existing practices and values, in context, we derive requirements and implications for the design of future forms of domestic archiving technology.

1. INTRODUCTION

People hoard and collect, they accumulate and they curate, and over the course of their lives, most will gather a collection of objects for which they feel sentimental attachment. That such fetishistic behavior is in many respects a fundamental human trait is attested to by the archaeological record of the modern human with its long observation of the use of burial goods to symbolize a person and to testify to their life [Renfrew and Bahn 2004]. In a sense, a great deal of research within the HCI community also pertains to this understanding of human beings as *homo faber* [Sennett 2008]—man as manufacturer and collector of objects, and as creatures who imbue sentiment in external artefacts. For example, within HCI, one emphasis has been on the ways in which people—users of computer technologies—are amassing and sharing more and more digital media for which they feel an important, personal connection. This can perhaps be best seen in recent studies of how people use digital photos and video [Kirk et al. 2006, 2007], and in research which aims to design new technologies to capture more diverse, richer types of digital records, such as adding sound to images [Frohlich 2004], capturing images automatically based on sensor data [Hodges et al. 2006] and adding other kinds of data such as location to digital images and video [Naaman 2004]. At the same time, efforts to build systems for "life logging" are also relevant here. Such systems strive to provide more complete digital records of people's personal lives [Gemmell et al. 2002, 2006] by capturing all kinds of data about their activities in the course of everyday life.

These advances in digital technology have been welcomed by some, such as Gordon Bell [Bell and Gemmell 2009], who paint a utopian picture in which human fallibilities of memory can be circumvented with the effortless digital capture of an entire life, fundamentally altering our relationship to acts of memory [van Dijck 2007]. This is not to say, however, that all view such advances in "total life capture" with such welcoming arms, some seeing potential dystopian outcomes in a world where everything is recorded for posterity.[1] Equally, Petrelli et al. [2009] strongly (and sagaciously) argue for a reshaping of the notion of life-logging that is more in accord with people's desires for information recording (based on their study of the requirements of those making time capsules in the home). Either way, most studies which consider the archiving and storage of digital artifacts, be they photos [Rodden and Wood 2003], videos [Abowd et al. 2003], or even academic research papers [Kaye et al. 2006], explicitly focus on what we might refer to as digital memories. These studies make an explicit assumption that the reason why we might want to store or "archive" digital data (such as photos, videos, or other potentially sentimental artifacts) is for the purpose of supporting memory. As part of this, there also appears to be a second assumption that the real value of the digital is that it offers the potential for a more complete and accurate record of things that have happened [van Dijck 2007].

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[1]The films *Freeze Frame* (2004) and *The Final Cut* (2004) being two clear examples wherein dystopian realities of total life video capture are posited demonstrating how consideration of such digital capture issues has seeped into popular culture and therefore public debate.

In this article, we consider these two assumptions and challenge the validity of the first and the relevance of the second. In other words, we describe a study of people's practices around their own collections of important artifacts (both physical and digital) and show how their role is much broader than that of supporting memory. We will show that, in the home at least (quite apart from how we might wish to archive for work purposes), objects are kept and archived for many different reasons, the connection to memory and one's personal past being but one. In exploring and explicating this, we seek to derive a deeper understanding of home archiving practices which in turn can be used to inform future developments in domestic archiving technologies.

To begin this process, it is perhaps germane to reflect on our prior experiences in the field studying home users of digital media [Kirk et al. 2006, 2007], wherein we have repeatedly observed an attraction towards the physical amongst technology users. Try as we might to understand practices of digital storage of photos and videos in isolation, tangible objects kept cropping up. Archiving practices often bore witness to transformations from the digital to the physical: select digital pictures were still printed and framed, and videos were often turned into nicely edited and packaged DVDs [Kirk et al. 2006, 2007]. The processes through which people construct and relate to such physically framed materials can be particularly nuanced and subtle [Drazin and Frohlich 2007, Taylor et al. 2007], but the very fact that humans relate to some qualities of the physical and orient around them is not surprising. Precious items in the home frequently include not only digital items such as photos and videos but obviously physical things as well: children's artwork, a baby's first pair of shoes, a collection of stones from a holiday, and all other kinds of objects besides. If nothing else, these observations should tell us that if we want to design better technologies for artifact storage (be that digital or physical artifacts) we should be "taking things seriously" [Glenn and Hayes 2007] and importantly the practices surrounding them.

When we do start to take *things* seriously it becomes evident that objects are polysemous. The kinds of sentimental artifacts found in homes have variously been described as evocative objects [Turkle 2007], biographical objects [Hoskins 1998], and sacred objects [Belk et al. 1989] (and such categorical distinctions are rarely mutually exclusive). Objects of sentiment in the home are clearly not simply kept to invoke memories, they perform other functions too, and to deeply understand what roles they might play in the family home is an important aspect if one wants to truly understand how and why they are archived. As a part of this it must also be remembered that the domestic environment is a negotiated space. In other words, there is a social construction to the fabrication of the ecology of the home [Hendon 2000], which means that decisions about which and whose artifacts are stored, displayed, and otherwise accessed is a negotiated activity and such decisions are not made in isolation. Consequently, the mundane artifacts of the home (whether physical or digital) are again not just objects of personal reflective value but are embedded in an otherwise revealingly complex ecosystem of familial archiving or storage practices [Hendon 2000].

This broader construction of the social life of objects is something that has been less of a focus in previous work concerning the design of archiving technologies [Petrelli et al. 2008, 2009], where the focus, as just highlighted, has remained on the role of objects as vehicles of memory and which has analytically concerned itself mainly with the role of objects in individuals' lives rather than within more familial practices. We herein seek to build on this earlier work. By taking a wider look at the social life of objects, of our human remains, both physical and digital, we can explore the rich ways in which we populate our domestic and familial spaces with objects of sentimental value and explore the relationships that we have with them. Such an approach should foreground current and developing practices of archiving and will speak to the design of new technologies, technologies which might enrich our experiences of living with digital artifacts. Equally, deeper understanding of both digital and physical archiving practices might be combined such that we can articulate ways in which these two sets of artifacts, currently kept distinct, might be brought together in more meaningful and compelling ways. From such a rich understanding, implications can be derived not only for the design of data storage systems but also for the methods and means by which we curate, display and otherwise interact with cherished objects (digital or physical) in the home.

In the following sections we briefly introduce previous work in this area which has considered either the design of technology to support the archiving of physical "memorabilia" as well as more social scientific work which has attempted to unpack the significance of *things* to human lives. We then present our fieldwork, which explores in greater depth how people relate to sentimental artifacts in the home, concluding with implications for the design of future technologies.

2. BACKGROUND

When considering research that has already been conducted in this area, it is evident that there are two main corpora of work which are of relevance. One concerns the explicit development of "memory technologies" recently considered in the HCI and affiliated technology literature, and the other stems from the large body of anthropological work which has considered the role of material cultures in domestic lives. Somewhat surprisingly, the two have been mainly disconnected: the deeper anthropological research has had little impact on the technology development work, and vice versa. We briefly reflect on both.

Much of the work on family archiving that has been seen among the HCI community stems from research on the home use of media such as photos and videos [Chalfen 1987]. Studies have explicitly explored how photos are stored in the home [Rodden and Wood 2003], and importantly how they are oriented to and talked around [Balabanović et al. 2000, Crabtree et al. 2004, Frohlich et al. 2002]. Such studies have directly sought to design better tools for photo storage and for the sharing of photos (photoware). Similar work has explored the storage and annotation for subsequent replay of video [Abowd

et al. 2003]. Much of this work however, while often using the study of physical (or analog, if you will) forms of photo and video as a research vehicle, has sought to inform the design of technology to support digital media with digital interactions.

However, moving beyond this is a developing interest in exploring the inter-relationship of the physical and digital, in a sense using one to enrich the experience of the other. One of the first technologies to be discussed in this frame is the "Memory box" [Frohlich and Murphy 2000]. In this small box, RFID tagged items could be placed (rather than stored) which would then trigger the replay of associated audio commentaries, essentially enhancing the experience of the object. Such a device, however, had many limitations, size clearly being one of them. Building on this, and based on some ethnographic work with families with young children, Stevens et al. [2001, 2003] presented their "Living Memory Box." This device sought to archive and annotate a greater range of objects, but whilst designs were explored with users, no prototype was apparently deployed. In addition, the research did not focus deeply on existing archiving practices, and the sample of participants was somewhat limited by its focus only on participants with young children. Equally, the development of the MEMENTO [West et al. 2007] and the Ubiquitous Memories [Kawamura et al. 2007] systems allowed users to combine elements of the physical and digital using, respectively, Anoto Pens and RFID tags, but had limited integration with an understanding of archiving practices. The MEMENTO system was based on highly specific work with an older population group, and the Ubiquitous Memories project was based more on a conceptual understanding of memory. Neither project has been evaluated in an ecologically valid deployment. Again, recent work in this space [Frohlich and Fennell 2007], has offered intriguing designs for a variety of specific memory-supporting artefacts, but similarly has not evaluated these proposed designs in actual homes. Clearly there is an interest in developing technologies in this space but efforts thus far have been somewhat limited.

If we move now to consider existing anthropological studies, we find a long tradition of studying material cultures and the processes of exchange economies, an understanding of which essentially sensitises the reader to the importance of structured practices of gift giving [Appadurai 1986, Douglas and Isherwood 1979, Mauss 1954]. In many respects this forms the precursor for our understanding of the importance of objects and why we might accumulate them. This work, while often culturally bound[2], tends to speak to broader issues. To understand the sensitivities of home archiving practices in the specific it is perhaps also germane to turn to the various treatments of domestic objects[3] that have sought more explicitly to explore the role of artefacts in the construction of memory [Middleton and Brown 2005], identity [Csikszentmihalyi and Rochberg-Halton 1981; Hoskins 1998], and the work of making a home a

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[2]Mauss' Trobriand Islanders for example.

[3]Note we are aware of existing studies of 'archiving' practices such as Kaye et al's [2006] study of academics' paper archives, but our focus here is on the domestic where we feel practices (or at least motivations) greatly differ from those which surface in personal, work-related archiving.

home [Gregson 2007; Miller 2001]. These studies make a key contribution in exploring how we come to populate spaces in which we live with objects of significance and, perhaps more importantly, how we relate to and through those objects. Such notions of the importance of place and space and the ways in which we create a domestic topography of sentimental artifacts as an external expression of aspects of self-identity have been discussed by Gonzalez [1995], who introduces the notion of *autotopography*:

> "In the creation of an autotopography—which does not include all personal property but only those objects seen to signify an 'individual' identity—the material world is called upon to present a physical map of memory, history and belief. The autobiographical object therefore becomes a prosthetic device: an addition, a trace, and a replacement for the intangible aspects of desire, identification and social relations."—(p. 134)

The genesis for Gonzalez's work, and the origin for the term "autotopography" seemingly stems from her critical reflection on work by Christian Boltanski, who engaged in a project of trying to get museums to create exhibits in one room only of all of the objects that surrounded a singular person during his/her lifetime [Gonzalez 1995], conceptually 'museums of the self'. Inevitably then the use of the term autotopography, if adopted as an analytical tool for research, frames the home from the perspective of a unitary relationship between a person and their environment. Such an approach, however, when attempting to understand the relationship between people and objects in a domestic environment, is inherently problematic given that the family home is logically a negotiated space. Consequently, competing influences from the family members affect the placing of objects and there is a complex ecology of overlapping relationships between family members and specific objects. To this end we draw support from the work of Hendon [2000] whose study of utilitarian storage argues:

> "Physical space acquires meaning because it is one way of embodying mutual knowledge. Storage is a situated and localized practice that informs constructed spaces with social meaning based on the connections people make between the act of storage and social relations."—(p. 44)

Just as Chalfen [1987] demonstrated that photos and videos in the home are ways of framing 'the family' we could also then argue that sentimental artifacts and the ways they are stored do the same. Clearly autotopographies have an analytical value but they also gloss over the sensitivities of how mundane objects have a role in the social construction of family and family memories.

In the most recent study of the role of mundane objects in home archiving practices, Petrelli et al. [2008] have made significant progress in understanding the home from the perspective of archiving mementos, attempting to understand what things are kept, why, and where. Their work has a specific focus with regard to home archiving, both methodologically and analytically which we believe we can broaden and build upon, in order to further explore the potential of new technologies for home archiving.

This earlier work [Petrelli et al. 2008] adopted a methodology which focused more on physical objects, relying as it did on a "home tour" where participants

were asked to select special objects that they could see (during the tour), that related to their Lives. The salience of digital objects was therefore lessened and the physical prioritised. Understanding the interrelationship between physical and digital artifacts, we would contend, is key to understanding how new digital archiving practices might evolve so as to take advantages of the affordances of both the digital and physical worlds.

Secondly, the research by Petrelli et al. maintained a strong focus on archiving as a way of supporting memory, specifically through the keeping of physical objects. For this reason, objects that they were concerned with are defined as "mementos," their role in reminding people, of past events, people and places being central to the analysis. Our belief is that this focus may not reflect the full range and diversity of why people cherish some objects, both physical and digital, attaching sentiment to them and choosing to keep them. In other words, we suspect that the triggering of memory is only part of the explanation of why people engage in home archiving practices. Accordingly, our focus herein is not on mementos per se, but on exploring a wide range of reasons that people keep sentimental objects.

Thirdly, because this prior research has relied on Gonzalez's notion of auto-topography as an analytical tool, the work has inevitably focused on the notion of objects in the home as a reflection of the self. Building on this, we would contend that, in line with Hendon, what family archiving practices really reveal is the social structure of the home. And what is important in family archiving practices are the ways in which these practices shape, and are in turn shaped by, the relationships among the family members. Consequently one might talk of the objects archived in a home not so much as an autotopography but perhaps a *familia-topography,* as the social relationships of the home are made manifest through material practices. To unpack this, we believe that for a grounded understanding of archiving practices, empirical work must incorporate a range of family structures to adequately understand which practices are common, which practices diverge and what the meaning of archiving is, for a range of users. This contrasts with some previous work (such as Stevens et al. [2003]) which largely focused on the more homogeneous archiving needs of parents with young children.

3. METHODOLOGY

We recruited 11 families to take part in our research (by advertisement and word of mouth) from the Cambridge and Oxford areas in the UK. Keen to avoid the problems of narrow samples raised above, we found a mix of family types,[4] including two young couples with no children (male-female and female-female couples); six two-parent families with children (including various combinations of, infant, preschool, elementary, and high school age groups); two older couples whose children had left home; and one widower who lived part-time with his adult child and lodger. In each family we spoke to at least two people, and

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[4]We acknowledge that this is not a comprehensive study of different household types but our goal was to widen the current perspective on archiving practices by considering a wider variety than has previously been considered.

in most cases spoke to all adults and several of the children (where present). Consequently, the participants that actively contributed ranged in age from 5 to 70. Our participants came from a variety of backgrounds and occupations and in every family (with the exception of the oldest retired couple) at least one adult was in full-time employment. In addition, most participants were educated to degree level, and all to at least high school graduate level. The sample was middle class, in line with recommendations that members of this segment of society are more likely to archive sentimental objects [Csikszentmihalyi and Rochberg-Halton 1981].

3.1 Guided Tour

Our fieldwork consisted of a mix of observation and interviews in situ. Data were gathered over the course of two home visits, the first of which involved each of our families giving us a guided tour of their home lasting between 1 and 1 $\frac{1}{2}$ hours. Participating family members showed us *every* room of their house (excluding inaccessible lofts or garages) and were asked to show us *any* items of sentimental value that they could find (with prompting from the researcher). Prior to the start of the tour we discussed with our families what we might mean by "sentimental items," suggesting that an item was sentimental if it was special in some way, more than purely decorative or functional. Variously, throughout the tours, any ambiguities were discussed.

In all cases, participants were keen to show us their artifacts, even those boxed away and in some form of storage, and would often resort to pulling objects out of various semihidden places. As we were shown the items, we photographed them for the record. We found participants would spontaneously produce accounts of what objects were, giving the history of the object and its associations, and often explicitly stating why the object was being kept where it was to account for its selection as an item of sentimental value. These spontaneous stories were audio-taped for later analysis. Participants were also asked about the nature of things kept in more inaccessible places such as attics (lofts), for comparison with what was otherwise being seen. At the most appropriate point in the tour (usually in the presence of a computer) participants were also asked to give details of the kinds of digital artefacts that they were keeping for sentimental reasons. This usually included prompting the participants to consider digital photos and videos, emails, and archived digital work. This would often lead to discussion of other digital devices that might store sentimental items such as cell phones and answer machines. Again, photos were taken of relevant screen shots or devices, as a part of the cataloguing process, and discussions were audio-recorded.

3.2 In-Depth Interview

Having determined what items people were actively archiving, we returned to each family to seek clarification about the issues of *why* different items and types of items were kept. A second visit, again lasting between 1 and 1 $\frac{1}{2}$ hours was conducted one to two weeks after the initial visit. On this visit, participants engaged in an informal semistructured interview around images

recorded on the previous visit. A subset of usually between 10 and 20 images were selected on the basis that they represented different categories of objects that we saw emerging in the data and to provide us with a sample of objects and perspectives that captured the range of that diversity. Participants were asked to give more detail about how they felt about those particular objects, why they had kept them, and how they had kept them.[5] They were also encouraged to reflect on the nature of differences between physical and digital artefacts, and were asked as to whether a digital copy of the items they were being asked about could be a substitute for the original physical item, or indeed if items could be enhanced in some way by being associated with other digital media. Questions about who had control of the family archive and who should have access to items within it were also broached in an attempt to explore issues of how collected artefacts were merged and managed within the family.

3.3 Data Collection and Analysis

All of the audio recordings of the home tours and interviews were transcribed. These transcripts, along with the photographic record of items captured on the home tours, were used as the primary source of evidence in our analysis. From iterative sampling of these data, we were able to construct a representative framework to understand what kinds of objects become archived, what the values of archiving in the home are, and how the home is curated. Each of these key properties of home archiving practice will be addressed in turn. From understanding these complex factors we are able to generate recommendations for the development of home archiving technologies that are better aligned to the subtle nuances of home archiving behavior as it currently exists with tangible artifacts.

4. FINDINGS

4.1 What Things Become Sentimental?

Our first stage in attempting to understand the nature of home archives was to consider the types of things that people were deliberately archiving. Here we draw a distinction between those items in the home that are merely accumulated—the ephemera that build with time—and those cherished objects of sentimental value that are consciously or intentionally kept. The items falling into this second category might not serve any practical function in the home but are there for more esoteric reasons, as we shall see.

In some respects this could be framed as a distinction between the sacred (which refers to a notion of being consecrated and devotional, almost spiritual and set apart to preserve sanctity) and the profane (the ritually unclean, the unsacred), as Belk et al. [1989] articulate in their exploration of the sacralization of consumer objects. Belk et al. describe the various types of things which anthropologists have regarded as being sacred—listing places, times, tangible

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[5]It should also be understood however that these materials were an aid to discussion and conversations were not restricted to just those items highlighted by the interviewer, participants were free to (and did) refer to other items as well, to help discuss their motivations for archiving.

things, intangible things, people, other beings, and experiences—all as possibilities for achieving sacred status. These things, it is argued, become sacred through one or more of seven principal means, described as *ritual*, *pilgrimage*, *quintessence*, *gift-giving*, *collection*, *inheritance*, and *external sanction*.

The types of things we were interested in, sentimental artifacts, most closely relate to the "tangible" things discussed by Belk et al. But in some respects it seems inappropriate to regard sentimental artefacts as sacred objects, despite some similarities. For example it is evident that in some cases, sentimental artifacts are held separate and are treated differently from other objects. But, as will be shown in more detail later, they can just as easily be intermingled with profane objects or be used in profane, mundane ways. What seems evident though, is that even if these sentimental objects are not always the "sacred things" that Belk et al. refer to, they are usually, instead, a means of association with them. In other words, we found many artifacts (both digital and physical) in people's homes to be sentimental *because* of the ways in which they act as evocative traces of, and evoking mechanisms for, a whole pantheon of sacred things. Sentimental artifacts can invoke and symbolize important places, times, things, people, and experiences. And it is through this process that they garner their value.

Now that being said, and having underlined the distinction between sacred things and sentimental artifacts, one value of Belk et al.'s work is in the explication of the different mechanisms by which things can come to be made sacred. As such, it also provides a way for us to think about how mundane objects of domestic life might come to be associated with a sacred thing (be that a person, place, time, etc.).

In this first section of findings it seems most appropriate to begin by mapping out the space a little, by revealing some of the types of cherished objects that we found in homes, the types of objects which people regarded as meaningful and important to them. This helps us to understand some of the basic issues at hand and the scope of this domestic ecology of sentimental artefacts that we wish to explore.

As Figure 1 shows, these cherished objects can be classified as physical, digital or existing in some hybrid state (a conceptual category rather than literal). Figure 1 also lists some examples of the kinds of objects which fall into these categories. The list is not necessarily exhaustive but is meant to give an overview of the types of things that we found. We examine each of these broader categories in turn, commenting in each on the process of how things become imbued with sentimental value through a few illustrative examples. A better understanding of not only *what* but *how* objects come to be special to people is important in conceptualizing the kinds of technologies we need to develop to enrich or support existing practices.

Physical Artifacts. Perhaps because of the comprehensive home tour method we adopted, we unearthed a wealth of diversity in the physical objects that people kept. We were shown everything from small objects found on beaches or inherited bits of jewelry, through to large ornaments and paintings, right up to a one-ton piece of sculpture.

ARTIFACTS

PHYSICAL	DIGITAL	HYBRID

PHYSICAL

Diaries / Books   **3D**
Furniture
Toys / Games
Ornaments
Pet Artifacts (collars etc)
Things once functional
  - e.g., engine parts
Weapons
Jewelry
Utensils / Tools
Consumer Products
Clothing
Natural Objects
  - e.g., feathers, stones
etc.

Certificates   **2½D**
Letters
Photos
Posters
Paintings
Cards
Cuttings (Newspapers
and Magazines)
Work – Adult (University,
      Job)
    – Child (School,
      Artwork)
Things once functional
  - e.g., sheet
    music, maps

DIGITAL

Photos
Videos
Work
Emails
Artwork

HYBRID

Audio records
  - People
  - Environmental
    sounds
  - Music
  - Mix tapes
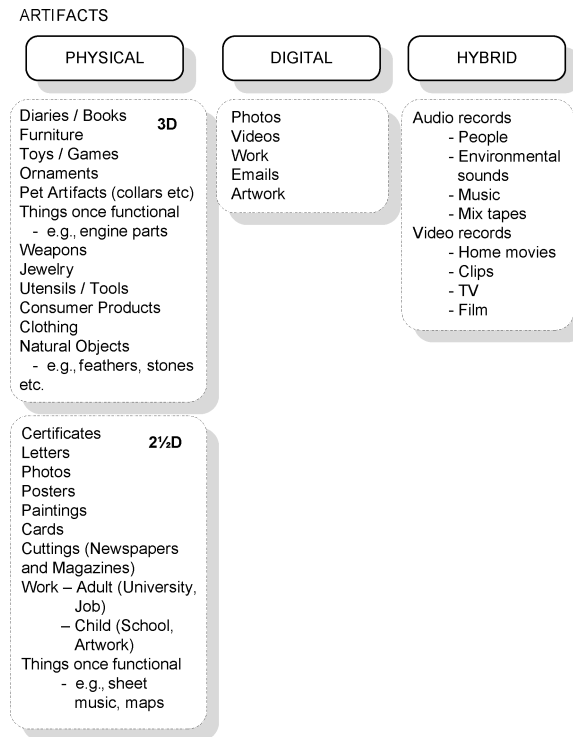Video records
  - Home movies
  - Clips
  - TV
  - Film

Fig. 1.   A taxonomy of types of cherished items archived in the home.

In one house that we visited, in addition to the many sentimental objects scattered throughout the house, a collection of special objects had also been carefully packed away in cardboard boxes stored up in the loft. In this particular family, the mother had been very diligent in making sure that every member of the family (herself, her husband and their three children) all had some kind of space within which to store things that were important to them. Everybody had their own box, suitably labeled, except for the father, who had a plastic bag of objects, eight of them, which turned out to be a distilled collection of emotive artifacts. The plastic bag, unlabeled and placed inside the mother's cardboard box, contained the father's christening bracelet; a christening bible; a Jubilee medal; a toy train carriage (in its original box) received as a present from his sister after a trip she took to France; a teddy bear, again from the same sister and a trip to Malta (and a favorite childhood toy); an ivory carved boat, which he couldn't remember anything about; a T-shirt of his father's that he slept with as a child after his father had died; and a cog from his first motorbike when he was 17, which had blown up, and which was the part responsible for the accident (see Figure 2).

Such examples were both mundane and deeply emotive at the same, clearly demonstrating how an object (such as the motorcycle cog) can in some sense be devoid of value, but in others respects be rich with it.

Fig. 2.   The cog from a motorcycle kept by the father in Family 1.

"That's the bottom of a sea urchin, look how beau-
tiful that pattern is, and how delicate it is, but it
got smashed by one of the kids.... I've kept the bits
and...and yeah I know, you know one day I'll glue it
back together....maybe....possibly." – (Mother, Fam-
ily 5)

Fig. 3.   Broken shell.

In another example, the mother of a different family produced from a shelf
on a writing bureau in her bedroom, a broken shell collected on a holiday, kept
carefully boxed (Figure 3). It could never be kept "out" and displayed because
the fractured pieces would disappear. The owner in this case aspired to the idea
that one day she might fix it together with glue, despite having hundreds of
other very similar objects.

With these examples of often functionally useless items, the sentiment at-
tached stemmed from an association with something sacred. For the motorcycle
cog it was the defining *experience* of a serious motorbike accident, and for the
shell a special *place* and *time*, a holiday taken with family. In each case the
means by which the specific object had become associated with these past events
was different. To use Belk et al's terminology, one might say that the motorcycle
cog came to be special through *quintessence*, in the sense that this was the only
piece of the motorcycle that was left and it was this particular piece which had
been responsible for the accident. For the shell it was the *pilgrimage*, the fact
that it had been carried and had survived since then, despite its fragility (to
some extent at least).

In addition to such 3D objects we have also found it useful to distinguish a
class of other objects which we refer to as $2\frac{1}{2}$D. These objects are in essence
paper or card-based objects. And again, like the 3D objects, we found a huge
variety of artefacts of this sort, including children's artwork, schoolwork and
certificates, letters, pictures, photos and newspaper cuttings, comprising a vari-
ety of sizes and shapes (although admittedly there is an obvious predominance
of rectangular forms). These artefacts are designed to layout information in
a 2-dimensional space, but we refer to them as $2\frac{1}{2}$D as they sometimes have

"This is something we got for our wedding, basically friends of ours who are opera singers, they performed a song and this basically is the text." – (Mother, Family 9)

Fig. 4.   Wedding service.

important 3-dimensional, tangible aspects to them. For example, sometimes they had ribbon or other adornments, such as is shown in Figure 4.

In this example, the treasured object was left propped behind some ornaments on a shelf, the owners not really sure what to do with it, but aware of its significance and wanting somehow to treat it with respect. The object itself was evocative of an important experience (a wedding) and important others (friends), further made special through the act of gift-giving. As mentioned above, part of the quality of the object was in its crafting, and in its decorative and tactile qualities.

In addition to adornments, with $2\frac{1}{2}$D objects there were other aspects of the material qualities of paper or card that held value for their owners. For example, as with physical 3D objects, there was a sense in which the aged material quality of the object was imbuing it with a further level of significance (an interesting point discussed in DeSilvey's [2006] analysis of "observed decay"[6]). There was a palpable sense that a photo, for example, which was worn with age, held some special quality for having survived and testimony to this was the patina of the object.

Digital Artifacts. As we noted at the outset, increasingly, people are archiving sentimental digital items too. The most common examples that we observed were digital photos and video clips. Additionally, though, we found people keeping sentimental emails, copies of digital work documents that they had produced but no longer needed (often kept purely for sentimental reasons such as associated feelings of achievement), and also some examples of digital artwork (in various forms), created and given as gifts. Anecdotally we were made aware of other digital items such as text messages and Web content (e.g., blogs written) although in our sample we saw no first hand evidence of this.

For one young couple, who had initially met over the Internet, they placed great value in their archived email stored online. In this respect they had a near complete record of all of their communications from the first few years of their burgeoning relationship. Coupled with the communications were the various digital "gifts" they had exchanged with each other (such as pieces of digital artwork or e-cards they had created), also archived on their all-important back-up hard drive.

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[6]DeSilvey's work [DeSilvey 2006] considers the 'degradation of cultural artefacts' considering whether it is 'possible to adopt an interpretative approach in which entropic processes of decomposition and decay, though implicated in the destruction of cultural memory traces on one register, contribute to the recovery of memory on another register.' (p. 318).

"The physical object of these tapes is not particularly important; if there was a way of turning these into a digital format then I'd be delighted to." – (Female, Family 11)

Fig. 5. Box of tapes.

W: But I've got ones (emails) that go back to '98, so right when we first met
H: From me? Holy cow.
W: I really don't delete anything
H: And those would be like really soppy stuff, teen romance emails going backwards and forwards
W: Geez yeah, that would...I can't even read that (laughs)

– (Husband, Wife, Family 2)

Here what the artifacts are representative of is the *intangible* relationship between the two people and their early experience of it, the associations between the digital artefacts and these concepts being made through the act of gift giving or simply the very collection of these many items of personal correspondence.

Hybrid Items. The third category in our taxonomy we refer to as "hybrid" objects. Hybrid objects are physical instantiations of media content such as cassette tapes, video tapes, CDs and vinyl records. These items could relatively easily be converted and become part of a larger digital collection, but currently exist in a physical format. We observed many instances of media storage, where the media in question was kept for sentimental reasons, such as TV shows and voice recordings taped during childhood, and therefore having associations with fond childhood experiences or rituals (people often having sentimental associations with or ritualised ways of watching certain films or listening to certain bits of music at particular moments in their lives). In such cases, the actual VHS or tape cassettes used for storage held no sentimental value whatsoever, but the content was considered to be very precious (Figure 5).

In this example, the collection of tapes was rarely listened to, as they were boxed away and left in the corner of the room (in this house one side of a large bedroom was given over to storage, given that they had no actual loft storage space—with rarely used items being carefully boxed and stacked away). As the quote suggests, the owners wanted the content potentially accessible but did not want to deal with the messiness of the cassette tapes, for which they felt no particular attachment (and which they felt had little aesthetic value).

There were some clear instances, however, where audio-video materials were kept in their original formats because of some tangible quality, such as the sleeve art of a vinyl record, but in many cases this was not seen as important as the information content itself. In particular, with created audio records stored

on cassette tape, either compilation tapes or voice recordings, there was often a fear expressed that the cases were very breakable, and the tape itself was prone to degrading. Consequently there was a strong desire to push these forms of media into a digital instantiation to safeguard the quality of the material recorded. A significant caveat when considering this however comes from the work of Brown and Sellen [2006] who clearly demonstrated the pride with which some collectors display the physical copies of their music collections, and who enjoy browsing through the physical media, here then sentiment is achieved through *collection* (in Belk et al's terms). In these cases, if there is an advantage to the digitization of such materials, such factors must be considered.[7]

4.2 The Values of Home Archiving

Having considered the types of artifacts found in the home and sketched out how such objects come to be special or imbued with sentimental value, we turn to the question of *why* people do home archiving. The reason behind wanting to understand this process more deeply is so that we can understand the values people might derive or want to derive from new kinds of archiving related technologies. To do this we need to understand not just how such objects become sentimental, but what they achieve and represent for people and for households, and what roles the archived objects perform as a constituent part of the home.

In this section we propose six values of home archiving practice, six reasons why people archive, derived both from our observations and interviews. It should be borne in mind that these are not intended to be mutually exclusive. For any given object there might be several of these values at play when considering why it was archived. However it is useful to distinguish these nonetheless because each offers us a different set of considerations for the ways in which we might choose to design technologies to support archiving practice; each value suggesting different human sensitivities which drive the archiving impulse, to which we might need to respond in technology design.

There are two important observations to make about these values:

First, note that the different reasons we offer go beyond the ways in which objects merely provide links to past events or memories. We find that these objects act as much more than mementos and we seek to highlight this. While they are sometimes about connecting with the past, we also find that they do important work in the present, and thus span a larger range of value than has been previously explicated. This includes for example, how objects can draw attention to people of special status, how they play a role in personal and family identity, how they help people fulfil a sense of duty, and how they can even help people forget the past (see Figure 6).

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[7]Although perhaps it should also be considered that commonly, notions of music collection, and for that matter many of the other types of home-mode collection of artifacts, which in many respects conform to hobbyist practices of collection, fall far short of Gelber's [1999] definition of collecting, which privileges the accumulation of only those items which have a significant economic value and which are collected and displayed in a particularly structured practice, and would therefore be more in line with examples of fetishistic behavior.
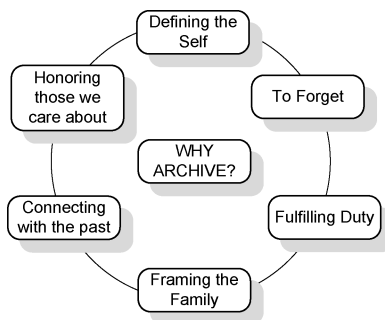
Fig. 6.   Six values of home archiving.

Second, most of the values we describe go beyond the realm of the individual. In other words, most have to do with the role of objects in a household context where people "work" to make the family a family. This includes the ways in which objects can help in demonstrating affection for one another, in creating shared links with the past, and in creating a shared public face of the family. We found that all members of the household participate in this, although different people take on different roles within archiving practice to achieve these aims.

Defining the Self. We begin with archiving for the purpose of self-identity, one of the most frequently cited reasons for archiving in the literature. In this way, as has been noted, individuals express something about themselves, surround themselves with objects which embody aspects of their past, and thereby trigger memories of personal events and relationships. This is the essence of the concept of autotopography as described by Gonzalez [1995], of work by Csikszentmihalyi and Rochberg-Halton [1981], and the principal analytical tool used by Petrelli et al. [2008] in their analysis of home archiving. Unsurprisingly, we found many examples too of objects of a personal nature, which represented some aspect of self, being archived for the purpose of *defining* the self.

Sometimes this was done in private ways, such as the mother of one household who had an old Bay City Rollers annual stored up in her loft reminding her of her teenage years (Figure 7). She supposed that such an object would have no value or meaning for others in her home, but felt it important to hold on to this aspect of her youth.

In contrast, other objects were kept so as to make a more public presentation of self. For example, one participant framed and hung on the wall the last circuit board he ever designed and made (Figure 8). Obviously such an item, being quite obscure, was a source for stories which were willingly told. This particular item was a clear vehicle for inviting discussion about the owner's background— his life story, as it were. Another participant displayed, on a bookshelf in his living room, a home-made mortarboard (a type of hat), the construction of which was traditional when graduating with a Ph.D. in Sweden. The design of such objects is supposed to thematically represent the topic of one's thesis (Figure 9)
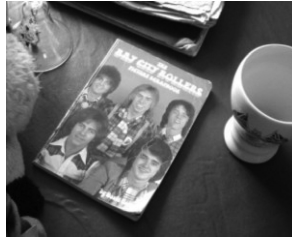
Fig. 7.   Bay City Rollers book.   Fig. 8.   Circuit board.   Fig. 9.   Graduation hat.

> "I like to be remembered and I like to tell people about the story behind it, it is a funny one, and sometimes we have people round who are like from the same research area....and just like we have this and other things from Sweden just to show kind of for us but also probably for others to show that we lived in Sweden and what our different traditions are and so on." – (Father, Family 9)

And again this object was a talking point for our participant who was keen to explain the significance of the object to him and his life.

All of these objects made manifest aspects of a person's past, and in doing so, represented something about each person's identity. When such objects were left visible and on display they were in essence being used to create a "face" for the owner [Goffman 1959].

The construction of self-identity through the archiving of *digital* items was also evident although it often manifested itself in different ways. Largely, it was more personal and less publicly displayed. The presence on hard drives of old bits of work, photos of a personal nature, music collections, or even just the particular arrangements of the digital desktop environment can be seen as a reflection of a person's identity and which are all candidates for things to which people become sentimentally attached.

One of our participants articulated for us why he kept digital items which he considered sentimental.

For this participant, the items in question were stored away on his faithful old (and heavily personalized) laptop (see Figure 10). But his discussion of the coding projects he had engaged in as an undergraduate revealed the pride he felt in his work and the way in which he kept hold of it as a marker of his achievement. It was interesting to note the potential air of envy though in his response that suggested that he felt slightly aggrieved that he couldn't display his work in a meaningful manner and that he had to keep it privately—noting that some other people he knew from university "kept blogs of this sort of stuff". But he was not sure of the value of such an approach, precisely because no one would ever really look at it.

It is interesting to note that in most homes, the results of one's craft are readily displayed, there being ample opportunity (as we observed in many homes) for things to be displayed on shelves or stuck to walls or fridge doors. The craft one might achieve in the digital realm, either work or art, (currently at least) is more constrained in terms of the physical places where it can be displayed. Most PCs in the home offer display in a very private context specific

Fig. 10. Personalized laptop.

H: All the work I did at University I haven't thrown away even though I'll probably never use it, for some reason I keep it with me.
Interviewer: Do you think that's got something to do with the amount of time and effort invested in it?
H: Oh it's definitely a pride thing. I'm sure people who do a Bachelor in art, you know, they'd struggle to throw away a painting that they'd done. And you know while they could hang their painting on the wall and people could come into their house and appreciate it and they could say 'yes I did that while I was at university' I can't really do that with, you know, a prime number sorter so you know it's only something that I and a couple of other people could appreciate, so I just keep it privately. – (Husband, Family 2)

to one user, or in the case of shared "family" PCs there is little scope for treating the display space as one might treat a note board or fridge front or wall as an amenable display as seen in so many homes.

Honoring Those We Care About. While many objects were displayed by those who wanted to say something about themselves, we found many cases of artifacts being displayed so as to draw attention to and honor *others* in the household or those of important friends and family. A good example of this was seen with one family who had a prolific artist among their pre-school-aged children. Their oldest child would spend every day drawing pictures leaving the parents despairing as to how to proudly display or even store his ever-expanding legacy of work. Consequently, their home was awash with images he had drawn. Their little girl, however, did not draw nearly as much. When she produced her first picture of the family they were extremely keen to ensure that she had space on the wall just as her brother did. And to further compensate for his volume of work over hers, they went to the extra length of framing her picture (see Figure 11).

Interesting here was the fact that as the image faded (parts of it had been originally rendered in yellow crayon), the mother worked to ensure that the picture stayed visible. Here she was forced to make the decision as to whether to modify the original. In the end she drew over her daughter's lines with a black marker pen. She claimed that this had been a hard decision, wrestling with whether to preserve the sanctity of the original or to ensure the longevity of the picture.[8]

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[8]Actually this point of the relationship between the sanctity of original objects and the notion of authenticity is one which has clear resonance for our study of the nature of archiving. It is a clearly unanswered question with regards the storage of digital documents and digital artefacts of sentimentality as to whether the ability to replicate and reproduce ad libitum might affect in some way how people relate to the objects. Evidently people orient to sentimental physical objects in part because of their uniqueness (or their quintessence) and it is unclear how this is replicated with digital items.
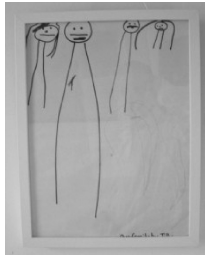
"It was the first picture that T did of our family...she doesn't particularly draw pictures, she does writing, but she'd drawn a picture of herself and she said 'this is a picture of mummy and daddy and L and T, and that's daddy with a beard.'....and then we put it in a frame and then it all faded and it was really sad and I had to go over the top of it, which then took some of the, something away somehow." – (Mother, Family 4)

Fig. 11. Framed drawing.

Of course elevating the status of an object within the home might not just have an impact on those within the home. Its purpose might not just be the equitable representation of the children in a shared space (something we saw played out in most homes with young children) but can also be for the purpose of honoring social relationships that extend beyond the home. For example, we were told that strange or disliked gifts were often given pride of place when the people who gave them visited, and in other work we have seen that framed pictures of relatives have to be given equal spatial billing [Drazin and Frohlich 2007; Taylor et al. 2007] lest distant family members become offended. It seemed apparent then that the role of objects in many homes was to constitute and maintain a set of social relationships within the family and beyond, extending to various contemporaries such as extended family and friends; the objects giving those participative members a status within the social fabric of the home.

While this was a clearly defined set of practices in the physical world, it was difficult to find examples of this occurring with digital artifacts in the households we studied. It appeared that honoring someone is tied to public display, and hence our participants said that important digital photos or art produced digitally by a child would most likely be printed out and made physical. In the same way, framing a particular physical image renders and distinguishes it as separate from its collection (i.e., a photo album). To elevate digital artefacts in status (the means by which we might honor someone) might be to render them separate somehow. This might be done with a digital photo frame, but none of our participants had these or showed particular interest in acquiring them.

Having suggested that a way of honoring others in the digital would be to find ways of displaying digital content in the home, similar motivations can be seen in the practices of one of our older participants, who would let her grandchildren use her laptop when they were visiting. The children often used the inbuilt camera of her MacBook to take pictures that amused them (often particularly rude pictures). The grandmother always kept these pictures, choosing not to delete them (despite her not liking them and being faintly embarrassed by them). In this practice of knowing and known retention (by others), the grandmother was in essence making space for the contribution of her grandchildren to her photo collection, thereby elevating the status of
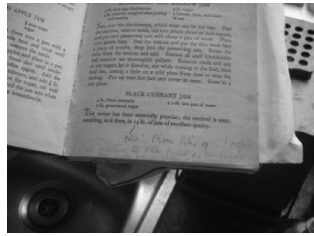
"I like the fact that I got it from my granny in that state with her scribbles in, and that's part of the degrading process and maybe I'll add some more scribbles and I'll probably add some more jams as the years go by." – (Mother, Family 5)

Fig. 12. Jam recipe book.

their offerings to that of valued objects. By not deleting them straightaway she was both sanctioning their behavior and giving them a place within her home (albeit in the digital realm).

Connecting with the Past. Beyond keeping objects to define oneself, and beyond wishing to honor close friends and family, another reason for keeping sentimental objects was to form connections with the past. By connections with the past, this was not necessarily in the sense of recollecting it or reliving some past experience. Rather we saw that, in the act of using, displaying, or keeping objects, oneself or others in the family are drawn closer to important people, places, times and events in the past. For instance, we saw many examples, often involving children, where parents kept objects in order to make a connection with a past that they otherwise would know nothing about, giving them a sense of heritage or kinship. Equally we saw ways in which objects were used in the home to create a sense of the family having a shared past. For some though the connection with the past was inherently personal.

A good example of connecting to a personal past can be observed in a conversation we had with one woman about a "jam book." With this book of jam recipes, kept in the kitchen where it would be needed, one of our participants had a ready means by which to connect with her dead grandmother. Her grandmother's jam book was dog-eared and old, but it was also replete with handwritten corrections and comments on the printed material (Figure 12).

Through using this book, through thumbing through it, our participant could evoke memories of times spent with her grandmother. Through the act of making jam and using the book, she came to feel closer to her.

For many people, the possibility of feeling nearer to those not present led to the display of photos. This was especially evident with photos of deceased relatives where we found evidence that mothers would want their children to grow up somehow "knowing" relatives that they had never actually met, at least in some small way (Figure 13).

In this way and in conjunction with the ready access to objects of common association (such as relics from shared holidays) such materials were used to foster a connection amongst family members to a shared family history, these tangible items representing and reinforcing a collective notion of that history [Radley 1990]. Here we can see that such objects may in fact have no connection to events in the past that anyone in the household can actually remember. Yet they symbolize a heritage and a history of things that

Fig. 13. Portrait photo.

"I'm quite aware of that whole thing of, erm, them being aware of their identity and their history and where they've come from, I think that's really important for children to know that." – (Mother, Family 4)

Fig. 14. Stone from beach.

Fig. 15. Family photo.

must have been, creating a new shared awareness of their importance in the present.

Other examples however do tie more directly to shared memories of past events. In Figure 14, we can see some of one family's collection of heart-shaped stones. Over the years the mother of the family cultivated a rule that said that on a family holiday no one is allowed to leave the beach until someone has found a heart-shaped stone. This particular "home rule" [Wood and Beck 1994] is therefore represented by the growing collection of stones designed at once to reflect this aspect of the family's culture, and to spark the recollection of the holidays in which they were collected.

In Figure 15 we find another intriguing example of shared recollection. In this picture, the family of this household appeared dressed in period costume. In this particular case, however, it depicted the family before the parents in question divorced. Displaying this picture, therefore, said more about the past than about the current living situation. Its owner, the son, explained that this

was a reminder of happier times. Displaying it on the wall was a way of finding an affinity with a past in which the parents in the picture were still happily married.

This attempt to use sentimental artifacts to form connections with the past was also seen with digital artifacts. This was perhaps most evident with the way in which households scanned versions of older print photos to include in their family collections. But here we also saw some households collect and create genealogical information either by gathering census record copies to provide missing information on ancestors, or by storing information in "family tree" programs on the family computer or by collecting audio records of grandparents' stories (we witnessed these kinds of activities in two of our families). Here the value of the digital was in the way in which it might be able to preserve artifacts in ways not considered possible with physical artifacts. One of our participants was busily typing up records written by her father because the text was degrading and would soon no longer be readable. In doing this though she felt that something of the document might be lost.

> *Interviewer*: Do you worry that some things like that (paper records) will degrade?
> *Wife*: Yes I do worry about that. That's why I'm typing some of them out.
> *Interviewer*: In typing them out do you think that you lose some of the character?
> *Wife*: Yes. I guess you could easily sell me the idea of photographing it all and just putting it all on file.
> *Wife*: I find it really interesting all of the family history stuff that you know if you're tracing people you get all the information about their births and deaths and you can go back to the original document and although there's no more information there, there actually seems to be in some sense that I can't quite explain. You know the fact that there's errors there and crossings out and there's the fact that it tells you who lived next door to who.
>
> – (Wife, family 8)

It is evident that such genealogical information is sentimental in the sense that it connects family members to their shared past, and in some respects what appears to make it more sentimental is the quintessence of any given record, the subtleties of its constitution that show that someone in the past has uniquely handled the object. And with the digital, there is the hint that some of this feeling can be instilled in an artefact if it shows something of its history even if this is just a digital copy—evidently a visual representation of contemporary writings seems more cherishable than a verbatim typed transcript. These features help one to connect to their shared past.

Finally, the curation, display and preserving of objects are perhaps the more obvious ways in which connections to the past are established for a family or household. The fact is that many objects in the home, being shared artifacts by the very fact that they are lived with by all present, come to have different meanings for different people. So the same object can connect different people in different ways. For example, in one family a father had a small wooden chair that he used as a child, which he had brought over from Germany for the express purpose of letting his baby son use it (Figure 16).

"I always remember the red small chair and the monkey, that was one of my favorite toys and yes so that's the story, and now when N was sitting on it and my parents saw it they said I always liked to sit on the chair and this kind of bonding is for me very important, if like my son picks up and uses the same toys, that's very interesting." – (Father, Family 9)

Fig. 16.   Child's toy and chair.

Now, this object is clearly over time going to have different connotations for the family members. For the father it already reminds him of his childhood, and it will come to represent enjoyable times with his son, and for the son it may well in turn come to represent evocative memories of his own childhood. The polysemous nature of artifacts, which can see items being regarded as mundane for some but sentimental for others (all within the same home), is well reported in studies of the disbandment of homes of the elderly [Ekerdt and Sergeant 2006, Shenk et al. 2004], and is something little considered in studies of digital archiving.

Framing the Family. In contrast to the notion of an autotopography [Gonzalez 1995] and in line with Hendon's [2000] view of the spatial relations of objects in the home being indicative of the social structures within it, we found many instances of artefact storage which spoke more to the social organisation of the home and the framing of the family, than the individuation of the self.

Mothers[9] were often observed to be making active decisions about which objects should be kept in the home, which things were to be displayed, and how they were to be displayed. This is not to say that these homes were not also negotiated spaces, with participation from all members. There were many examples of spaces within these homes being appropriated by others, bedrooms being a common example. But particularly in shared family spaces, the mother of the family had most control over how the "public face" of the family was configured. This included the allocation and usage of space among various family members, such as giving equal space and attention to the various children (as per the little girl's drawing of the family discussed earlier).

Much of the work of framing the family though appears to be done to present a public face for the family (not just the individual) to visitors, in essence to say, "This is the type of family we are." It would appear that such activities are part of the process of making a home a home. The spatial configuration of displayed items in places where visitors might be likely to encounter them shows that mothers often try to frame the family in some suitable way. We have already discussed the example of the family awash with children's pictures,

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[9]We use this term here reservedly for it is not necessarily always the mother of the family who is responsible for the curation of the home. In the households we examined, however, the task of organizing the home, including curatorial duties, was mainly taken on by mothers.

(*In reference to her kids' pictures*) "When they've done it I just throw it in the bin, I'm up to here with stuff, I don't know what the other mums are like."
(*In reference to ancestral artworks—see opposite*) "I mean maybe it's misplaced but, you do feel a certain pride that some relative of mine was able to paint that." – (Mother, Family 3)

Fig. 17. Relatives painting.

demonstrating to all who care to look the overwhelming importance of the children in their lives and their pride in what they produce. For another family we found the careful positioning of ancestral artworks:

Here then is the use of a living room as a "front region" [Goffman 1959]. The paintings are consciously chosen not just to remind the family of their historical links but also inevitably to define that they are a family of culture. The prominent display of stones from the "Holy Land" in the living room also helps to mark out the family's religious intentions. Of course it is important to point out here that objects in and of themselves do not necessarily do this face work on their own. They are vehicles for narrative excursions. Some objects will of course tell stories, but those stories will be determined by the viewer who brings their own assumption to the object. With the example in Figure 17 of the paintings in the home, there was a sense to the interviewer that these objects defined the family in question as being of a certain mindset or being desirous to present a certain image of social standing. This facet of the artifacts was not reflected however in the way the family chose to talk about them. For them it was as stated a way of showing how they might be cultured and a way of showing how their family members had been talented people for a number of generations. The point here is to note that much of the face work that is done by objects in front regions is managed through the performative accounts given of the objects by their owners and in part their placing in such locations is the facilitating precursor to these accounts.

The ability to present a family face was less evident in the digital realm. We found no examples of these practices of framing the family so evidently exploited in the physical world. It was reportedly uncommon for our participants to actively share digital artefacts such as photos and videos with those from outside of the home (an issue commonly discussed in previous studies of photoware [Crabtree et al. 2004, Frohlich et al. 2002]). Digital data, largely locked away inside a physical object (the PC), could of course be displayed in many ways. Screensavers and digital photo frames can cycle through family photo collections; family websites are also ways of constructing digital representations of the family which can be publicly shared. However, for whatever reasons, we saw little evidence of such practices in the households we studied. It is perhaps an interesting tension that in the digital world there is a much greater emphasis on personal experience rather than family

"Some of the things that are in there are things that they brought with them and I just thought that it was the right thing to do to keep them. They have no sentimental value to me but, and they probably won't even remember them, but the fact that they were theirs before they came here, sort of acknowledges that they had a life before they came here." – (Mother, Family 1)

Fig. 18.   Baby box.

experience. The internet, while conceived of as a space for community resources, still in some ways is primarily a vehicle for individual experience. We currently have little scope for enacting interfamily interactions through the internet which might support notions needing to present a family face and the consequent considerations for how this might be managed. Some current work is considering, however, how digital content might come to be included in the practices of framing the family in the physical home given a future which will be replete with multiple digital displays (for an extensive discussion see Durrant [2010]).

Fulfilling Duty. Another reason for archiving which emerged as a theme in the course of our fieldwork had to do with the drive to fulfil a sense of duty. In other words, we found that the motivation to archive can often be suffused with a sense of duty towards preserving artifacts for the sake of the household, for those whom one cares about, and sometimes even for no one in particular.

An interesting example is provided by one of our families who had adopted children. In this family, the children were adopted at an early age but nonetheless had items that came into the house with them, such as various toys. The mother of the family had diligently stored these items away when the children outgrew them and lost interest in them. Whereas she would normally have disposed of these unwanted items, she felt strongly that they held a special status and were not hers to do with as she wished. She felt that these objects represented a tangible link for the children between themselves and their former lives (despite the fact they had no memory of them), and knew that one day this link might have a renewed significance for the children (Figure 18).

Here then is a clear example of a mother archiving items of sentimental value. They were not of sentimental value to her, or currently, as it happened, to anybody. But she knew they would *become* items of sentimental value, in the future, for other people (namely her adopted children). This preservation of the past for her children is clearly archiving with a sense of duty.

In other cases, some of our participants were archiving aged documents of distant and deceased relatives. Having no personal attachment to these objects they felt the value was in their age and of their social commentary (Figure 19).

Consequently these items were carefully archived so as to protect them from the further ravages of time so that at some point, once a suitable recipient could

"This one is curious. It's not a beautiful photo- graph it's of historical interest I suppose and erm I probably wouldn't have put it out except for erm it came from my Father's and it was sort of lying around. I'm not quite sure what I'm going to do with it... I might actually give it to err the college, he was a professor in Trinity and I might possibly give it to Trinity. It's prob- ably the most interesting for an outsider but it doesn't have any special meaning for me." – (Father, Family 7)

Fig. 19.   Father's college photo.

be found (perhaps a museum or other willing repository of social history) they could be passed on for the future enjoyment of unknown others. Obviously this kind of preservation where one wishes to keep an object in pristine condition may in part be at odds with the added value that can be garnered from an observable degradation with age (as discussed in DeSilvey [2006]).

There was no evidence of a similar notion of archiving the items of another through a sense of obligation and duty amongst the digital artefacts we ob- served in the study. However, much as how physical objects can be bequeathed and the recipient feels obligated to keep them or perhaps keeps them to pass on to future generations who they think will perceive them sentimentally, the products of our digital lives are either little considered in this respect or we are too early into the digital revolution for this to be relevant. Certainly among our participants we had no cases of families being bequeathed digital data from a deceased relative or significant other; although it is evident that these kinds of issue will become more important in future years [see Kirk and Banks 2008, Odom et al. 2010].

Now beyond this sense in which fulfilling duty is concerned with preserving history for others and dealing with the remains of those who have passed on (especially those objects with which we feel no particular affect), there is another aspect we also observed. For many people (those responsible in family homes for the construction and maintenance of the family archive) there is a sense in which we understand that artifacts which might be important need to be dealt with in some meaningful way. We have previously observed this kind of value in our studies of photowork and videowork [Kirk et al. 2006, 2007], and it has been discussed in studies of clutter [Swan et al. 2008].[10]

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[10]Clutter as a discursive topic suggests notions of the uncategorized accumulation of ephemeral stuff often found in homes. We could have analyzed home archiving from such a perspective, because of the curious affinity we have found it has with contemporary approaches in HCI to the other forms of artifacts of memory that we have previously studied. Most research that has considered digital photographs and digital video has conceived of these media as being inherently problematic and their exponential growth and archival on home PCs inherently messy [Abowd et al. 2003; Rodden and Wood 2003]. Such media has been treated as clutter which must be minimized, ordered, and tagged so as to aid retrieval (and this does appear in many respects to be a Douglas-like [Douglas 1966] approach of treating the digital media files as "polluting" or "matter out of place"). What we have tried to do in our previous research is demonstrate the rich and even "artful" (after Taylor

"That's my filing cabinet in the house, cos I spend so much time in the kitchen that's how it's ended up in the kitchen, 90% of my waking time is spent in there....Since I'm in the kitchen so much I might try and snatch a bit of time for some admin work and so I might as well store it all together. I suppose some of the memorabilia stuff from school that kind of thing could have gone into the bedroom but there's just no room there." – (Mother, Family 3)

Fig. 20.   Filing cabinet.

Such feelings were clearly evident with the digital archived items, as we often found (in accordance with our previous work on photowork [Kirk et al. 2006]) that our participants had collections of digital photos in temporary storage. Items would be held in temporary folders before being sorted properly later on. In this way items of sentimental value, such as pictures from a holiday could be knowingly dealt with enough to make the owner feel that at least in an initial respect they had done their duty by them, in that they were safely stored for the present.

In the quotation in Figure 20 we can further see how parts of a family archive are stored in ways such that the person responsible knows that the item has been dealt with. Note that this is in some ways quite opposite to the way in which some objects are singled out and displayed. Here, they are dealt with by putting them away, and by putting them with other similar kinds of artefacts. A designated area (even temporary—but acknowledged as such) becomes the sanctuary for the to-be-preserved items. The change in status from general ephemera on a counter or a table or in a school bag to being in the "drawer for stuff we're keeping" fulfil a sense of duty that something should be done with the object.

Forgetting.   A final aspect of archiving practice, and another underlying motivation that is rarely considered, is the extent to which we archive items to forget them. In one conversation we had with a young couple, one woman mentioned letters she had received from her mother, which she still keeps, but which are painful to her (Figure 21).

Such practices were evident with digital artefacts too. We found evidence of emails kept (see interview excerpt in Section 4.1) and pictures stored that had upsetting or embarrassing connotations. These items were too important in a sense to discard, but at the same time they were stored in the deeper recesses of hierarchical file structures where they would be less frequently accessed.

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and Swan [2005]) ways in which people *actually* interact with their digital media, showing that it is demonstrably more organized and less problematic than researchers have assumed. While it would be easy to simplistically approach physical memorabilia as if it were inherently problematic like "clutter" (most readers will be familiar with the occasional feeling that we are burdened by our possessions) this would be antagonistic to the many years of study which have clearly highlighted the central importance of objects in the home to both the appropriation of space and people's emotional lives.

"Bits and pieces that I feel I shouldn't get rid of but don't want to look at, so I thought I would allow myself to have one box where these things would live, so that I would know I still had them....because I guess you'd feel guilty for throwing some things out, correspondence or bits of paper that might make you sad or bits of music that might make me think of a particular time...I don't necessarily want to engage with all of those memories." – (Female, Family 11)

Fig. 21. Box of bits.

Evidently, a purpose of an archive in the home can be to not just protect the contents but to protect the owner from the contents as well. It raises the question as to *why* objects such as these are not simply thrown away or gotten rid of. It would appear that in some instances, such as the letters we have discussed, there is a palpable sense in which the objects are constitutive of the person. In this case, they are deeply personal letters. While their contents might be embarrassing or painful, to destroy the objects would be to dishonor the memory, the experience or the sender that they signify. It may be then, that while engaging with such objects is difficult, destroying or discarding them would also be a step too far, perhaps causing a certain amount of guilt. Consequently then by archiving artefacts out of sight, and having fulfilled a sense of duty toward the associations bundled with the artifacts, they can be rendered such that they are no longer present in mind. In effect, through archiving, a person can engage in "ridding" themselves of objects [Gregson 2007] without the finality of discarding them. Such a process allows us an emotional reprieve from dealing with artifacts' content or connotations but at the same time isolates us from any guilt we might feel in disposing of the object. A related example that confirms this view was in a story told to us by one participant about an apple tart that her mother had made just before going into a home. This apple tart was retrieved from the mother's freezer and kept frozen in our participant's home. After the mother had died, the apple tart lived on frozen, but the participant could neither eat her dead mother's apple tart or get rid of it because that would have made her feel guilty. In the end she had to get her husband to dispose of it without telling her whilst she was out of the house. In this way the guilt was not hers.

We found no similar kinds of examples in the digital realm, where artefacts were kept but deliberately hidden. However, given the often emotive content of text messages and email, it would also come as no surprise if this does in fact occur.[11] At the very least, it suggests that this might be an interesting yet still emerging research theme as the role of electronic communications in our lives becomes ever more central.

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[11]Indeed initial research exploring more specifically the interrelationship between processes of bereavement and technology use has begun to uncover such cases [Odom et al. 2010].
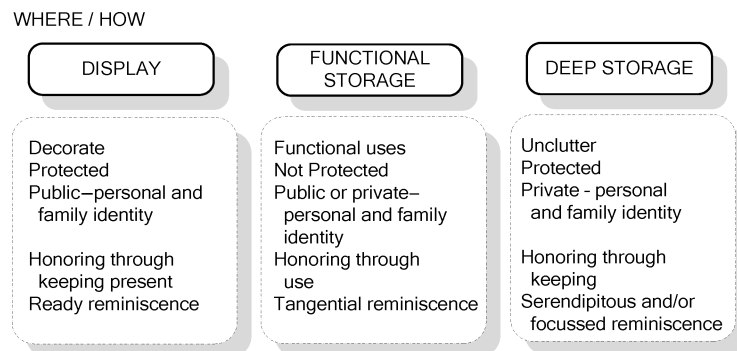
WHERE / HOW

DISPLAY	FUNCTIONAL STORAGE	DEEP STORAGE

Decorate
Protected
Public–personal and
  family identity
 	
Honoring through
  keeping present
Ready reminiscence
	Functional uses
	Not Protected
	Public or private–
	  personal and family
	  identity
	Honoring through
	  use
	Tangential reminiscence
		Unclutter
		Protected
		Private - personal
		  and family identity
		
		Honoring through
		  keeping
		Serendipitous and/or
		  focussed reminiscence

Fig. 22.   How objects were stored in the households.

"*F*: It's partly just that we wanted to starting filling up the walls a little bit when we got in here you know, wasn't it. But not with loads of pictures of people and things.....You go to those places and you just get the same poster that everybody else has got....so with those things....It's still quite nice that you've got something up there that's got a connection with people." – (Father, Family 4)

Fig. 23.   Decorative painting.

4.3 Understanding the Spatiality of Home Archiving

A final set of observations has to do with the ways in which objects were archived in the households we studied. We observed three broad categories of method of storage, which we refer to as *display*, *functional storage*, and *deep storage* (Figure 22). From our interviews and observations, it became apparent that how artefacts were placed throughout the home impacted how families related to them. For example, it was often the case that artefacts of shared family value were understood through storytelling around those objects. Here we saw that the ways in which artifacts were arranged, where they were placed in the home, how they were displayed or whether they were hidden, dictated how stories came to happen, or indeed whether they happened at all. More specifically, displayed objects were made consciously available, mentioned in passing or used as regular tools in conversational practices. Functionally stored objects were made associative through talk during enacted use of the object or simply through use itself. And deep storage items were the objects of focussed consideration only when they were pulled out of storage and rummaged through. We consider each of these three types of storage in more depth in this section.

Display. Artifacts on display served a variety of purposes and resonated with various values as discussed previously. In addition, we observed many cases of objects being on display to simply decorate spaces. This was often accomplished by using objects that also had sentimental value (Figure 23).

"When L came here he didn't have a work per-
mit, he was learning English, and he loves mod-
els, scale models and so he started making that
and so he made it, and it's not quite finished as
you can see... I'd quite like to get rid of it. But
he, you know, he made it. It's bloody big, lots of
people talk about it when they come in, but would
you really want a scene from World War Two in
your living room?" – (Mother, Family 5)

Fig. 24.   Home-made diorama.

Often, when displayed, these important objects were essentially protected as
well: paintings were frequently behind glass, or just "up high" and consequently
protected from knocks or other dangerous events. But more than this, through
display, objects draw attention to themselves, and, as we have shown earlier, in
doing so, they achieve many different purposes including framing the family,
defining the self, honoring others, and so on.

In some cases, the placement of an object or set of objects on display had
more subtle messages to convey, reflecting what can often be complex issues in
households. Take, for example, the case of one family where the living room was
somewhat dominated by a large vignette/diorama of WWII Russian soldiers,
made by the father in the household (Figure 24).

Really, this diorama was not a shared family artifact. Despite being in a fam-
ily room, it said much more about the father and his relationship to the family
than the family itself. For here the father in the house was in fact stepfather to
some of the children. He had also been unemployed while making the object. In
this case, it could be argued that by making space in the shared family room,
the mother was ensuring that her partner felt he had equal participation in
the family, especially at a time when he may have been striving for acceptance
in his new family and indeed new home, made all the harder by also being a
recent immigrant to the country.

In similar ways, artifacts on display acted to honor others by keeping them
present in the family, such as was frequently seen with the presence of various
photos of absent loved ones. In this respect the display of artefacts renders
them available for a form of interaction we could call "ready reminiscence." By
this we mean that because the artefacts are readily to hand, always present,
their associations with people or experiences need never be consciously *brought*
to mind as they, always being present, never really leave it.

In addition if one is to consider the display of collections it is apparent (espe-
cially given Gelber's [1999] analysis of hobbyist collectors) that for some forms
of archived material the very act of displaying the object is that which makes
it worthwhile in the first place. With collections, the display demonstrates
the quantity and the completeness of the collection [Brown and Sellen 2006],
which if Gelber [1999] is correct, offers the true value of the archive. Indeed
often when our families owned collections, we found them displayed. This was
certainly the case with the toy cars, cat portrait plates, and books shown in

Fig. 25.   Toy car collection.

Fig. 26.   Cat plates.

Fig. 27.   Edited books.

Fig. 28.   Magazine pile.

Figures 25–27 where there was a definite sense of identity associated with the objects and the display was prominently in the household living room. It was less evident when the participant was more embarrassed by the collection such as the pile of *Homes & Garden*–style magazines seen in Figure 28, kept hidden away in a back bedroom.

Of course the display of digitally archived items is often somewhat different. There are generally speaking fewer options for the situated display of digital artefacts. While our participants made some amends in this respect by using desktop wallpapers and screensavers on their PCs to display photos, none of our participants felt inclined to purchase a digital photo frame which might have allowed for more situated access.

Functional Storage. A different way of keeping important objects was not to protect and display them, but was to use them. These objects of sentiment had often existed as functional items before and were still regularly being used as such. The book of jams discussed earlier is one good example. Another involves the use of a ladle of handed down by another woman's grandmother (Figure 29).

"I have to admit when I see these things I am reminded of my grandma's kitchen and I used to sit there on the floor playing happily and she would prepare lunch, and I still have the smell in my nose, so this is very close to me." – (Mother, Family 9)

Fig. 29. Granny's ladle.

These kinds of objects were regularly observed to support either public or private demonstrations of family or personal identity. Their very nature as innocuous objects and the fact that they were routinely placed at points of functional use (such as by the stove in the kitchen, for example) meant that their meaning was kept ambiguous. They could either be placed as a way of visibly expressing something about oneself or one's family, perhaps emphasizing the role of cooking in one's family, but could also surreptitiously connect people to remote others without making this link explicit to those not in the know. As our participant detailed, the act of using the ladle was enough to make her feel closer to her deceased grandmother. In this way, then, it became apparent that this class of object, functionally stored, served to honor important associations through *use*. It therefore provided a different form of reminiscence, the tangential reminiscence in which memory is enacted surreptitiously through action. Through affinity with the object for some defined purpose the artifact triggers fond (or otherwise[12]) associative memories. Again, the capacity for achieving this kind of interaction with a digital object seems somewhat limited, and consequently we found limited evidence among our participants of the sentimental use of old digital tools. That being said, we did have one subject who retained an old laptop that he had had since school days which he still used on and off and for which he did feel sentimental attachment. The extent to which, however, this was due to digital aspects of the tool or just the physical form factor of the device (a decorated laptop) is somewhat unclear, although experiences of both might constitute a sentimental attachment.

Deep Storage. The final way objects were kept was in *deep storage*. These were the objects often boxed or otherwise put away, in many cases both out of sight and out of mind. In these places, many of our families had what amounted to "distilled" memory collections hidden in some space in the house. Often these items were associated with artefacts of private significance, such as the Bay City Rollers annual mentioned earlier, acknowledged to be only of interest or value to the mother of the family. Other times, they were of significance for the

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[12]Having said this it is evident that this form of tangential reminiscence if associated with memories of a negative connotation would be most unwelcome given that the memory is essentially stumbled over rather than approached directly as with the last class of spatiality we discuss: deep storage.

H: Well it's kind of like a surprise then, cos you're like tidy, tidy, tidy, doing my daily chores, 'Oh what's this? Oh yes it's the box. Aha it's the mix tape! We'll put that on.'
W: It's kind of like uncovering a time capsule I guess
H: Of a couple of years of your life. – (Husband, Wife, Family 2)

Fig. 30.   Stumbled across box.

whole family, such as the family photo collection piled into a storage chest or drawer.

The reasons for deep storage were diverse. For some, there was a drive to reduce clutter (see discussion earlier), which often happened when there was a sense of having to fulfil a duty in keeping the objects in question but not necessarily to the point where they should be displayed. In other cases, artifacts were stored away so as to protect them, with participants worrying that being out and available might lead to the objects being damaged (as discussed above with the documents of social history). And sometimes deep storage was used so that objects could be dealt with but rendered invisible, so that their emotive aspects need not be engaged with regularly (to aid in forgetting, as we have already discussed).

For this class of memory artifact the act of engaging with the memory becomes one of either focused or serendipitous reminiscence. The owner will either consciously think to go and seek the object so as to enjoy it again (activities such as going through old chests of photos being the obvious example), or having rendered the object out of sight and mind, will enjoy the occasional propensity for stumbling across it while engaged in some other activity (Figure 30).

This kind of serendipitous practice poses intriguing challenges for how it might be evoked in the digital world. Digital means in many respects seem ideal for these forms of deep storage. By their very nature, digital artefacts may be hidden away in any number of places, not having any "natural" form of embodiment. We observed many instances where old digital content and items of sentiment were stored away on various innocuous storage media, such as floppy disks, CDs, and hard drives in PCs, thus rendering them, in some ways, invisible. Much of this content was accessible only when there was an explicit intention for it to be retrieved. Because these materials are so deeply buried, and rendered so invisible, we may forget about them entirely. It suggests that there may be value in building in mechanisms where serendipitous discovery is more likely to occur.

A related and final point to make here is that deep storage refers to a concept rather than necessarily to a physical method of archiving objects. While it might be possible to conflate notions of storing personal objects with personal areas of the home, we think it more worthwhile to highlight how deep storage is actually enacted more conceptually than literally. Whilst the spatial rendering of an object *might* render it deeply stored, this is more fine grained than claiming that

"Those are photos of the baby that I lost before I had G that's why they're there, like, this is my safe place I know no one will touch it and nothing will go from this place." – (Mother, Family 6)

Fig. 31.   A safe shelf.

objects in the attic are far removed and therefore deeply stored. For example, one particularly evocative item was a mother's prenatal scans of a miscarried child. The placing of these pictures in an innocuous envelope on a small shelf, up high in the corner of a family room/kitchen was specifically done to keep the pictures out of reach of her inquisitive children (Figure 31).

Given that all areas of the house were considered to be fair game for exploration among the children, she had sensibly used the physical barrier of height to bar access and the visible location to promote assurance of safety. For her, it was important that this tangible link to a loved one remain unsullied by profane hands.

Here then we find an object of deep personal significance, which is related to painful and sad but otherwise important memories, which is conceptually deeply stored but located in a public and family room.[13] By the placement in an otherwise overlooked and innocuous corner of the room, the objects are rendered out of conscious attention for most who would glance past. It is this way in which an object of sentiment can be 'put away' and rendered unconscious.

5. DISCUSSION AND IMPLICATIONS FOR DESIGN

We have seen that there are many reasons why sentimental artefacts (whether they be physical, digital or hybrid objects) are kept in the home, and these reasons pertain to six key values that underpin archiving practice. Through these archived objects, which often form an integral part of the very fabric of our homes, we can celebrate our identities and achievements, show and honor our connections with significant others, connect with our past, help us construct an idea of the family, fulfill a sense of duty, and even forget the past. In achieving these goals, the placement of objects, how they are stumbled across or rummaged through, how they are shared or kept private, how they are collected or singled out and how they are left as human remains for others are all aspects which we have seen to be important. Here we have also seen that sometimes these treasured objects spark memories and create the opportunity for story telling about the past, but oftentimes they do not. To say that such objects are mementos in the sense of cues for reliving the past is to be too simplistic about the real diversity of value that these objects deliver.

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[13]Note that this contrasts with previous categorical distinctions between private space being for private object storage and public spaces being for public object storage (e.g., Petrelli et al. [2008]).

Furthermore, building on previous work in this space, we have sought to show how the practices of archiving are not solitary in the family home. The family home is a negotiated space and while one member might take a lead in maintaining the integrity of the home, the work that they do as part of this activity serves to define and support the social construction of the family, by for example giving equal time and space to various members of the household. This includes celebrating the achievements of various members, giving space where it is needed for self-expression but also delivering a public face for the family, and importantly connecting the people within the home as part of a wider social fabric. As Hendon [2000] claimed, the stratigraphy of storage in the home is therefore revealing of the social structures within it. Consequently any analysis of domestic autotopographies may be too isolating because it fails to take into account the social aspects of home archiving: the ways in which sentimental artifacts are shared within the home, and the ways in which mundane objects for one person become sacred objects for another through shifting circumstance.

5.1 Implications for the Design of Home Archiving Technology

When we turn our attention to digital technologies for home archiving, this study has reaffirmed the importance of considering the whole diversity of objects, both physical and digital, that people keep, collect and treasure. This suggests that if we truly understand the reasons why people archive, and the ways in which they do it, there might be compelling new design opportunities engendered by attending to this diversity. Digital technologies can do this in at least two ways:

—*Affordances of the digital*. It is worth initially considering what we see the benefits of digital storage to be. Evidently there are a diverse range of natural digital behaviours which facilitate such activities as the accurate indexing, cataloguing and retrieval of information, combined with the ability to edit content, append meta-data and to otherwise manipulate and move it through various means of sharing, alongside a significant reduction in the amount of physical space that is necessarily required for the storage of sentimental artefacts. Consequently, it is worth asking if a system designed to help capture, manage, share and keep safe digital materials could be expanded upon and enriched to incorporate aspects of the vast array of physical things that we may also keep and care about. In other words, when we look at our computers and think about existing tools for helping to manage and archive digital photographs and videos, we can begin to ask ourselves what a digital archiving system would look like if it took the diversity of other kinds of objects into account and tried to apply the strengths of digital archiving to a broader set of artefacts. How might this change the nature of physical artefacts such that they can be incorporated with the digital artefacts or be connected to them in richer ways?

—*Affordances of the physical*. A second approach is to consider the affordances of the physical and to understand the properties that this engenders and to explore how this might shape our experiences with digital objects. Amongst other things, such an approach would prompt us to consider the ways in

which digital objects might be displayed like the plethora of display practices observed with physical objects. Equally, the repurposing of physical objects over time might suggest designs for the repurposing of digital data, much in the way that antiques often move from a life of use to a life of decoration after significant time. Additionally, as physical objects age they degrade, but this fragility is often cherished, and the development of patina through use or neglect can add value to an object. Such affordances of the physical are not normally applied to our digital artefacts (after all—digital is supposed to be forever) but evidently such aspects of physicality might lead to intriguing redesigns of digital objects giving them new values.

In either case, we propose that the design process needs to take into account a deep understanding of the range of values that physical and digital objects deliver, and how the affordances of the objects themselves as well as the *ways* they are archived help to achieve these values. Building on these two sets of ideas and drawing on the findings from this study, we wish to focus on two potential approaches to the design of family archiving systems:

An Integrated Digital Archive. There are many obvious advantages to conceptualizing a home archiving system as a single, integrated digital database. Such a system can allow us to flexibly organize all of the materials that are important to us, to create new digital collections and associations within those materials, to search and browse through our digital objects in powerful ways, to share these objects through networked connections and to back-up and keep safe these important materials. Indeed the rising popularity of Web-based tools for managing, sharing, and storing photos and videos attest to people's desire for such centralized systems (often perhaps because of the inherent ease with which digital materials can be curated).

It is important however to emphasise here, that the invocation of a term like "Integrated Digital Archive" is not meant to conjure up thoughts of some monolithic device, a big virtual box as it were, in which all mementos are to be kept. What we wish to suggest is something more subtle and nuanced, and perhaps a new perspective on the value of what an integrated collections of artifacts (both physical and digital) might be for the home. If nothing else, the empirical work we present should suggest to the reader that a fundamental aspect of the archiving of cherished objects is the way in which they are enmeshed within, and constitutive of, the material fabric of the home. This itself suggests a heterogeneous distributed collection. But this is only when one is thinking from within the perspective of the home. The home taken as a whole can be conceptualized as an integrated archive. It is a distilled and socially shaped collection of artifacts (cherished or otherwise). Thinking at this broader level we can see advantages to enriching connections, between objects (physical and digital) within this space as a curated collection. Having some sense of integration, connection, and collection between heterogeneous elements of the home, such as disparate display devices or disparate distillations, collections and gatherings of artifacts and the content itself would allow greater flexibility in how artifacts can be meaningfully handled. An integrated database then becomes the connective (technological) tissue and one layer of this socio-material fabric of the home.

Thinking further on what things constitute the meaningful, cherished, artefacts of the home, the findings of this study also suggest that various kinds of digital materials, such as those stored in what we have called "hybrid" objects might also be valuably integrated with (as in given some connection to) existing material collections. For example, it suggests that people would value easy ways to capture and incorporate into this database the media stored on cassette tapes, CDs, and video tapes. We have also have seen how documents, email, and other kinds of digital materials can have sentimental value. In other work we have also seen that when people capture ambient audio recordings, these can become treasured objects too [Oleksik et al 2008]. We can speculate that in the future, home archives might well contain much more diverse kinds of digital content than they currently do, including a more diverse range of these materials suggests digital archives that might allow richer, more interesting collections of heterogeneous objects, not merely limiting them to photos and videos.

When it comes to physical objects, however, the findings of this study raise many different kinds of questions about how such objects could ever be represented in a digital world. We have seen that even paper-based objects can have important tangible qualities, hence our use of the term "2 $\frac{1}{2}$ D." Under what circumstances, then would a digital copy of that object be valued? Likewise, we have seen that other objects such as the cog from a motorcycle accident are made special by their very quintessence—by the fact that they are unique. Copying that object in any sense, even if that copy were high fidelity, then undermines the very value of the object. The issue of authenticity is well illustrated by the example of the mother who was torn by the need to draw over the lines on her daughter's artwork to preserve it, and the desire to retain its authenticity.

Physicality too has other important implications, as we have seen. For example, some of the objects in our study were valued because of their functional use. The ladle handed down from a grandmother was valued not just for the memory it sparked, but because it sparked that memory through use—something a digital copy could never achieve. Likewise, we saw that physical objects afforded display in public regions of the house, and a way to draw attention, invite conversation and to become a part of the physical fabric of the house in ways that digital objects did not. Physical objects naturally afford the kind of persistent but peripheral display that allows us to surround ourselves with the things that are meaningful to us.

There are many reasons, therefore, that we can never equate a digital copy of a physical object, no matter how veridical, with its original. This is not to say, however, that there is no potential value in digital copies of physical objects. The question is whether such digital copies could achieve some of the range of values we have seen in other ways, or even achieve *new* kinds of values by considering their incorporation into an integrated database.

The point here is that digital copies of physical objects become new and different objects, but they may still retain some of the value of the original. A copy of the pages of the "jam book" may not be as special as the real thing, but excerpts can now be linked to pictures of the grandmother, a collage created

perhaps of her writings, and other materials which shed light on her life. The digital copy does not replace the sacred object, but it may provide a resource to a digital system that allows new kinds of creativity with a wider range of materials. In this way a digital database which incorporates such objects allow us new ways to honour others, connect to a shared past, frame the family, and so on.

More than this, copies of physical objects may take on new value through being part of a larger collection enabled by the digital system. We have seen, for example, that children's artwork was sometimes framed and treasured, but other times was seen as a problem and conundrum because of the sheer amount that children produce. Scanned collections of artwork over time might become valued objects in themselves not because of their authenticity, but because the collection and the way the artwork can be seen to evolve over time becomes a new and compelling artifact in itself. The values expressed through physical objects, such as ways to fulfil one's duty as a parent, can be achieved in new ways with new objects through such a digital system.

Relatedly, for those objects which one wants to "deal with," a digital system may provide easier, clutter-free ways of doing this. Certainly in the case of wanting to keep things but to hide them, or for examples where we saw expressions of guilt or tension about ridding oneself of physical objects, a digital system might provide a middle ground for ways of keeping objects in new ways.

Finally, an obvious benefit of digital systems is that they provide other ways to back up and safeguard materials, even if those materials can never be as good as the originals. We may not choose to rid ourselves of cherished objects, but there may be times when they are lost or damaged beyond our control. We could argue in the sad case of the lost baby, for example, that a digital copy of the child's scan, if that became lost, would be better than nothing at all. Of course the digital is not infallible, and while it might be easy to imply that digital records last forever, we already know that this is not the case. As technology standards develop, file formats become obsolete, and this has already had significant impact in people's lives. However, the ability to design digital records to last, by considering the longevity and the design of digital file formats, is still present and obviously needs to be an issue of urgent consideration.

Considered broadly, all of this suggests that there may be a much richer landscape for digital systems if they begin to incorporate more diverse kinds of materials, whether these originate from other digital sources (such as email, documents, and ambient sound) or whether we begin to incorporate new ways of capturing aspects of physical objects to create amalgams and collections of materials. By attending to the various kinds of value that these materials deliver for people, we can begin to open up the design space for integrated digital archiving systems.

Physical Augmentation. Another perspective on design is, rather than considering how we might digitize new kinds of materials, we consider how to make the most of physical affordances. This study has highlighted how physicality is fundamental to many of the objects that are cherished.

The first observation to make, highlighted by the findings of this study, is the importance of stories. The objects that people showed us usually sparked a story about why the object was important, how it came to be, or why it was kept where it was. Furthermore, many such objects revealed, as we have discussed, how the meanings of objects and the stories associated with them can become part of a shared family history or can be quite different for different members of a household. This suggests that technology might play a role in capturing and associating stories or narratives with different physical objects (something that others have recognized before, such as the "Memory Box" concept [Frohlich and Murphy 2000]). There are many ways one can speculate that these stories might be shared. They might for example, be "stumbled across" in the functional use of a physical object. Imagine that using your grandmother's jam book or soup ladle occasionally plays back a story your mother told about your grandmother, that it plays a snippet of her voice, or that it causes pictures of your grandmother to be displayed on your digital picture frame. Making such an explicit connection between objects and their associations might be either disturbing or compelling. Perhaps more obvious though is the desire that we saw in our study of wanting to share or pass down stories across generations. Here, one could imagine recording stories about objects that could be stored or accessed through paper or RFID tags attached to the objects in question. These could be played back using various different kinds of readers, as others have suggested [Frohlich 2004]. These findings provide confirmation of the potential value of augmenting physical objects.

Another aspect of considering the important aspects of physicality is to consider how digital objects might take on some of the affordances of the physical world. For example, throughout our study we remarked on how digital objects tended to be hidden away, with the consequence that it was usually physical objects that were displayed in order to draw attention to oneself, honor others, frame the family, and so on. Although digital picture frames are increasingly available that might achieve the kind of situated display we saw with physical pictures, photos, and artwork, they did not figure in the homes we visited. Despite this fact, it seems plausible that in future, more diverse forms of digital display might find their way into people's homes in order to give digital objects a different status in the home: to draw attention to them, to elevate them, and to make them points of discussion. One can imagine not just digital picture frames, but different kinds of situated displays that might for example, provide a dedicated space for materials relating to certain events, specific people, or specific times and places. These objects would then take on a new kind of persistence and establish a physical and social space within the household. We have developed some concepts such as this in our own research group. For example, Shoebox is a concept which allows at once the digital storage of photos in a tangible box, with a display [Banks and Sellen 2009]. Different Shoeboxes might correspond to different events, like a wedding or a birthday, or belong to different people. HomeBook is another display for the home in which different regions of the display are owned by different members of the household. Each part of the display or "channel" then becomes a place where one can establish and frame one's own identity within the home. As it happens, in use,

HomeBook also becomes a place where storytelling is commonplace, as looking back through each channel forms the basis for a personal narrative (see Sellen et al. [2006] and discussion in Lindley et al. [2009]).

In addition to display, we also remarked on the various ways in which physical objects can be hidden or stored away out of sight. Some objects were kept in deep storage because they are highly personal; others because they are painful; and yet others because they are simply forgotten. It is interesting to speculate on how the design space for digital objects might be opened up by considering these aspects of the physical. First, it suggests that looser metaphors for storage, such as boxes as containers, might be more suitable for storing digital objects in the home than highly structured filing systems, such as is the norm in digital systems. Second, it was clear that people took often great delight in coming across collections of objects, or as one woman put it—time capsules— that they might stumble across accidentally. This suggests that exploring ways of enabling new kinds of serendipitous display for digital objects, otherwise buried deep in collections, would be compelling [Petrelli et al. 2009]. Of course, screen savers in a sense do this, but they tend not to be very rich, simply cycling through objects. It might be more interesting to be able to rummage through your heterogeneous digital collections in a more hands-on way. Equally, we can begin to think about ways in which digital materials might be compartmentalized in new ways, not simply in the sense of restricting access, but in ways that they can be bundled perhaps physically.

An obvious possibility here is the bundling of digital objects and the stories associated with them in a physical object that can be passed on almost like an heirloom, something we have written about elsewhere [Kirk and Banks 2008]. Building on this notion of heirlooms again raises the potential for taking from the physical notions of frailty and degradation or patina, issues which were raised throughout the fieldwork as people marvelled at objects they owned such as the old photographs where the very survival of the images through the ravages of time was seen as a mark of value. Turning the perceived value of the digital's lasting permanence on its head by offering digital files that gracefully degrade through use might then offer richer ways of interacting with the digital in line with the values of observed decay in curated spaces spoken about by DeSilvey [2006]. Overall however, as we amass more and more personal digital information, we will have to look for new technological solutions to deal with the inheritance of not only physical but also digital materials and have a concern for how these artifacts of sentimentality, these cherished objects should be treated to give them the significance and respect they deserve.

6. CONCLUSIONS

Through excavating the home archive this research has attempted to demonstrate that home environments and the archives of sentimental items that we keep are complex entities, perhaps more so than has been considered by previous designers of digital archiving and memory devices. More than just flicking through a repository of "memories," we interact with our home archives in distinct ways, showing different types of reminiscence and different motivations

for archiving at all. Ultimately this work demonstrates that more important than a focus on "remembering" and how that happens is a focus on human values, as it is those that truly underpin home archiving practices. In seeking to explore these values it has challenged notions of autotopography and their relevance for researching artefacts of memory in the domestic sphere and it has conversely highlighted the relevance of the social interaction of the home. Ultimately this article has provided suggestions for how we might design new and better archiving technologies and it has raised questions for future research which should help us to further understand how people orient to and relate to both physical and digital objects of importance in their lives.

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