Supporting a Sense of Connectedness: Meaningful Things in the Lives of New University Students

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ABSTRACT

We report findings from interviews with new undergraduate students, in which they identified particular items as supporting a sense of connectedness with home. We characterize ways in which artifacts underpinned a sense of connection, including by conveying the character of the parental home, supporting a sense of continuity with it, and enabling a physical presence to be maintained there. We then consider how simple affordances offered by these artifacts, such as being able to move, position and sort them, enabled participants to reinforce the meanings that were associated with them. Such actions are normally taken for granted, but we describe how they are compromised for social media especially, due to functional limitations and questions of ownership. We highlight design opportunities for making the transition from home more gradual, and supporting the archiving and display of social media.

Author Keywords

Cherished object, memento, virtual possession, ownership, residential mobility, transition, cloud, physical, digital.

ACM Classification Keywords

H.5.2. User Interfaces: User-centered design

INTRODUCTION

The importance of cherished objects is well recognized in HCI. Researchers have tried to understand how it is that objects come to be cherished, the roles they play within family life [11], and why it is that participants rarely highlight the digital when talking about their cherished possessions, despite an increasing abundance of digital mementos, including video, photos, and emails [20]. These studies tend to explore established 'family archives' [e.g. 11, 20, 21], but less is known about how these archives are formed and curated over time, or the events that prompt people to consciously shape them, discarding things once considered precious, and keeping others, in a reaffirmation of their status as important.

Yet there are clear trigger points that cause people to take

stock of their belongings and consciously engage with them. Transition points, such as moving, are an excellent example of this. These periods of transition create moments when people are forced to make decisions about what to bring with them, decisions that will shape the way that they can connect with the past, and continue to reminisce in the future. In this paper, we focus on a specific type of transition: that of moving away from home for the first time to go to university. The move to university is especially interesting because students often simultaneously maintain a space at home whilst creating a new space for themselves at university. This echoes social changes that also occur in the lives of students at this time. They may wish to balance the maintenance of ties with their childhood friends and family with the forging of a new identity for themselves in their new environment.

New university students are also an interesting group because they, generally speaking, belong to a generation of so-called 'digital natives'. While HCI researchers have struggled to get participants to identify the digital when pointing to things that are cherished, work with teenagers has revealed a more complex set of practices surrounding what Odom et al. [19] describe as 'virtual possessions'. These practices include making virtual possessions physical, for example by printing them, and combining media to create new, personalized digital artifacts. We might expect digital things to also fall under the rubric of cherished possessions for university students and, while virtual possessions are not subject to the same sort of constraints as physical things, the psychological and social nature of the transition to university may nevertheless prompt their curation. This may especially so for content on social network sites, which play an inherent role in interactions with (new) others.

In this paper, we report findings from interviews with ten new university students about their meaningful things after moving to a new hall of residence, placing particular emphasis on how these items support a sense of connectedness to home. We show how this was underpinned by a variety of artifacts, and consider how the affordances that they offered enabled participants to reinforce the meanings associated with them. We note that this was compromised with social media especially, which nevertheless served as a key source of content for our

participants. We suggest opportunities for design that relate to supporting the personal archiving and display of social media content, and a transition from home that is gradual.

RELATED WORK

Research on transitioning to university has explored how technologies play a role in supporting communication between college students and their parents as well as how new technologies might be designed to support a sense of connectedness to home. Chen and Katz [3] focus on the fundamental role that the mobile phone plays in supporting communication between college students and their parents, and Dey and de Guzman [6] highlight the importance of objects such as photographs and gifts, that can be peripherally displayed and that cue memories associated with friends and family. Smith et al. [25] illustrate a more complex relationship with home: in their research, the use of technologies by college freshmen was seen as mediating both closeness with, and independence from, parents. Smith et al.'s work in particular underlines how the nature of going to university entails something of a balance between staying connected and moving on. Yet, this circumstance is not unique to students. Shklovski et al.'s [23] research on residential mobility more generally suggests the need, initially at least, to keep in touch with a prior location, be this through following local news or checking the weather. Such practices not only support a sense of connectedness, but also serve as a social vehicle for conversations with friends who still live there. Shklovski et al.'s later work [24] examines in more detail how technology is implicated in keeping in touch following a residential move. They highlight the role of communications such as emails, which can be understood as both communication act and tangible good, and which serve as an unobtrusive reminder of a relationship as they persist in the inbox.

However, and as Shklovski et al. [23] note, an essential part of settling into a new home is overcoming the tension between the old and the new by leaving aspects of the old behind. Marcoux [13] has demonstrated how this tension is sometimes tackled head-on; the act of sorting through one's possessions can serve as a means to re-evaluate relationships and "reshuffle memories", enabling the opportunity to leave things behind. On the flip side of this, of course, possessions that survive a move and become integrated into new living spaces and practices can serve as a point of continuity with the past. Petrelli and Whittaker [20] argue that homes are designed to express and reinforce memories, with mementos being integrated into familiar spaces and everyday practices. Kirk and Sellen [11] build on this point, noting that the 'archiving' of cherished objects entails their being enmeshed in and constitutive of the material fabric of the home. They note that artifacts on display support a form of "ready reminiscence" by dint of their being continually present. In other cases, sentimental objects (such as a grandmother's ladle) are stored in such a way as to support functional use, while a third category of artifacts are placed in 'deep storage', where they might be

encountered serendipitously but otherwise need to be consciously sought out. Kirk and Sellen suggest that through being embedded in the home, objects play a role in defining the self, honoring those that are cared about, connecting with the past, framing the family, fulfilling duty, and enabling forgetting. Durrant et al. [7] also observe how the display of photos at home is curated to present a unifying image of family.

This integration of material objects in home life offers a contrast to the ways in which virtual possessions are stored and used. While family members in the studies described above could readily identify physical objects as sentimental or cherished, they found it difficult to do the same for their virtual possessions. Petrelli and Whittaker [20] suggest that the digital mementos that their participants did eventually identify, such as photos and communications, did not initially spring to mind because of the ways in which they are stored; they are simply not located in places where they are persistently encountered. Related to this, Petrelli et al. [21] note that the periodic sorting and distilling of personal belongings is important in sustaining a compact collection that one can meaningfully engage with, a process that is atypical with digital content [e.g. 14]. Additional reasons highlighted in various studies include that digital media is not really experienced as an 'object' [8], that it is perceived as transient and inexpressive [20], and that it conveys simple and representative meanings, rather than these being abstract and esoteric [21]. In an exploration of the attributes of physical and digital things, Banks [2] also notes that the former offer qualities such as uniqueness and the acquisition of patina, which are difficult to meaningfully replicate with digital materials.

Nevertheless, other researchers have argued that virtual possessions are valued artifacts. Indeed, Banks [2] also notes that digital artifacts have their own set of attributes, such as the ability to underpin serendipitous encounters, which offer opportunities for design, and Golsteijn et al. [8] highlight how the *crafting* of digital artifacts such as websites can add to their perceived value. Furthermore, work with teenagers has highlighted text messages as gifts that can embody memories, and has shown how practices develop around preserving those that are deemed particularly special [26]. In a more recent study, Odom et al. [19] demonstrate how some of the unique qualities of digital media, such as the accrual of metadata and the placelessness of data stored online, support a unique set of meanings and uses. Metadata was found to provide a platform for users to collaboratively and individually personalize digital media, as well as to link different types of content together. The collaborative tagging of and commenting upon Facebook photos was felt to create a more authentic representation of an event and to reinforce affiliations amongst friends, whilst the giving and receiving of musical playlists often incorporated modified metadata, such as photos instead of album artwork. The placelessness of content in the cloud also enabled teenagers to draw on

their virtual possessions across contexts. Interestingly though, they also amplified the material presence of their digital things, by keeping their computers, mobile phones and media devices always on and connected to their virtual collections, and in some cases by printing them out to create physical collages.

Odom et al.'s [19] findings illustrate how teenagers find ways to integrate their virtual possessions into their environments, whilst also highlighting the collaborative and essentially placeless nature of these artifacts. These qualities are of interest in the context of transitioning to university and maintaining a connection to home. Text messages, emails and social media might all be understood as virtual possessions that, as Shklovski et al. [24] note, serve as reminders of relationships but, more than that, might be consciously integrated into student bedrooms to underpin a sense of connectedness.

Yet the nature of content stored in the cloud has been found to have other implications for how virtual possessions are understood. Odom et al. [17] have argued that simple concepts such as that of 'possession' become weakened when one does not really know *where* one's content is. We might wonder if this sense of ownership might be compromised further by the collective quality of social media, yet Marshall and Shipman have demonstrated through surveys that people do feel they have the right to save and reuse photos [16] and tweets [15] that are shared online. Thus it seems that the ways in which people conceptualize these new types of 'virtual possession' are complex and perhaps even contradictory: a sense of ownership over one's own content is diluted, but also extended to embrace that which is generated by others.

RESEARCH AIMS

Given this mix of physical objects, virtual possessions stored on one's own devices, digital content in the cloud, and digital content posted online by others, we sought to explore how new university students would conceptualize their meaningful 'things' and, further, the ways in which these would support a sense of connectedness with home. We expected that, due to their recent transition to university, it would be important to new students to retain a sense of connectedness to home [3, 25], and that they would be sensitized to the notion of selecting and curating their belongings to support this. Indeed, if homes are understood to be curated [7], or even designed to reinforce memories [20], then we might expect new students to do something similar with the bedrooms that represent the first step in their transition from the parental home.

During our interviews, we focused especially on what attributes of these objects (both physical and digital) facilitated feelings of connection, and whether this was with the notion of home as a place, or with the people who live there. Our aim was to draw on these observations to underpin recommendations for design.

We also aimed to unpack the potential value of social metadata such as comments and tags, and to explore how issues of ownership come into play when considering cherished possessions. In particular, we wondered whether digital artifacts that have a collaborative quality (such as the Facebook photos described by Odom et al. [19]) would be valued differently to personal archives that are hosted online (such as webmail archives), and whether these in turn would take on different meanings to digital content that is stored on one's own personal devices and, perhaps, associated with a stronger sense of 'possession'. We anticipated that, like the teenagers that Odom et al. [19] describe, university students would have a range of meaningful virtual possessions, and that these might be stored or hosted in a number of places including the cloud and on social network sites. Indeed, we wondered whether the small amount of space allocated to students in halls of residence might lead to a greater emphasis on digital content when discussing their possessions.

In the following sections we describe how items identified by the participants supported a sense of connectedness, and how the different qualities of these things, being physical, digital, stored in the cloud, or hosted in shared spaces such as social network sites, affected the ways in which participants viewed them as meaningful. We begin by describing our approach in more detail.

METHOD

Participants

We recruited and interviewed ten first-year university students (five female, five male) within the first two months of their moving away from home for the first time (October of 2011). Participants were all between 18 and 21 years old. We selected for students who came from homes located at least 40 miles (~64 km) distant, and who did not personally own a vehicle. Due to the practicalities of the move, each participant had only been able to take a single carload of possessions with them to university, and therefore had to be selective about what they chose to bring. Participants were recruited through a combination of fliers and advertising in a weekly university email bulletin, and were compensated with a gift voucher to an online retailer for participation in the study. Each participant had a personal computer, and half of those computers had been purchased recently, specifically for university. All ten also had cell phones; three had two cell phones. Two had cameras, seven had iPods, and other digital devices that participants had brought with them to university included an iPad, a digital photo frame, a digivice, a Gameboy, and a Kindle. Additionally all participants regularly accessed their personal webmail and Facebook accounts.

Interviews

We conducted semi-structured interviews situated in the participants' personal bedrooms. The university where we conducted the interviews provides each first-year student with their own private room, so the bedroom spaces

consisted only of items the participants had brought, along with some university provided furniture.

The interview began with general questions about what participants had brought with them to university that was important to them and made them feel connected to home. Often this question prompted descriptions of physical objects, and so we also explicitly asked questions about digital items, both stored on computers and hosted in the cloud, to allow us to understand if, and if so, why (or why not) these other types of content were also seen as meaningful. We designed several of our questions based on those asked by Csikszentmihalyi and Rochberg-Halton [5] in their work on meaningful things, adapting them as needed to include digital objects. We were concerned that asking unaltered questions such as, "If the building were on fire what three items would you save?" might skew students towards considering only physical items, so we added additional questions that focused on purely digital content, such as, "If you could save only three digital things what would you save?" We also asked questions relating specifically to identifying objects both digital and physical which supported feelings of connectedness with home, such as "can you show me something on your computer that reminds you of home, family, or friends?" The interviews were audio recorded and transcribed. All objects were photographed at the end of each interview.

ANALYSIS
Transcripts of the interviews were analyzed using grounded theory techniques [4], so as to allow themes to emerge from the data in a bottom-up manner. This approach was adopted because of the broad nature of the research questions. Initial data analyses comprised of ascribing open codes before undertaking axial coding and developing higher-level categories. We did a first pass at this after conducting five interviews in order to inform the focus of the remaining data collection. After a further five interviews we undertook a second pass of coding, iterating the development of categories until we the judged that the major categories showed sufficient depth and breadth and we considered sufficient sampling to have occurred.

FINDINGS
In this section we first discuss the different ways in which the objects that participants identified underpinned a sense of connectedness with home. We then consider how the attributes of these things supported this sense of connection.

Supporting a Sense of Connectedness
The artifacts that participants pointed to supported a sense of connectedness with home for numerous reasons that resonate with prior work. They were, for example, previously owned by, created by, or received as gifts from, family and friends. We will not re-articulate these values here, focusing instead on the transition to university and how connectedness is supported in this context. We focus on five non-mutually exclusive themes: integrating representations of friends and family; conveying the unique character of home-life; supporting continuity with home; maintaining a sense of home *at* home; and visiting digital spaces to connect with home.

Integrating representations of friends and family
Our participants' bedrooms featured content that was carefully curated, and in some cases especially created, in order to integrate representations of friends and family from home into this new space. This was done by placing framed photos around the room to highlight particular individuals such as boyfriends and girlfriends, as well as by building larger collages to represent groups of friends and family. Where montages of printed photos were assembled, care was taken to include everyone, even if this meant including pictures that were less favored, as 7M describes:

"I was trying to kind of go through and work out which friends I wanted to be reminded of in particular. Went roughly on that and then I found there's some people like there just aren't any photos of them that I have, so I kind of, that's why some of the photos are just massive group ones."

Similarly, where participants had brought with them a selection of their belongings, such as only a fraction of their books, they had been careful to include those that represented friends and family. For example, 2F kept a book that had been written by a friend with a small collection of others that she had brought with her:

".. it's a novel that a friend of mine wrote, and I love the friend dearly, but it's a terrible novel, it's really awful, but I love the person so it's there."

Although 2F did not enjoy reading the book, she kept it with others that were important to her, a collection that also included a copy of Shakespeare that had been owned by her mother and grandfather, and a first edition copy of an Oscar Wilde book gifted from a boyfriend. Through grouping these together, she was able to emphasize their significance. This type of enmeshing is easier with physical objects, although participants did do something similar with digital content when creating collages. Here photos printed from friends' Facebook pages were combined with those printed from the participants' own collections, and with older photos from the family film camera.

In rare cases, content was displayed in its digital format. This was mainly achieved by setting computer desktop wallpaper to display a particular photo. Like the framed photos we saw, these were often of a significant other rather than representing a scrolling collection or a randomly generated slideshow. In contrast, the only digital photo frame that we encountered in the study, which would have offered a slideshow experience, was switched off.

In summary, the ways in which artifacts were integrated into participants' bedrooms was undertaken to highlight relationships with boyfriends and girlfriends, to group together friends and family and to encompass objects that connected the participants with others into more general

collections of meaningful objects. This integration supported a sense of connectedness with home.

Conveying the unique character of home-life
While artifacts identified in the previous section were notable for their associations with people, be these particular individuals or entire groups of friends, other objects were notable for the ways in which they highlighted the qualities of home-life more generally, and its idiosyncrasies in particular. These often reflected in-jokes that were associated with family or particular groups of close friends, meanings that could not be understood by others. Nevertheless, these objects were often prominently displayed. As an example, 4F described how a pipe (see Figure 1) that was positioned by her window represented "*a running joke I had with my dad about how I'd like to be a gent*" (4F). The pipe supports the telling of a humorous tale that highlights something of the character of 4F and ties this to her relationship with her family (4F being a woman who wishes to be a pipe-smoking English gentleman). Other items on display also had the potential to support this type of storytelling, for example 3F described how a printed copy of a digitally-drawn picture of herself and her closest friends, which was pinned to her notice board, incorporated various in-jokes that only made sense to them, and M8 pointed out a glass vase that made him feel connected to his parents:

"*Um, you see that glass thing there? That's sort of what I suppose that's um an example of a habit my parents have. I really like going and looking around charity shops and car boot sales and stuff, um and that's sort of a habit they have. I actually unashamedly enjoy doing that with them so that was something I got here.*"

Such objects enable participants to reveal (or choose not to reveal) aspects of their character to new-found friends. In this way they can serve as social vehicles for conveying how identity is bound up with home.

Figure 1. Objects highlighted by participants: a pipe, baskets taken from home, and a photo frame with hidden mementos.

Supporting continuity with home
Another value associated with objects that supported a sense of connectedness with home was bound up with continuity. These artifacts had either been part of the home environment, or somehow echoed aspects of that space. These objects might be practical or precious, and cherished for themselves or appreciated for the practices they enabled. For example, 4F described how she had had the opportunity

to buy new items for her room at university but had decided to bring her existing storage baskets instead:

"*.. originally I was thinking maybe I should just leave them at home, and then just get new stuff, but then I thought it was quite nice just to have a little bit of continuity, and I knew they'd look good. It's quite nice as well just to have some bits from your old room, sort of scattered about so it's not a completely separate place.*"

Practical objects of this type had not been brought primarily for reasons of nostalgia or sentiment, but nonetheless were noted for supporting connectedness through their use. 4F also described how a dressing gown she had brought to university simply because did not have one of her own, and chiefly appreciated because she now found herself using a communal bathroom, also had more subtle qualities that reminded her of home:

"*.. she [my mother] was sort of saying before I left you know you have to have a proper dressing gown and I was like naw don't worry I'll just sort of put on a jumper, but she was like no have a dressing gown […] it also has a slight smell of one of her perfumes which actually I didn't realize 'til I got here and I was like, Oh!*"

Such everyday items often supported feelings of connectedness in addition to fulfilling immediate needs. In other cases, objects were brought to university purely out of sentiment. 3F commented upon a stuffed toy seal that provided a sense of connection with her life at home:

"*[seal is] a constant factor that has been there for my whole life. And that's quite nice when you've like moved somewhere completely new with completely new people, and then it's just like one thing constant, that I can always like hug and pretend like I'm at home still, which is nice occasionally.*"

In 3F's case her stuffed seal represented a bridge between her new life and her old. The continuity with home that seal provided was a welcome comfort as she adjusted to living away from her family for the first time.

Finally, a sense of continuity with home was underpinned by objects that were duplicates of, or otherwise mirrored, those at home. When 1F described a wedding portrait of her parents that was positioned in her room, she also noted that "*we have a larger one at home on the shelf*". Similarly, 2F had a decorative bird shaped candleholder that was twinned with another "*at home hanging in the window*".

Maintaining a sense of home at *home*
A fourth value that emerged relates not so much to the bringing of belongings to university, but the leaving of them behind. By not bringing every meaningful item with them, students were able to maintain a sense that their space at home was intact, to be returned to. Most participants still retained their childhood bedroom, and did not want to empty this of their possessions, as stated by 4F:

"I wanted to leave like a fair amount of stuff at home just to um so that my room didn't look too bare when I got back".

Home was also seen as a safe place for precious possessions. Several participants described items that they chose to leave behind out of fear of loss or damage to them:

".. for my 18th I got like a photo album of my last kind of 18 years that I left at home purposely […] cos it's valuable to me and it would probably be safer at home" (10M).

By keeping these meaningful items at home students were able to protect them, whilst also retaining a presence in their home space while they were away.

Visiting digital spaces to connect with home

As a final point, some participants spoke about practices that involved visiting websites and social network sites or perusing digital archives in order to feel connected with home, friends and family.

The visiting of websites associated with home was often a newly developed practice, which centered around previous schools, sports teams and other groups participants had belonged to. 3F described how she visited various websites that reminded her of home:

"I sort of go on my old school and sixth form website and see what's happening there sometimes. Which is quite nice, sort of stalk them a little bit."

In other cases, participants described how they revisited old text messages or reminisced by visiting Facebook:

"I do go back [on Facebook] and look at old photos and yeah sometimes, I don't know just for no particular reason really" (1F).

Unlike visits to the websites, this type of activity tended to be something that participants would get sidetracked into after going to Facebook to chat with friends, check for notifications and read recent news feeds. Similarly, the perusal of old text messages was something that participants engaged in while killing time or got sucked into during the larger activity of sorting out their inboxes. For our sample, reminiscing through Facebook seemed to be encouraged by a now retired Facebook feature, which highlighted old photos and conversations in the side bar, increasing the likelihood that users would encounter older content.

In discussing the advantages of socially networked content, participants noted that the comments attributed to photos posted on Facebook could enhance their meaningfulness:

"I think it's more just like people's character coming through, so you, cos they're quite chatty, so, it gives the photos a bit more life I suppose" (6F).

Further, this type of content was also noted for supporting a very strong sense of connection by providing a platform for

joint action. 1F described how she and her friends from home would comment on the same Facebook photos:

"I like it, and then, I mean I know I'm not the only person that does this, you get notifications from friends on photos from like three years ago leaving some soppy comment, and that's cool and then everyone goes back, and everyone is looking at all their old photos at the same time, and that's nice, it's like you're having a mass reunion even though you're all really far away from each other."

The experience of interacting around an old photo enabled joint reminiscing, offering the experience of being in the same place, at the same time, together.

Nevertheless, comments and metadata were not always perceived as a reliable way of identifying meaningful content online. 3F noted that no metadata could "*reference the enjoyment I got out of it*", and 1F noted how online content often failed to depict her own "*emotional*" reactions to content. Thus, while commenting provided a vehicle for social interaction and thus could convey the character of others, it was not seen as accurately capturing one's own feelings towards digital content.

In summary, digital spaces were implicated in new practices that enabled participants to feel connected to home. Unlike in the prior themes, the artifacts highlighted by our participants here were valued for the exploration they supported; participants became immersed in reading text messages, or got sidetracked into looking at Facebook photos and, occasionally, into conversing around them.

Reinforcing the Meaning of Things

Having described how artifacts, both digital and physical, were found to support a sense of connectedness with home, we now analyze in more detail how the meanings associated with them were reinforced through their material qualities and the actions that they consequently permitted.

We focus in particular on how participants were able to interact with these artifacts because, while it is true to say that some of the objects identified were highlighted because of some inherent quality, such as the lingering scent of a mother's perfume on a dressing gown, in most cases their meanings were intrinsically linked to the choices that participants made and the actions they took in relation to them. This difference was perhaps most evident when we looked at participants' descriptions of photos, a medium that existed prominently in both the physical and digital realm. In many cases, printed photos identified by participants as important were also available in digital format, either stored locally or on social network sites. However, when asked about meaningful content stored digitally, these same photos were never highlighted (indeed, participants found it difficult to pinpoint any photos that they particularly valued within their digital archives). We use this example to highlight how, while the image is the same, the affordances that these digital and physical photos offer clearly had implications for how they were able to

underpin a sense of connectedness to home. In what follows, we highlight three themes that relate to attributes of artifacts identified by participants, and consider how these were important in reinforcing the meanings they were associated with.

Moving and choosing

The first set of actions we wish to highlight in this paper relate to being able to move artifacts from one place to another. For example, as we have already seen, participants left objects at home as a means of maintaining a physical presence there, selected items that represented their friends and family for their new bedrooms, and included artifacts that echoed or otherwise represented continuity with home.

This sense of *moving* things from one space to another was largely lacking for digital things, and only in cases where digital media had been carefully embodied was there a sense that it had been deliberately placed in a particular location. For example, 1F described how she left her USB sticks containing precious digital media at home, encased in a cardboard box that was taped shut. However, this type of example was very rare in our data. In general participants brought all of their digital content with them, copying indiscriminately from the family computer if they had recently acquired a new laptop (half of our sample owned new computers). Further, this duplication of digital content was not seen as echoing other spaces in the same way that duplicates of physical things were, and while maintaining a physical space at home was important, maintaining a digital presence at home was simply not reflected upon. Indeed, participants often had very little idea of what digital content they had stored in different places, either locally or remote, or how content was duplicated across these locations.

Rather, going to university was found to encourage participants to *create* new artifacts, such as collages, out of digital media. For example, the printed photo montages that participants pointed out had often been downloaded from Facebook or copied from the family computer. Instead of necessitating the choosing of which digital artifacts to bring to university, the transition seemed to trigger the crafting of virtual-made-material displays.

Positioning and grouping

Of course, moving things from one location to another was only one aspect of how objects were acted upon. Their specific positioning within the participants' bedrooms, be that apart from others, or as part of an important collection (such as in the case of the "terrible" novel), was also essential in reinforcing the meanings associated with them. For example, 5M described a framed photo that his long-distance girlfriend had given to him before he left for university (see Figure 1):

"It's a picture of us and inside there are some um, things that remind me of the things that we have done together. Disney World, airplane ticket to Miami, things like that."

The frame was designed so that only the photo was visible to an observer, whilst hidden inside was a selection of mementos. The singular status of this photo frame was made evident through it being set apart from other things, an emphasis that was also lent to desktop wallpapers that featured images of significant others or depicted special occasions, such as a picture of a picnic with a boyfriend:

"That (current desktop photo) was the night before I left, we went out and had a night-time picnic on the cliffs" (2F).

The positioning of collages was also done mindfully, in order to separate out different types of relationship and to support encounters with them. For example, 6F had two notice boards in her room featuring photos printed from her digital collection, one focusing on family and one on friends. The family board was prioritized in terms of its location "*cos you know, I probably miss them more*" (see Figure 2). 7M also described how he positioned his photos above his desk in order to support encounters with them:

"…I put them there so it was like the ones that I really wanted up. […] I just look at them and kind of smile […] If I've been working a lot all day and you just turn, it kind of reminds you that you're not always working".
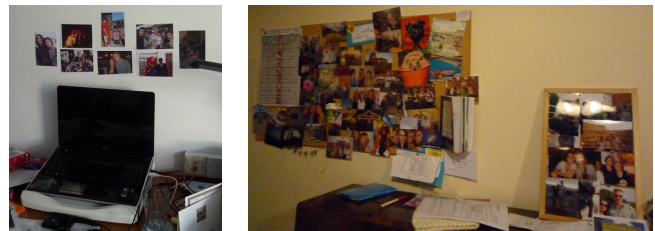

Figure 2. Favorite photos positioned above desk; Photos of family placed on a separate board in a more central location.

When asked about meaningful content on their laptops or on Facebook, neither of these participants mentioned these same images. In contrast, the printed versions had had their meaningfulness reinforced from the context of the room, where they had been organized into collections and made glanceable from specific viewpoints.

Sorting, gathering and deleting

In contrast to artifacts that were brought to university from home, participants also had to manage assemblies of digital content that continued to grow and require managing after the move. These included inboxes of emails and text messages, and content hosted on social network sites. These archives were spaces that participants could visit, explore and get sucked into as a way of feeling connected to home.

That these archives underpinned this type of exploration was related to the ways in which they were managed. For example, 1F told us, "*I don't save all my old texts, just the ones I like*", and 9M put every email from his parents in the same webmail folder:

"I'm kind of making a family archive, sort of every email I get from my parents or whatever so I can remember it. So that sort of reminds me of home."

These approaches are very different: while 1F maintains a small, selective collection of text messages that she wants to keep, 9M creates a resource of every single email he receives from his family. Indeed, he noted how he adopts a similar strategy with his new phone:

"on my old phone I did delete every text after, pretty much after I'd read it, […] whereas my new phone I've kept all my texts cos it does it in sort of a conversationy thing, with bubbles and stuff. I don't think I'd want to delete them cos it's sort of memories and stuff."

Here the structure of the data affects the perceived value of the messages. 9M's webmail allowed him to create structure, while his old phone neither provided by default, nor supported the creation of, a structure for his texts.

In addition to these personal archives, content hosted on social network sites was also noted for supporting a sense of connectedness. However, websites like Facebook were not generally seen as hosting content that could be managed and curated, and this was the case even when that content was one's own. Put simply, participants did not feel fully in control of the content that they and their friends posted online. Some of the reasons for this were straightforward; for example, participants noted the difficulty of being able to 'keep' content that is not really their own:

"I guess it makes it, you know, more difficult for me to keep them cause since they are not my pictures they can always get deleted from one day to the other" (5M).

But in other cases the reasoning was more subtle. Participants described how what they posted and what they removed was done with a wider view to the social nature of Facebook. They described how they would post content to *"elicit a conversation"* (2M), and then *"just delete it .. if it doesn't have very many 'likes'"* (1F). Further, they were sometimes explicitly asked to remove content because it was, for example, deemed unflattering: *"they'll be like oh please take it down it's not nice"* (4F).

The social quality of Facebook meant that photos were posted for social ends and edited with regard to the views of others, rather than to emphasize one's own set of meanings. Consequently and, as noted earlier, participants felt that there was little on the site in terms of comments or metadata to illustrate which images were most enjoyable *to them*, or had triggered emotional reactions *for themselves*. Instead the collection was seen as *"pretty generic"* and *"nice to have"* (4F) rather than essential to keep. This is particularly striking, given that only two of our participants owned their own cameras, and only a further two knew how to download photos off their camera phones. Thus despite this ambivalence, Facebook represented a primary source of photos. As 7M commented about his printed photos:

"they're virtually all from Facebook, um there's a couple that are actually from like my [family's] camera or someone else's camera where I got an email and I copied, but at least three quarters are from Facebook".

DISCUSSION

In this paper we have considered how physical and digital artifacts support a sense of connectedness with home for new university students, and have reflected on how the affordances they offer enable the meanings associated with them to be reinforced through action. In the discussion, we consider opportunities for the design of technologies to support connectedness for new students, before considering whether our findings can generalize beyond this group.

Opportunities for Design

Our findings suggest a number of opportunities for design, including creating archives that can be browsed and explored [20], designing digital materials that can be persistently encountered [20] and kept in 'functional' storage [11] rather than hidden away in computers, enabling digital 'gifts' [8] and supporting happy coincidences [1] through interactions around content. Some of our observations suggest ways in which these might be realized, for example, the now-retired Facebook feature that enabled 'mass reunions' around old photos was a good example of how digital media can be more persistently encountered, and in doing so, support interactions with old friends. In general though, these findings resonate with prior work. Therefore, in this section we focus on three opportunities that relate to supporting connectedness in the circumstance of transitioning to university, and where the predominance of social media means that virtual possessions are often collectively, rather than personally, owned.

Integrating the digital into physical space

Physical artifacts were an important part of making the transition to university; they supported the notion that participants still had a place at the parental home, allowed this presence to be gradually withdrawn, reinforced the idea of home as a safe place, and allowed for a sense of continuity with it. Opportunities for the design of technology include supporting ways of storing digital content that can be prominently displayed (a good example here is George Guo's hard disk robot [9]), so that it can be integrated into the fabric of both old and new locations. Content stored on such devices would, of course, need to be deeply secure, and this could be reinforced if it could only be accessed from certain locations, for example one's bedroom at home and one's bedroom at university. The notion of twinning locations also suggests a second possibility. Location-sensitive desktop wallpapers might be displayed only in one's bedroom, be this either at university or at home. Both suggestions could underpin a sense of continuity, emphasizing a connection across the two spaces.

Curation of archives that are collectively owned

Curation was a way of reinforcing the meanings of digital materials, be this by maintaining small selective archives of

text messages, or by developing webmail folders to emphasize the importance of certain relationships. Yet the curation of digital materials is notoriously difficult [14], and we found it to be especially complex when it comes to content hosted on social network sites. This complexity has both technical and social elements. Firstly, content hosted on social network sites spans users. Thus the collection of photos that one is tagged in, or that one can browse, is unlikely to be the same as that which one has rights to edit. Secondly and importantly, even if the technical means were available for users to edit photos within this collection, the social nature of the site makes it difficult for them to do so. Indeed, we found that participants did not feel in control of their *own* content because of the implications that editing it had for others. This extends prior work on the concept of ownership, suggesting that while users do feel able to *download* and reuse social media [16], they do not feel a real sense that they can do with it as they will while it is hosted *online*. Further, their sense of control is not only compromised by a lack of certainty regarding *where* content is [17], but more strongly by the simple fact that it is hosted in a space where their actions have implications for others.

This suggests an opportunity for social network sites to provide a means for users to privately 'archive' this collective content. Enabling a way of doing this that is not disclosed to the wider network is essential if such an archive is not to become compromised by concerns over self-presentation and the management of social relationships. Further, users would only be likely to invest in such a feature if there was no risk that content would then be withdrawn; such a feature would only be compelling if it enabled one to 'keep' content through the process of 'archiving' it. Implicated here is the management of digital rights to images posted online, and who can do what with them. Actions such as tagging may offer a natural way for users to extend permissions to specific others, enabling them to copy or even 'keep' content.

Creating digital displays that acknowledge provenance
Golsteijn et al. [8] suggest craft as a means of making digital objects more cherishable, and here we found that the move to university was a significant motivator for the creation of new artifacts out of digital materials. Furthermore, these materials were often owned by others, many having been printed off from Facebook. Making the provenance of these materials visible could be one way of supporting connectedness, in the same way that physical artifacts previously owned by others, such as the dressing gown and copy of Shakespeare, underpinned this. This suggests an opportunity for the creation of dynamic photo displays that acknowledge origin whilst also supporting personalization.

In designing for such displays we could draw inspiration from ancient Chinese art, where in addition to the artist leaving his seal on the painting, prominent owners would leave their own seal and add additional colophons,

recording their thoughts about the piece in beautiful calligraphy [12]. Similarly, digital materials could be designed to become more unique through making their provenance visible whilst also allowing them to be tailored by the person who crafts their display. Such displays could be created using e-paper, and could show favorite photos along with visual indicators that show the heritage of the photo, such as an image of who the photo was taken by. This kind of digital patina can complement other existing sources of digital personalization, such as photo comments on a social network, and digital photo filters such as those provided by services like Instagram [10], allowing for the creation of unique digital objects that hold their own value.

Limitations and Future Work

Our decision to interview first year university students for this study was taken because we expected them to be sensitive to the process of choosing which items to bring to university to help them feel connected to home. Additionally, we expected them to have a wealth of virtual possessions, thus supporting a discussion about valued digital things. The advantages of using such a sample can be balanced against the limitations, as follows.

Firstly, our findings offered insights into the importance of maintaining a space at the parental home when transitioning to university. This is a unique circumstance that does not typically generalize to residential mobility, where people leave a location behind. Nevertheless, it does suggest possibilities for future work. One group worth exploring further may be children of divorced parents. Prior research [18] has indicated how the shift from living in one parental home to residing across two might be eased by the integration of personal things into new spaces. Our own findings raise questions regarding whether supporting presence in absence could also be valued, and how this can be achieved through virtual possessions, which are known to be meaningful for teenagers in particular [19].

Secondly, our participants were interesting because of the type of digital content that they owned or had access to. Only two owned cameras and, while all ten had a camera phone, only two could easily extract photos from them. Instead photos were taken from social network sites and family computers. The fact that many of our participants did not own their own cameras, or relied on photos posted online by others, is not out of kilter with other work (see e.g. [7, 27]), and offers an interesting contrast to prior work on cherished objects that has largely focused on parents and their own content [11, 20, 21]. We believe our findings point to the importance of an emerging issue, that of being able to archive content that is 'collectively' owned and hosted on social network sites.

CONCLUSION

We have reported findings from an in-bedroom interview study conducted with first year undergraduate students within two months of moving away from home for the first time. Participants derived a sense of connectedness with

home through displaying and interacting with a variety of artifacts, including those that represented others, conveyed the character of home-life, and supported a sense of continuity with home. Further, while physical items allowed participants to maintain a presence at their parental home, digital spaces became the focus of new practices. We consider how the affordances offered by these artifacts enabled participants to reinforce the meanings associated with them, and note that this was compromised for social media especially. A first set of reasons for this were technical, in that there is a lack of functionality for storing and organizing social media, especially when this has been uploaded by someone else. A second set of reasons were social, because any actions taken in relation to social media are performed in a public space, and thus have ramifications for others, as well as possibly triggering or influencing interactions with them. Opportunities for design include providing a means for the personal archiving and display of social media content. We believe that the current requirement to download and print off social media content in order to make it one's 'own' could be improved upon by providing new possibilities for interacting with it both online and through the creation of new digital displays. Doing so could result in artifacts that encompass values currently associated with either digital or physical media, but not with both.

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REFERENCES

1. Ashkanasy, S., Benda, P. and Vetere, F. Happy coincidences in designing for social connectedness and play through opportunistic image capture. In *Proc. DUX 2007*, Article 4.

2. Banks, R. 2011. *The Future of Looking Back*. Microsoft Press, Redmond.

3. Chen, Y.-F. and Katz, J.E. 2009. Extending family to school life: college students' use of the mobile phone. *Int. J. Human-Computer Studies 67*, 179-191.

4. Corbin, J. and Strauss, A. 2008. *Basics of Qualitative Research (3rd ed)*. Sage Publications, London.

5. Csikszentmihalyi, M., and Rochberg-Halton, E. 1981. *The Meaning of Things*. Cambridge University Press, Cambridge.

6. Dey, A.K. and de Guzman, E. 2006. From awareness to connectedness: The design and deployment of presence displays. In *Proc. CHI 2006*, 899-908.

7. Durrant, A., Frohlich, D., Sellen, A. and Lyons, E. Home curation versus teenage photography: Photo displays in the family home. *Int. J. Human-Computer Studies 67*, 12, 1005-1023.

8. Golsteijn, C, van den Hoven, E., Frohlich, D. and Sellen, A. 2011. Towards a more cherishable digital object. In *Proc. DIS 2012*, 655-664.

9. Guo, G. Hard disk robot. CGHub. http://cghub.com/images/view/90512/

10. Instagram. http://instagram.com/

11. Kirk, D., and Sellen, A. 2010. On human remains: values and practice in the home archiving of cherished objects. *ACM Trans. Comput.-Hum. Interact. 17*, 1-43.

12. Lee, S. 1964. *A History of Far Eastern Art*. Abrams, New York.

13. Marcoux, J.-S. The refurbishment of memory. In D. Miller (Ed.), *Home possessions*, 2001. Berg, Oxford.

14. Marshall, C.C. How people manage digital information over a lifetime. In W. Jones and J. Teevan (Eds.), *Personal Information Management*, 2007. University of Washington Press, Seattle.

15. Marshall, C.C. and Shipman, F.M. 2011. Social media ownership: using Twitter as a window onto current attitudes and beliefs. In *Proc. CHI 2011*, 1081-1090.

16. Marshall, C.C. and Shipman, F.M. 2011. The ownership and reuse of visual media. In *Proc. JCDL 2011*, 157-166.

17. Odom, W., Sellen, A., Harper, R. and Thereska, E. 2012. Lost in translation: understanding the possession of digital things in the cloud. In *Proc. CHI 2012*, 781-790.

18. Odom, W., Zimmerman, J. and Forlizzi, J. 2010. Designing for dynamic family structures: Divorced families and interactive systems. In *Proc. DIS 2010*, 151-160.

19. Odom, W., Zimmerman, J. and Forlizzi, J. 2011. Teenagers and their virtual possessions: design opportunities and issues. In *Proc. 2011*, 1491-1500.

20. Petrelli, D. and Whittaker, S. 2010. Family memories in the home: contrasting physical and digital mementos. *Pers. Ubiquit. Comput. 14*, 153-169.

21. Petrelli, D., Whittaker, S., and Brockmeier, J. 2008. AutoTopography: What can physical mementos tell us about digital memories? In *Proc. CHI 2008*, 53-62.

22. Reid, J., Hull, R., Cater, K., & Fleuriot, C. (2005). Magic moments in situated mediascapes. In *Proc. ACE 2005*, 290-293.

23. Shklovski, I.A. and Mainwaring, S.D. 2005. Exploring technology adoption and use through the lens of residential mobility. In *Proc. CHI 2005*, 621-630.

24. Shklovski, I., Kraut, R. and Cummings, J. 2008. Keeping in touch by technology: Maintaining friendships after a residential move. In *Proc. CHI 2008*, 807-816.

25. Smith, M.E., Nguyen, D.T., Lai, C., Leshed, G. and Baumer, E.P.S. Going to college and staying connected: Communication between college freshmen and their parents. In *Proc. CSCW 2012*, 789-798.

26. Taylor, A. and Harper, R. 2003. The gift of the gab? A design oriented sociology of young people's use of mobiles. *Computer Supported Cooperative Work 12*, 3, 367-396.

27. Van House, N.A. Collocated photo sharing, story-telling, and the performance of self. *International Journal of Human-Computer Studies 67*, 12, 1073-1086.