Virtual Possessions

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ABSTRACT

For more than forty years, researchers have detailed how people develop attachments to their material possessions as they create and evolve a sense of self. Over the past several years people have increasingly acquired *virtual possessions*. These include both possessions that are losing their material integrity (books, photos, music, movies) as well as things that have never had material form (e.g. email archives, social networking profiles, personal behavior logs). However, little is known about how people perceive, value, and form attachments to their virtual possessions. To investigate, we conducted a study with teens exploring their virtual possessions. Preliminary findings reveal three key themes and suggest emerging interaction design opportunities for new forms for people's virtual things.

ACM Classification Keywords

H.5.2 Information interfaces and presentation: Prototyping

Keywords

Virtual Possessions, Cloud Computing, Interactive Systems

INTRODUCTION

For more than forty years, consumer behavior researchers have investigated the significance of people's material possessions [6]. This research maps how people develop attachments to their material possessions as they create and evolve a sense of self. For the last several years, people have increasingly acquired, created and interacted with *virtual possessions*. These new possessions have two origins. First, they include material things that continue to lose their lasting material form, including books, music, movies, photos, plane tickets, paychecks, money, etc.. Second, they include new things that have never had a lasting material form. Examples include avatars from different games and online services; electronic messages including email, SMS, and status updates; social networking profiles; logs of personal behavior such as purchase histories, visited locations from services such as brightkite.com, and a listing of activities such as jogging routes from MapMyRun.com; etc.

While research on archiving of sentimental digital objects is very recently emerging [e.g. 4], to date practically no research in the Interaction Design (IxD) community has investigated how people perceive, value, and form attachments to their virtual possessions. Yet, escalating growth of social computing systems and applications as well as the strong trend across cloud and mobile computing to make access to virtual possessions increasingly ubiquitous, point to IxD opportunities around systems that help people find value in their virtual possessions.

To investigate this emerging design space, we conducted in depth interviews with 18 teens to explore what kinds of virtual things they use and the ways in which value is perceived to manifest in virtual things. Initial findings point to design opportunities around: *expressive storage of virtual possessions*; *developing access privileges for dynamic presentations of self;* and *leveraging movement between material and virtual places*. In this paper, we first provide a background on work related to this emerging area. We then describe our study and detail select findings, each of which is accompanied by design opportunities. We conclude with a discussion on implications for future work.

BACKGROUND

Studies of material possessions in the home describe attachment as a result from meaning-making that emerges from possessions as they are integrated into one's life and help to form idealized future goals [3; 6]. Consumer behavior researchers have been concerned with the processes through which people develop a deep love for their possessions. In this context, meaningful attachment emerges through the process of self-extension, where people attribute important aspects of their self to the persons, places, things and events symbolized by their possessions [1]. Through interactions with possessions over time and in the presence of other social groups and environments, people develop a reflective sense of self and establish deeper relationships with their things [1].

People also develop attachments to the places they inhabit; the home typically signifies the deepest place of attachment [3]. For teenagers the strongest attachment is most often their bedroom [2]. Here, teens surround themselves with precious possessions, representing a material infrastructure where they can experiment with their identity through their display of self to their parents and friends [1]. One important activity for teens is access and display of media such as music, movies, celebrities, etc., as a way of authoring their space and communicating values and desires [7].

With the emergence of the Internet, people (and the teenage population in particular [5]) have begun to create digital selves. Social network sites enable people to create

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personal online places where they can project, design, reflect on and reformulate experimental selves [8]. With these new modes of self-expression comes production of new kinds of virtual possessions, reflecting key elements of the past as well as future idealized goals. More generally, it is clear teens have emerged as rapid adopters of technology and are growing up in a time when possessions are increasingly virtual [5].

METHOD

We conducted a field study with the goal of revealing IxD opportunities in the design space of virtual possessions. We recruited 18 teens and tweens from a mid-sized city in the United States. Participants' ages ranged from 12-16; 7 female and 11 male. We chose this group for three reasons: first, they are deeply occupied with the process of constructing their identities [1]; second, they are heavily engaged in digital media, online communication and use of interactive technologies [5]; and third, they are on the vanguard of social and cloud computing, embracing these emerging technologies and actively defining the behavior of these products and services [5].

Semi–structured interviews were conducted in participants' bedrooms and lasted 1.5 to 2 hours. We selected bedrooms in order to better observe their attachments to and relationships with physical possessions, and to provide a basis of comparison to their virtual possessions. Interviews aimed to develop a better understanding of everyday lives, common activities, technology usage trends and cherished physical and virtual possessions. We paid particular attention to how participants access, engage with and organize their virtual and material possessions. For example, we would typically ask participants to give us a tour of their material possessions both stored and on display in their bedroom and to describe their relationships with these artifacts. This was typically followed by a tour of participants' virtual possessions, where we observed virtual artifacts on their personal computer, phone, music player, etc.

We videotaped the interviews and took field notes, capturing reflections of the individual interviewers. In a process modeled on Strauss [10]. Collectively, the team reviewed field notes and video, and drew out underlying themes and relationships. In addition, we created affinity diagrams using sticky notes to find unexpected connections across participants.

FINDINGS

Interviews and observations in children's bedrooms revealed a range of material possessions valued as deeply significant. A sample of these included: photographs of family and friends, artifacts created by other friends (e.g. photo collages), self-made artifacts (e.g. blown glass), mementos owing to various trips, and objects symbolic of personal achievement (e.g. framed academic or sporting awards). These possessions were nearly always on display in bedrooms, and were commonly only used in that room.

When conversations turned to digital artifacts, it was clear our participants were comfortable, frequent users of technology. All participants had access to computers (either shared within home or personal access). Additionally, all but one of our participants owned a mobile phone and/or a media player, which emerged as a common device through which virtual possessions were accessed, made and managed. Discussions with participants revealed diverse collections of virtual possessions. A sample of these kinds of things included: several years worth of homework assignments, blog entries, data from social networking systems (e.g. status messages, chat logs, posts, comments), archived SMS messages, self-made and commercially produced digital video, various self-made digital artworks, and expansive archives of digital music (often with accompanying digital artwork). Digital photos also emerged as a major category of virtual possessions, which could roughly be broken down into three categories: images of family, friends and social events (e.g. vacations, school events), photographic artwork, and photographs specifically taken to document material possessions (which were typically uploaded online). In what follows, we describe several instances taken from our observations, which we feel capture the core themes emerging across our interviews with respect to how virtual possessions were accessed, managed and valued, as well as the opportunities they suggest for design.

Expressive storage of virtual possessions

We observed that participants stored things locally on and across personal and shared computers, mobile phones, digital cameras, media players (e.g. iPods) and, to a lesser extent, thumb drives and other forms of physical media (e.g. DVDs and CDs). Participants communicated an overarching desire for their virtual possessions to be immediately accessible in and outside of the bedroom. Nonetheless, constraining virtual possessions to specific devices often complicated this goal and, as a result, nearly all of our participants exhibited a strong trend toward storing virtual possessions on and across cloud computing servers, which was perceived as a safe and unlimited form of storage. This was particularly salient in instances in which participants were asked to describe their management strategies. While most participants had previously used some sort of folder-based scheme to organize their virtual things on local physical storage (mostly computer hard drives), all reported storing many of their virtual possessions in the cloud, often immediately and through the use of several services. For example, photos were uploaded to Facebook directly, often without placing them on a local hard drive. The majority of our participants had 1-4 years worth of photos stored online through social networking services. Collectively, these findings suggest several design opportunities. For example, participants' desire to ubiquitously access and contribute new virtual possessions to particular online places with varying levels of privacy suggest there is a need to design mobile technology that makes it easier to directly upload

content to a more diversified range of cloud computing services. We also found that despite our population's age, they are amassing deeply significant and private virtual possessions. As archives expand, this suggests opportunities for considering how the safety and location of this content could be conveyed as well as demarcated from perhaps more trivial possessions as these systems of storage and the range of social meanings expansively grow. Emerging work in this area can emphasize richer cultivation of key selections of treasured digital belongings over capture of all data encountered across one's digital life [9].

We also found different types of virtual possessions take on new qualities when stored in the cloud over time. Possessions like archives of homework and diary entries tended to persist unchanged and were rarely revisited, while possessions such as photos stored in online places accrued new value through comments and other social attributions. One opportunity this suggests is designing interactive systems that more expressively illustrate the ongoing social histories and patina accrued by these virtual possessions. It appears that enabling people to view the total elements of these archives in relation to each other could support rich reflection on past experiences. We imagine there are opportunities for extending these behaviors both through in-site cloud computing applications and persistent domestic appliances.

Access privileges and dynamic presentations of self

The ways in which material possessions are displayed and organized in teenagers' bedrooms play significant roles in identity construction and their evolving sense of self. The presentation of trophies, photo collages of friends, and posters of popular culture icons shape teens' perceptions of who they are and who they might become. The bedroom represents a key environment teens can exert control over and experiment with their identity. For example, one of our participants had an equestrian theme permeating her room, where many of her possessions depicted or related to riding horses. However, she had recently lost interest in horses and had since made plans to redecorate her room in a more 'mature' way.

Additionally, many participants customized mobile phone, media player, and computer display backgrounds. Images depicted on backgrounds ranged from photos of friends and family members to popular culture icons or physical artifacts symbolic of favorite hobbies. Unlike material possessions, virtual possessions populating backgrounds changed frequently (from weekly to several times a day), potentially suggesting that the flexibility of digital media may generally offer opportunities to quickly experiment with shifting taste and preferences.

The types of possessions participants presented and used in the bedroom appeared to shift depending on who was present. When peers were present, possessions relating to popular culture, such as music, magazines, and movies were often consumed and discussed. In the presence of parents, possessions symbolic of personal achievement (e.g. framed awards on wall) or photos and mementos owing to familial events were typically interacted with. While the bedroom was a key site for identity experimentation, it at times conflicted with the broader moral structure of the home. For example, several participants remarked being unable to display posters or artworks considered by their parents to conflict with family rules and values.

Interestingly, personal pages on social networking sites appeared to represent the first places in which participants had total control over expressing and curating their identity. It became apparent across our interviews that through the presentation of virtual possessions in these online places, participants were experimenting with crafting and presenting multiple selves to different audiences. Privacy settings were changed to demarcate only certain types of possessions as viewable to certain audiences online. For example, several participants reflected on how making their status messages and specific groups of photos accessible only to friends (e.g. as opposed to parents) shaped the content they included in their status and the ways in which photos were framed and described. At the same time, information public to everyone (e.g. parents, family, etc.) was shaped to reflect more mundane facts perceived to be safely communicable to anyone. In nearly all of our interviews, problems had arisen for participants when possessions reflecting aspects of their lives they intended to share with only a specific group were publicly projected to everyone in their network (e.g. a family member viewing a photo only socially appropriate when shared with another peer). This resulted in participants untagging themselves from photos or, in some cases, permanently destroying them.

These insights highlight how the management of virtual possessions in online places offers key opportunities for supporting creative experimentation with one's sense of self. In particular, the ability to attribute access privileges to specific virtual possessions affords them with a unique quality to be drawn in relation and presented to particular audiences, ultimately enabling owners to express multiple selves. Current tools that people use to manage online privacy rites are deeply underdeveloped. This suggests major design opportunities around designing systems that enable end users to create multiple displays of their self to be delivered to different audiences, which is far beyond the current model of managing permissions. This could lead to more complex and expressive assemblies of virtual possessions that, in turn, project more socially appropriate and meaningful aspects of self to particular audiences. Such a system could take on greater significance as notions of one's self expands and evolves over time.

Movement between material and virtual places

A key factor differentiating virtual possessions from material ones was a lack of enduring physical presence. One way participants compensated for this was by keeping

their computers and mobile phones always on, logged into, and updating social networking media streams. This embedded a persistent, accessible presentation of virtual possessions among other bedroom artifacts. Their efforts revealed a desire to break down the barrier between the physical and virtual worlds or possibly a belief that no barrier actually exists.

Limitations such as battery life, screen size, shared use, and other technical issues complicated these efforts. We also encountered instances in which participants had integrated virtual possessions within their bedroom by printing and displaying them. For example, we observed several participants had printed out treasured photographs from Facebook, at times constructing entire wall collages of images originally stored online. We also encountered a case in which a participant had saved an archive of her friends' status messages and chat logs in a word document, and made printed phrases and conversations present in her bedroom. These *virtual-made-material* possessions often served as focal points for conversation and collective reminisce over shared experiences when in the presence of other friends in the bedroom.

Conversely, participants also described using mobile phones and cameras to make digital copies of material possessions. These material things were typically constrained to the bedroom. When virtualized, they often accrued new value through socially constructed narratives emerging around them. Examples of *material-made-virtual* possessions included trophies, artifacts associated with a favorite hobby or self-made artworks. For example, one participant described uploading digital copies of material photographs to Facebook. Over time, his friends had left comments and annotations about the experiences occupying the places depicted in the photos, and, more broadly, social recognition of this artistic endeavor. These interactions jointly inscribed a meaningful and unique social record of metadata into this collection of now virtual possessions.

These instances suggest key insights into how value emerges as possessions move between material and virtual places. On one hand, the materialization and presence of virtual possessions such as textual chat logs, mundane status updates and photos opened a space to support collective reminisce on life stories and experiences. On the other hand, we found teens were deeply attached to their online places, and the projection of material-made-virtual possessions were inscribed with new socially constructed value over time. These instances all seem to suggest that there are much larger opportunities for designing interactive systems to amplify the material presence of virtual possessions in ways more rich, enduring and dynamic than through the temporary appearance on a computer or mobile phone screen; and more expressively support the collaborative inscription of socially constructed narratives to archives of virtual possessions as their meaning and value grows over time.

CONCLUSION & FUTURE WORK

In this paper, we described fieldwork exploring how teens value and form attachments to their virtual possessions. We found there is a growing drive among this population to increase the accessibility and amplify the presence of their virtual things. We also found teens increasingly managing virtual possessions to express and explore multiple selves in online places. These findings suggested a series of design opportunities: expressive storage of virtual possessions; developing access privileges for dynamic presentations of self; and leveraging movement between material and virtual places. In future work, we plan to develop prototypes based on these opportunity areas to critically explore future systems aimed at engaging people with their virtual possessions in more valuable, and ultimately meaningful, ways.

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