

Reciprocity, Deep Storage, and Letting Go: Opportunities for Designing Interactions with Inherited Digital Materials

William Odom

Carnegie Mellon University | wodom@cs.cmu.edu

Richard Banks

Microsoft Research | rbanks@microsoft.com

Dave Kirk

University of Nottingham | dsk@cs.nott.ac.uk

We are seeing a vast proliferation of self-generated content on the Internet. From ever-expanding online photo archives to mundane records of everyday life through tweets, blog posts, and status updates, new forms of digital content that people find deeply meaningful and may want to pass down one day are being created. On the one hand, digital suggests possibilities of permanence and new modes of presence and expression for these kinds of materials. On the other, it brings into question what we would want to preserve and who should make those decisions. These issues come at a time when we are moving beyond the point at which digital content is constrained to a particular generation, raising further issues about how the digital residue of a person's life could become the property of someone else and be representative of a person after they have passed on.

Despite these shifts, little is being done to consider the means

by which our digital remains will persist after we are gone. For example, deceased users' social networking Web pages typically persist after their passing, often without measures in place to appropriately handle this content [1]. In general there are few mechanisms to enable people to pass digital content to loved ones, whether stored locally or in the cloud. These technological trends compel interaction designers to consider how digital possessions and archives will be handled as we begin to consider the implications of their persistence beyond the lives of the original owners.

How will we be remembered in the future? Will the digital objects we leave behind ultimately be used for reflecting on the past? Who will decide how they are treated and what forms they might take? To begin to explore these questions, we conducted interviews with people who had recently inherited physical and digital belongings from

a loved one, with an eye toward key tensions that emerged in and through these exchanges. We found that people's experiences highlighted some important concerns for the design community as we collectively begin to consider designing interactions with digital materials over much longer periods of time [2].

Designing for Experiences of Reciprocity Across Exchanges

A series of complications emerged for people during the reception—and subsequent maintenance—of digital materials from the departed. One of the most pervasive problems centered on people being unable to make sense of large collections of inherited digital data. While bequeathed physical objects were generally regarded as manageable, the vast amount of unfiltered content on even a single digital device often raised troubling concerns. In some cases, participants inadvertently stumbled upon content not

[1] Recently, Facebook has included a "memorial" feature for users' homepages. Nonetheless, many problems remain, such as users being reminded to "reconnect" with deceased friends. See Ortulay, B. "Facebook to Memorialize Deceased User Profiles." *The Globe and Mail*, 27 October 2009; <http://www.theglobeandmail.com/news/technology/facebook-to-memorialize-deceased-user-profiles/article1339899/>

[2] For a more in-depth description of findings from our field research, see: Odom, W. Harper, R., Sellen, A., Kirk, D., and Banks, R. "Passing On and Putting to Rest: Understanding Bereavement in the Context of Interactive Technologies." 1831–1840. In *Proc. of CHI '10*. New York: ACM Press, 2010.

► Storing digital artifacts can go beyond flash drives and cloud computing; this archival cabinet is a manifestation of the physical and digital worlds we straddle. The dual-sided cabinet contains 16 drawers for physical objects on one side and 16 corresponding engraved patterns on the other. The pattern, which is a unique universal barcode, is linked to digital materials that are accessible when interfaced with a camera phone or computer. The digital content can be modified online, which doesn't affect the engraved pattern.



intended for them when navigating through expansive, idiosyncratically structured archives. In other instances, people spoke of being in a state of paralysis, ambivalent over how to approach excavating hard-drive content that was meaningful to them and unsure of how their loved one's residual digital detritus should be handled. In all cases,

participants felt a heavy obligation to deal with these digital remains, remaining burdened as they attempted to craft some sense of meaning and resolution.

While storage increasingly becomes cheaper and personal collections of digital possessions continue to grow, there seems to be value in exploring how people might pass down smaller

selections of content intended for a particular audience, as opposed to handing over the entire contents of one's digital life [3]. One potential opportunity involves designing better applications across local storage and Internet services that would support people in demarcating significant digital possessions from the trivial, ultimately in

[3] This design direction is suggested by recent work critiquing the dominant view of life logging. See Sellen, A. and Whittaker, S. "Beyond Total Capture: A Constructive Critique of Lifelogging." *Communications of the ACM* 53, 5 (2010).

the service of collating meaningful digital materials over time. Another area of concern lies in designing interactive systems that can deliver this kind of content to receivers in more elegant and expressive ways. On the one hand, there are clear opportunities for designing interactive tool sets for attributing rich annotations to sentimental materials in anticipation of their inheritance. On the other, we can imagine a new space of interactions opening up for the receiver that would make sense of this kind of collection and perhaps inscribe another layer of value onto the memories and legacy it signifies. Moreover, designing an engaging space for loved ones to construct shared value from their digital inheritance might relieve the sense of burden and invoke the social relationships implicated in these materials in much more appropriate and satisfying ways.

Designing Interactions with Possessions in Deep Storage

The diverse ways in which people managed relationships with departed loved ones were often reflected in how they stored and presented physical and digital possessions in their homes. In some cases, people possessed objects that remained troubling, such as posthumously received handwritten letters or collections of digital documents and photos that the departed had arranged to be passed on after their death. Whether concealing physical objects in a desk drawer or burying digital files deep within the directory structure, great care was taken to both preserve and hide away these possessions. Despite their troubling qualities, these things remained signifi-

cant, and it was crucial for owners to know their location and be assured of their safety, even though the materials were hidden out of sight. However, there was no readily accessible way for people to explicitly differentiate these digital possessions from other content within the system.

More generally, people populated their homes with physical artifacts they had been bequeathed (e.g., photo albums, clocks, various trinkets). These kinds of things could be drawn on when someone needed to reflect on the departed's life; at the same time, they could easily be put away or fade naturally into the background. The relatively unobtrusive and emergent reflective qualities of these possessions were significant in that there was a sense of honoring the departed merely by maintaining their presence in the home and at times attending to them on their own terms. Here again, digital materials were quite different in that current modes of interaction and presentation of digital content required people to make the effort to find, open up, and view materials that had been passed down, which complicated the discreet yet accessible properties of remembrance.

These instances collectively suggest several opportunities for designing richer experiences around the preservation and presence of inherited digital possessions in everyday life. Regarding modes of storage, one end of the spectrum suggests exploring opportunities around preserving the digital locally within a container, which holds formats universally accessible so long as the power supply is

intact. As advances in transitive materials [4] increasingly blur the material distinction between the physical and the digital, the surfaces and form factors of these "deep storage" artifacts could be augmented to convey presence and secure the preservation of deeply sensitive content to owners in subtle yet expressive ways. As these objects transition across families and generations, there are abundant opportunities for exploring how metadata characterizing these exchanges might be captured and represented, and how the presence of the objects themselves gives rise to new narratives associated with the contents they embody.

At the other end of the spectrum, cloud-computing services offer opportunities to enable vast groups of people with access to digital archives across locations and devices.

While the transition of sensitive content online brings up issues of ownership, trust, and privacy, there nonetheless are key opportunities in designing interactive systems that could enable collective reminiscence and reflection on a person's life. In contrast to physical artifacts from the departed becoming fragmented across surviving loved one's homes, meaningful digital materials could be collated within centralized online spaces as a basis for personal or public commemoration of a person's life. There appears to be great possibility for designing interactive applications and appliances aimed at expanding how these socially constructed portraits could evolve over time with new entries to become shared, enduring records of the departed's legacy.

[4] Coelho, M. et al. 2009. "Programming Reality: From Transitive Materials to Organic User Interfaces." 4759–4762. In *Proc. of CHI '09*. New York: ACM Press, 2009.

Designing to Support Rituals of Letting Go

Maintaining ownership of possessions left behind by departed loved ones was a clear way in which legacies persisted in the present. However, we observed several cases in which letting go of key inherited materials played highly significant roles for people in terms of honoring the departed and putting core aspects of relationships with them to rest. These rituals took on diverse forms, both physical and digital. A particularly compelling example centered on a statue sculpted by a participant's late wife. While inside the widower's home, it showed significant signs of weathering and decomposition. He described the degraded nature of the statue as resulting from his choice to move it outside, where it would begin to fade away, eventually finding “its final resting place.” It was clear that his choice to slowly let this possession go meaningfully reflected the shifting nature of his relationship with his departed wife.

We also encountered many instances of people retaining archives of emails or text messages received prior to a loved one's passing, which highlighted both momentous and mundane experience with the departed; in several cases they were incorporated into rituals of remembrance and letting go. For example, one participant described being in possession of several hundred email messages from his wife, which had been downloaded locally onto his desktop. He described reflecting on the emails from time to time, and eventually beginning to delete the messages as a way of honor-

ing his wife by moving on with his own life. However, in contrast to the nuanced form of transition illustrated in the decaying statue, the digital afforded only a crude binary representation—existence or deletion.

In contrast to the increasing movement to archive all information we produce or interact with, these instances suggest opportunities for designing interactions with digital content aimed at supporting elegant forms of interment. Whether through the gradual decay or growth of tangible patina, the physical realm appeared to support more expressive ways in which rituals of “putting to rest” were recognized and enacted. This brings up several interesting questions and opportunities for interaction designers. How might the passage of time be represented in ritualized archives of digital objects? How would we design for experiences of deletion over time? What qualities and attributes might support interactions with decaying digital objects? And how could increasingly fleeting interactions with these kinds of digital materials better support rituals of remembrance and tribute?

Conclusion

As we continue to accumulate rich archives of digital possessions reflective of our lives and our loved ones, the interaction design community must begin to ask what will become of these collections in the future. This brings up issues regarding the forms in which sentimental digital possessions could be made more present in our everyday lives, the design choices that might lead to their acquiring new

value over time, and how file formats and data structures will be preserved to support enduring legacies [5]. We highlighted a few of what will be many emerging opportunities for interaction designers to develop new ways in which digital materials signifying our most meaningful social relationships might persist, evolve—and perhaps fade away—alongside us, now and into the future.

[5] These directions collectively suggest clear concerns over the ethical treatment of content over time and across owners; very recently, HCI researchers have begun to articulate the imperative to approach the design of information systems with multiple life spans in mind. For example, see Friedman, B. and Nathan, L. “Multi-Lifespan Information System Design: A Research Initiative for the HCI Community,” 2243–2246 In *Proc. of CHI '10*. New York: ACM Press, 2010.



ABOUT THE AUTHORS

William Odom is a Ph.D. student in the Human-Computer Interaction Institute at Carnegie Mellon University. With a background spanning anthropology, design, and informatics, he is interested in exploring what it might mean to design and live with more enduring technologies in contexts of everyday life. He was a Fulbright Scholar at the Queensland College of Art in Brisbane, Australia, and has an M.S. in interaction design from Indiana University. He can be reached at willoom.com



Richard Banks is a senior interaction designer at Microsoft Research in Cambridge, UK. A graduate of the Royal College of Art in London, Banks spent a decade working on the interface design of a broad set of Microsoft's products before joining the research division in 2006. Since then he has collaborated closely with Richard Harper and Abigail Sellen in the Socio-Digital Systems group, developing a wide variety of insights and solutions surrounding technology use in the home.



David Kirk is a lecturer of HCI in the Mixed Reality Lab at the University of Nottingham. A psychologist by background, he has researched user practices of archiving and storage of both digital and physical artifacts in the home, in particular the social practices surrounding photos. He is currently extending this research to explore the design, ethics, and human values of “technology heirlooms” designed to outlive their owners that become imbued with sentiment and reminiscent value.