RESEARCH FROM THE SOCIO-DIGITAL SYSTEMS GROUP THAT MIGHT BE USEFUL IF YOU WORK ON PRODUCTS WHERE PEOPLE KEEP THINGS.

04
ISSUE

THINGS WE'VE LEARNT ABOUT

Digital Possessions

CONTENTS

CHAPTER 1 | TO HAVE AND TO HOLD

THE FORMS THAT OUR BELONGINGS TAKE ARE SHIFTING TO THE DIGITAL, AS WE INCREASINGLY DISCOVER, KEEP AND SHARE CONTENT ONLINE, IN THE CLOUD, AND VIA SOCIAL MEDIA. IN THIS MAGAZINE WE CONSIDER WHAT THESE DIGITAL FORMS MEAN FOR THE WAYS IN WHICH USERS FEEL OWNERSHIP OVER THE CONTENT THEY GENERATE, COLLECT AND STORE, AND ASK, HOW CAN WE DESIGN FOR A SENSE OF POSSESSION?
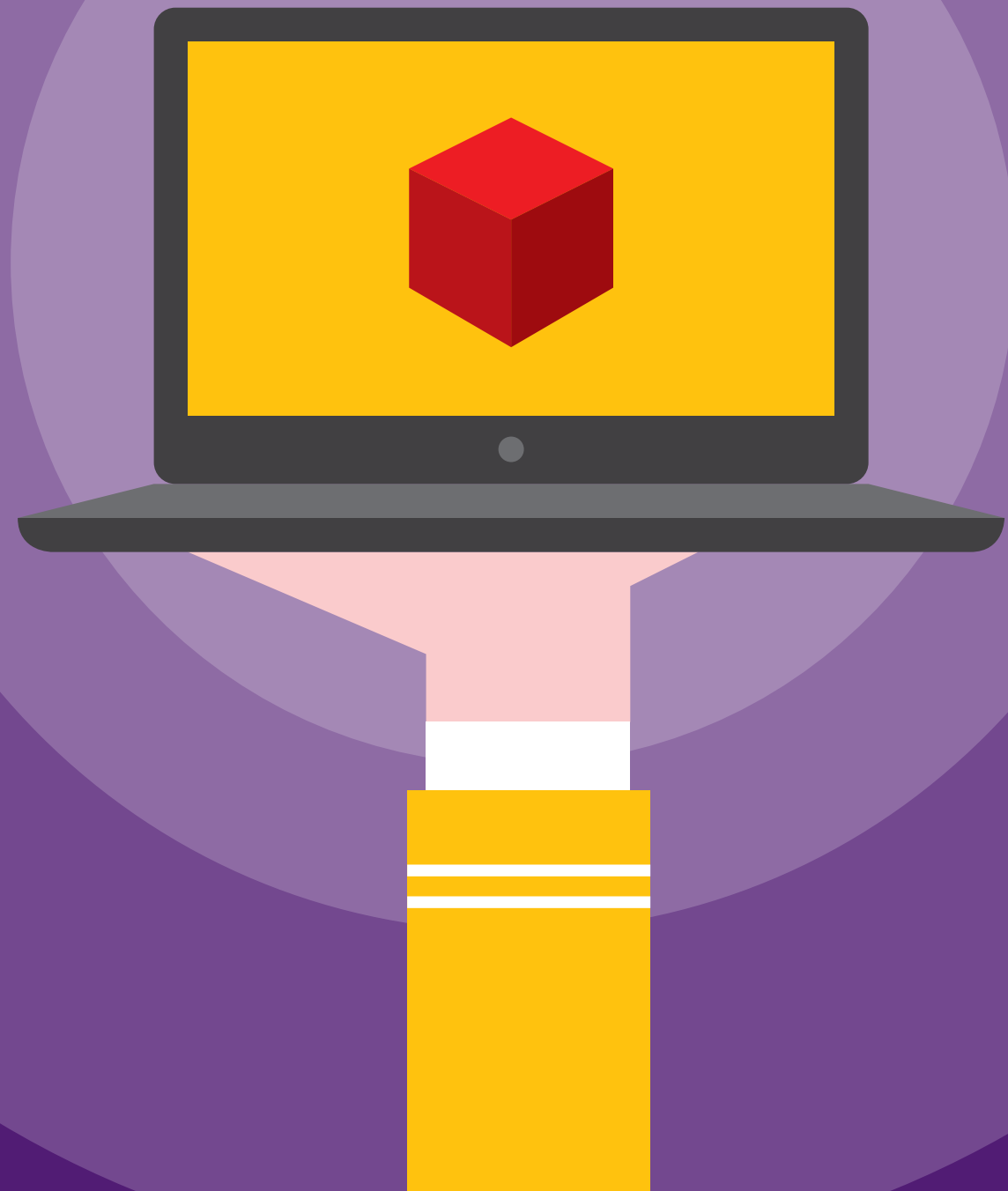
OUR SENSE OF OWNERSHIP OVER OUR BELONGINGS IS NOT SIMPLY A STATUS, BUT IS A FEELING THAT IS UNDERPINNED BY ACTION. THE SHIFT OF OUR PHOTOS, MUSIC, BOOKS AND DOCUMENTS FROM PHYSICAL TO DIGITAL FORM HAS IMPLICATIONS FOR THE WAYS IN WHICH WE INTERACT WITH THESE THINGS AND, CONSEQUENTLY, THE MEANS BY WHICH WE TAKE POSSESSION OF THEM.

growing diversity of networked devices, are creating new opportunities for people to move personal files to online places, as well as to create new digital content through online services. The ways in which these shifts are shaping people's orientations toward their digital possessions are only just beginning to be understood.

In this first chapter, we draw on interviews with users to consider how they view their digital possessions (Odom et al., 2012). Their responses highlight that the notion

of what it means to possess something digital is nuanced and difficult to articulate, and is often grounded in how we view possession over physical things. In the following pages, we highlight five aspects of possession that emerged in our data, which pinpoint what it means to possess something, and the difficulties of doing so when that something is digital.

I t is well known that people struggle to manage and keep track of their 'digital belongings'. Ever-growing collections of digital stuff mean that even favourite photos and important records can be lost in the depths of computer folders and virtual filing systems. These problems are exacerbated as our relationships and interactions with digital content continue to diversify.

Consider music as an example. While some of our relationships with music build on well-established metaphors, enabling users to purchase, collect, and get rid of albums, others are radically shifting. Take, for instance, music streamed through a Spotify app on a mobile phone. It is clear that this music is not 'owned' in the traditional sense, although the user does obtain a record of what they have listened to, and perhaps it is this metadata rather than the music itself that becomes 'theirs'. But just as the user cannot take music from Spotify, they would struggle to 'take' the metadata associated with it. It has no real form. Other types of user-generated content illustrate the same point; mobile phone apps often make the 'files' they are built upon invisible, and user-generated content such as tweets, Facebook messages and profile pages are intrinsically linked with the sites on which they are hosted. Although created and maintained by users, the lines of

possession become blurred, even undermined. Research has suggested that users seek to retain control over the social media, tweets and photos that they produce, but it is not clear how this might be achieved (e.g. Marshall and Shipman, 2011).

In this magazine, we want to look more closely at what digital possessions are, where they are hosted and stored, how users can interact with them, and what this means for their relationships with them. Do users feel like they possess this content? And is this of concern to them, or has the landscape of Cloud computing, Web 2.0 and operating systems that hide away folder hierarchies changed the way we think about our digital stuff? If possession is important, how might it be supported?

We begin by considering the notion of possession in itself. We are less interested here in the ways in which ownership is complicated by digital rights, such as in the example of George Orwell's 1984 being deleted from Kindles by Amazon (see Stone, 2009). Rather, we are concerned with the ways in which the user can interact with digital content which is nominally 'theirs', and how this comes to underpin a sense of ownership over it. The convergence of social and Cloud computing, along with the

DIG TAL

KNOWING WHAT YOU HAVE

In the physical world, part of knowing what you have entails knowing where it is. We organize our possessions in containers, put them in special places, and even have locations for 'clutter'. Making local copies of online things, in order to give them a stronger sense of place, is one strategy for feeling more in control of content in the Cloud and on social networks sites.

"I feel like I need to copy them [my online photos] somewhere, have them covered... I use the sentence 'I've got some photos' .. but I don't know really if I possess them, not until they're here [pointing at her laptop], at least then I know where they are."

HAVING ACCESS WHEN YOU WANT

Bound up with knowing where your physical things are is being able to readily access them. With digital content however, access may be temporarily interrupted by something as simple as a brief server failure, or permanently compromised if passwords are forgotten, or if members of your social network remove their content – the comments they added to your photos, and the photos they tagged you in, can all be transformed when this occurs.
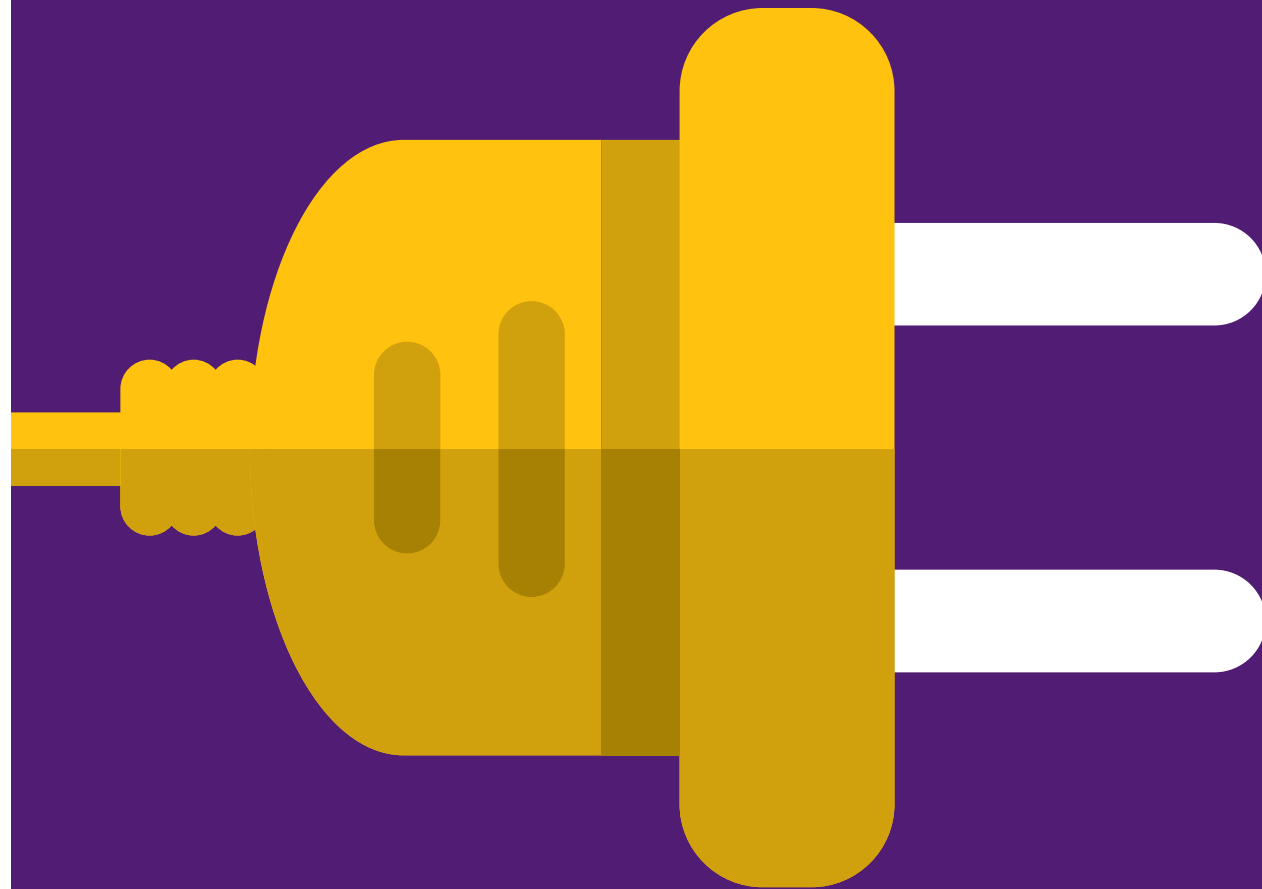
"With Facebook, there are so many things on there that are important to me but they're different than my [physical] things because there's this chance I'd never be able to get to them. That fine line can change a lot about how I think of them. It's like possessing them, but not quite."

BEING ACCOUNTABLE FOR CARE AND PROTECTION

A third aspect of possession is accountability. This might be, for example, a duty to look after the family photos. Keeping things online, while in some respects more secure, nevertheless hands that accountability over to some unknown, unseen entity, whereas having that data in one's own possession, for example backed up to a hard drive, can reinstate a sense of responsibility and control.

"I know my computer could die, but at least it would be on me ...it's my responsibility to take care of it. Leaving it up to a website, there's no guarantee it's going to stay around. I can't live with that."
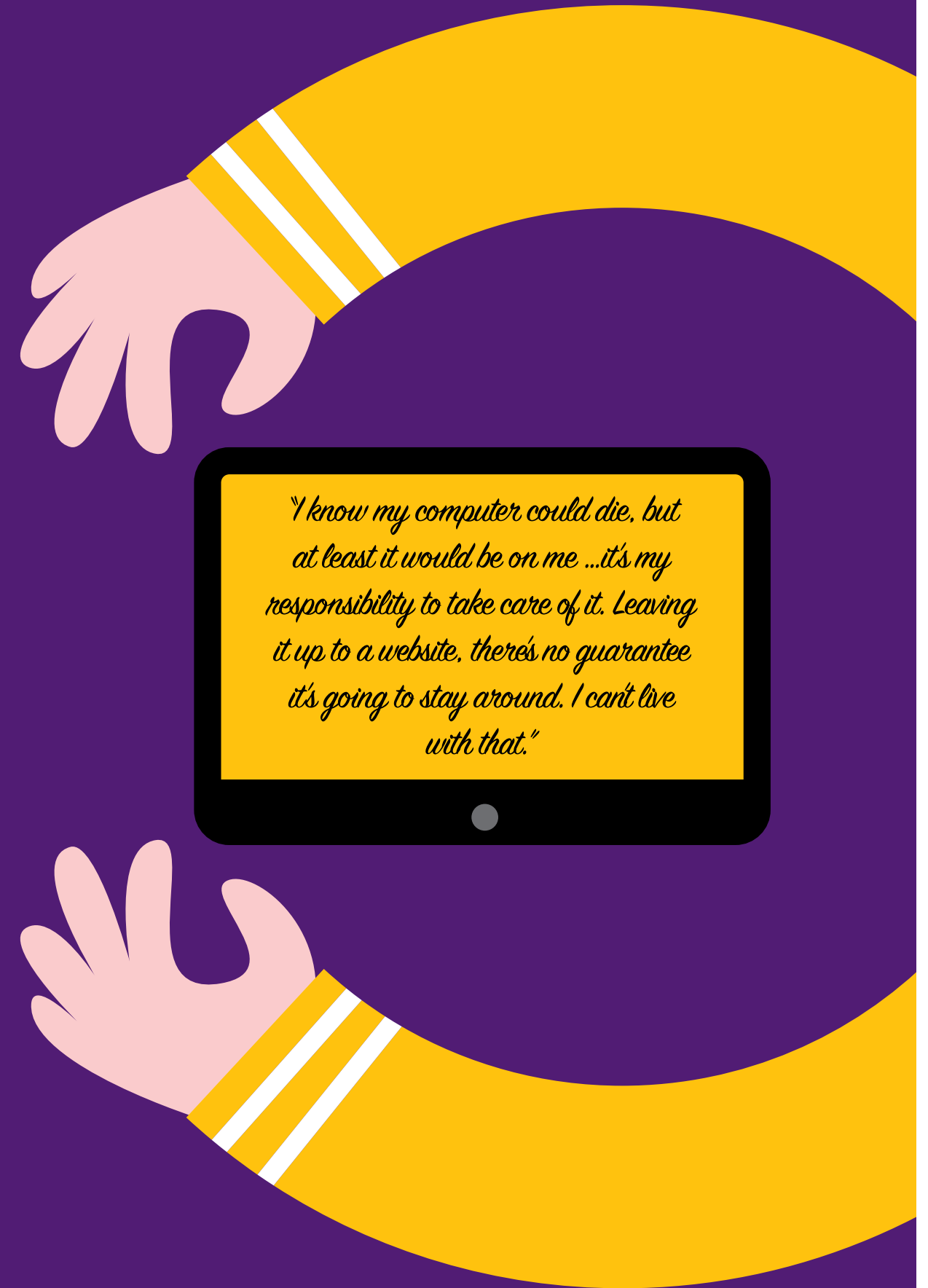
GIVING RIGHTS OR ACCESS TO OTHERS

Possessing a material thing implies some level of control over it. If you possess something, you have the right to alter it and give or loan it to someone else. This relationship is transformed with digital content, especially that which is put online, whereby others can take copies of content, or transform it through metadata such as comments and tags.

'I 'have' them so 'I' should have access to them and be able to decide who else does too. ...but once it goes online it, it's like a void. ...who knows where it will go, or really where it is. ...For me possession is about knowing my things.'

BEING ABLE TO RELINQUISH POSSESSION

A final key property of possession is the ability to get rid of something. Whether by throwing away love letters or deleting digital photos from a computer, people relinquish possession of things they no longer want in their lives. However, in contrast to material things that evoke memories we would rather forget, we can find ourselves peculiarly unable to free ourselves of these things in the digital world.

"...online, well I can try to delete something, but who knows? Who deletes the deleted? Where does it go? I don't know, but I don't think it disappears, and that's odd come to think about it. ...You can't very well possess something if you can't `unpossess' it."

Taking on new meaning
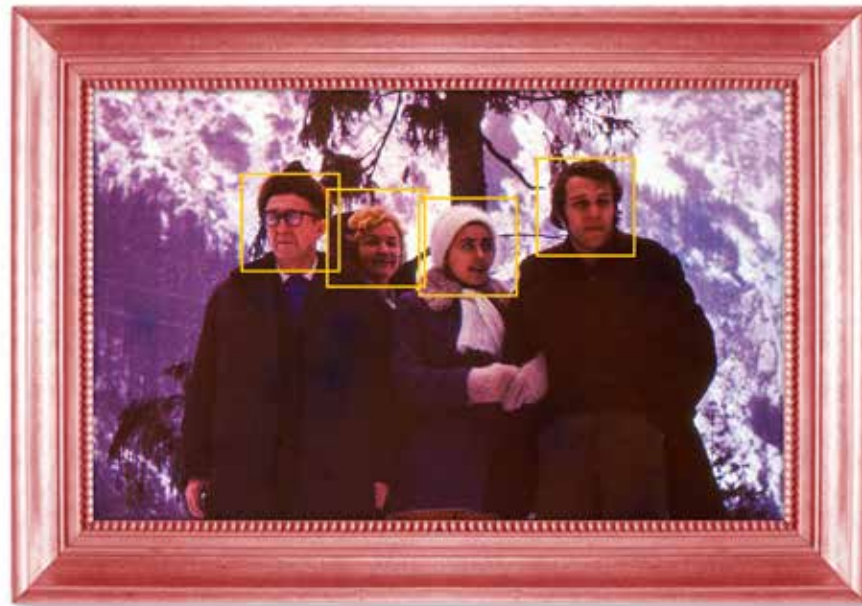
Mark Johnson
Great family holiday in the Alps

Like • Comment • Share

👍 **4 people** like this

Lovely photo x

Such a nice place.

Cool! hope you are keeping warm.

Haha! Look at Grandad!

I know, he never looks at the camera!

Where is this you guys, and why didn't I get an invite???

A log cabin with you for four days? I don't think so ;-) xxx

T previous pages illustrate how our sense of possession is deeply rooted in our relationship with physical things. One approach when building new technologies may be to attempt to mirror these qualities: there may be ways of leveraging concepts of physical ownership to improve the way we deal with digital materials. Yet this is unlikely to succeed in itself. Some of the properties of the digital seem to fundamentally change the nature of possession, for example, by making the thing in question open to changes by others. New forms of sharing that are enabled by putting things online means that digital belongings can become imbued with social metadata, a 'digital patina' of sorts. Like the patina on materials like wood or leather, this has the potential to make an object richer; the residue left as friends and family interact around digital mementoes serving to enhance their meaning.

It is not all positive, however. The placement of a digital thing online can have perplexing effects for people, in particular when it challenges ingrained notions about possession. This includes the fact that ownership is associated with places that one can control access to, and keep safe if need be. Possession becomes a difficult concept when the thing possessed has no geographic locale. This becomes quite clear in the unresolved tensions that come to the fore when valued things have to go online. Location is no longer a resource that can be used to judge the safety of a thing. Likewise absence from a location is no guarantee that something no longer exists. The point here is that online digital things (or even online places) break subtle but long-held notions of what possession means in practice.

What this implies is that to possess is not merely a verb, but a complex set of actions that transform the relationship between a thing (virtual or physical) and a person. Like physical possessions, virtual ones play an important role in how people assert their identity, realize their aspirations and interconnect with the lives of others. It is no wonder, then, that as users of contemporary technology increasingly engage with their digital stuff, placing it in secure storage, sharing it with others, and sometimes wanting to know 'who has it' or 'where it has gone', they end up worrying about rather profound issues. As our relationship with our digital content becomes more complex, and our sense of what ownership of it is evolves, it is a good time to reflect on and re-design our interactions with our digital possessions.

Opposite page: Social metadata is now attached to our things.
Below: Listening to music becomes a shared experience.

Nick Duffield
Great mix!
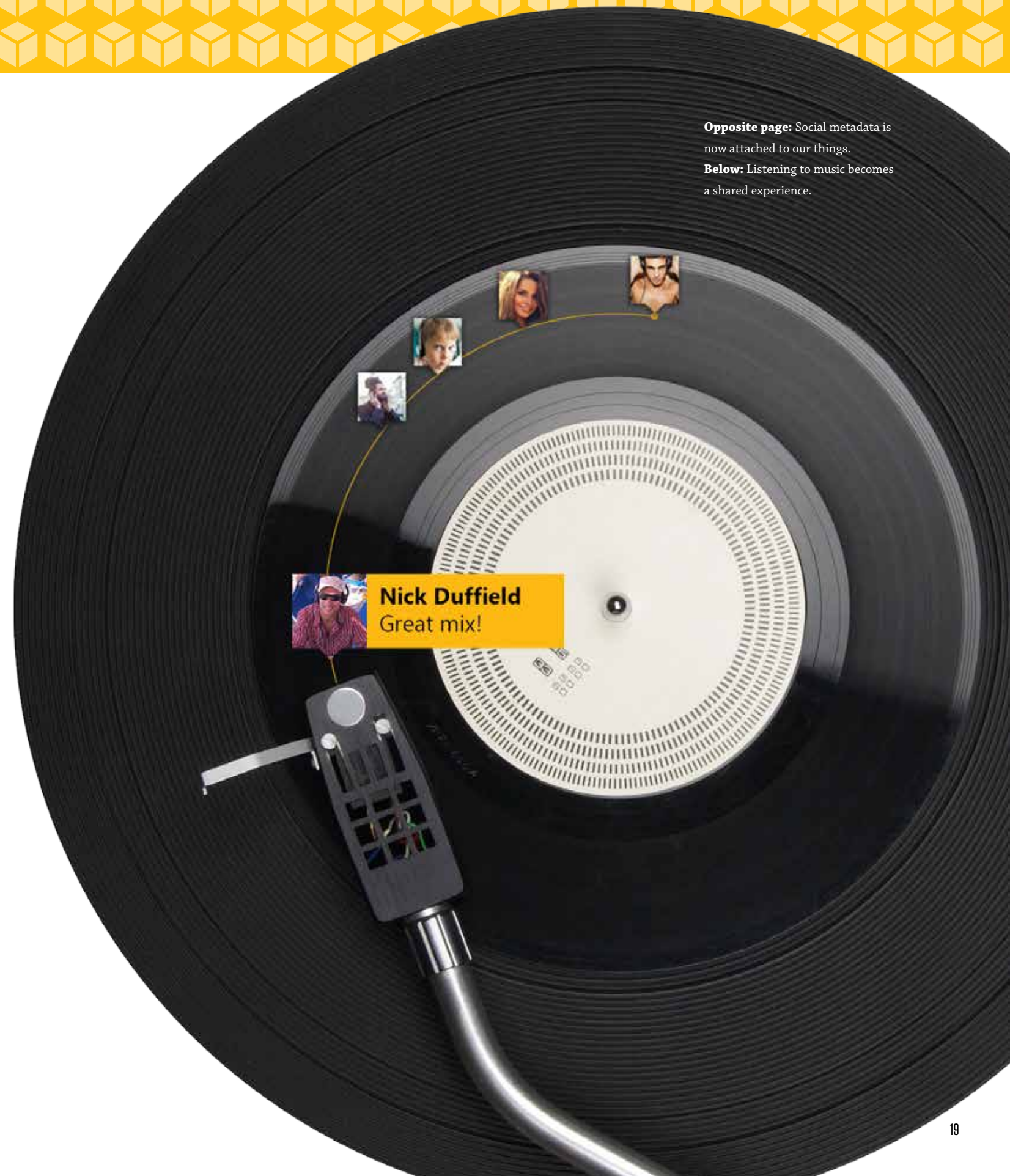
CHAPTER 2 | PHYSICAL AND DIGITAL POSSESSIONS

DIGITAL AND PHYSICAL OBJECTS HAVE VERY DIFFERENT AFFORDANCES, WHICH HAVE AN IMPACT ON THE NATURE OF POSSESSION. CAN WE CREATE NEW KINDS OF HYBRID ARTEFACTS BY TAKING THESE INTO ACCOUNT, AND WHAT WOULD THE DESIGN POSSIBILITIES FOR THESE HYBRID ARTEFACTS BE?
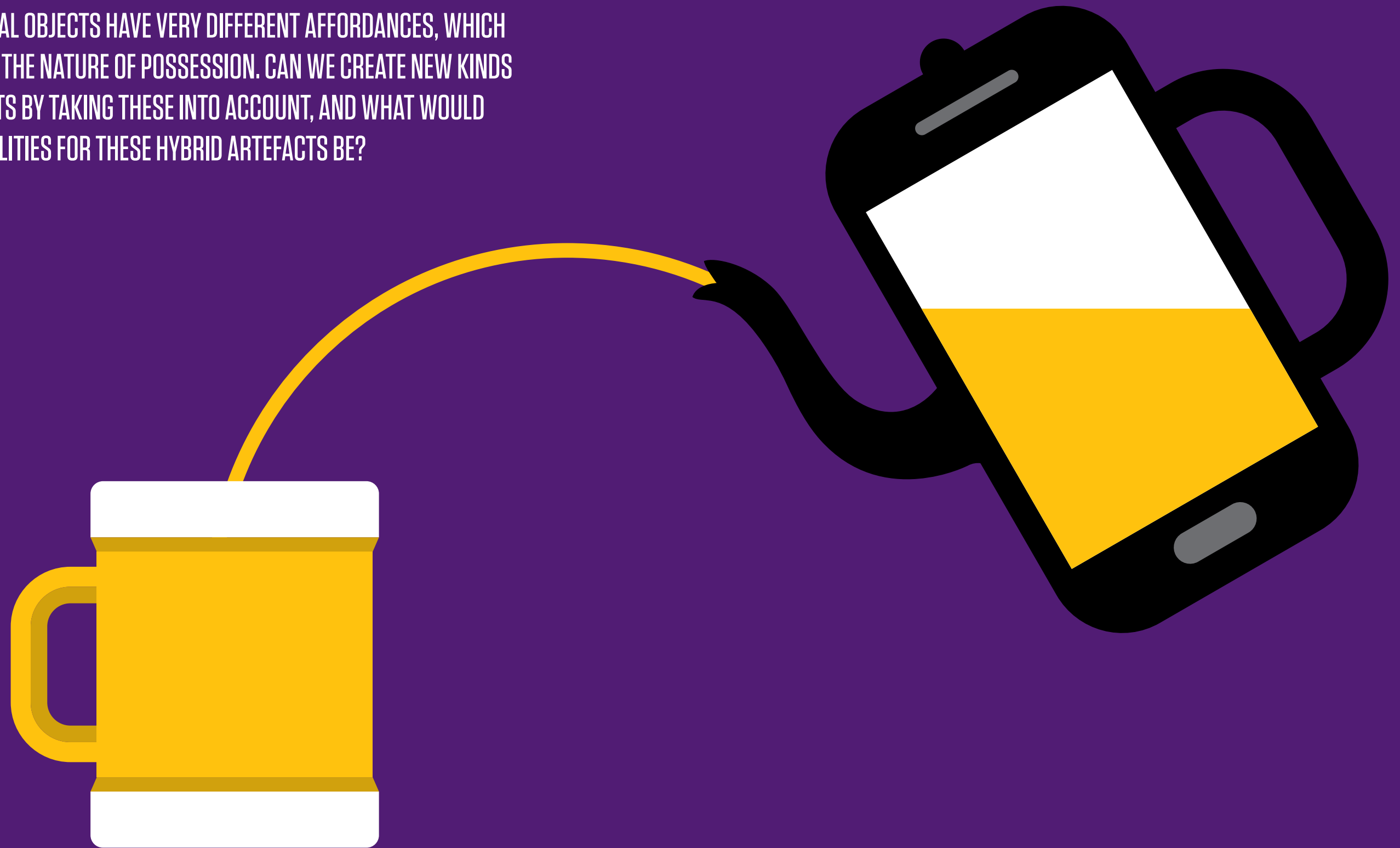
Living in a Hybrid World of Objects

IN A SENSE, ALL DIGITAL OBJECTS AND OUR INTERACTIONS WITH THEM TAKE PLACE THROUGH THE PHYSICAL WORLD. WE VIEW DIGITAL DATA ON PHYSICAL SCREENS, AND INTERACT WITH IT USING PHYSICAL DEVICES SUCH AS A MOUSE AND KEYBOARD. HOWEVER, PEOPLE USE AND PERCEIVE DIGITAL AND PHYSICAL OBJECTS DIFFERENTLY IN TERMS OF THE WAY THEY CREATE THEM, INTERACT WITH THEM, MANAGE THEM, AND KEEP THEM.

Let us consider just the stuff we keep in our homes. When it comes to our personal or household possessions, the physical things we keep tend to be the things we cherish the most, whilst digital objects are typically of much less sentimental value. We tend to take more pride in physical possessions, displaying them with care, organizing them in neat containers, and using them to give our homes character. The flipside of this is that we may often feel guilt about the things we collect and the clutter we accumulate, and sometimes work to organise or hide physical objects away. For all of these reasons, physical things tend to convey the unique identity of a household and the people who live within it.

Our research has explored why we value objects in the home, and why we choose to keep particular things. Cherished objects foster many values. For example, souvenirs may trigger memories, old recipe books may represent a connection with the past, photos can convey a sense of personal or family identity, and the family heirlooms can be a way of honouring those we care about or fulfilling family duty. Possessions can even support 'forgetting', in that objects that may be difficult to encounter can be put away in a safe place. Although it takes work to curate our household possessions, there are many reasons why this is important.

Contrast this with our digital possessions. For one thing, the sheer quantity of our digital stuff presents a huge challenge for managing, curating and filtering these collections. For example, in addition to the shoeboxes of 'to be sorted' printed photos, many of us now have hundreds if not thousands of images and home videos sitting on our computers too. Added to this, our digital stuff can encompass anything from text messages and emails to other kinds of documents we keep in digital form. And, increasingly, the glut of digital data will confront us anew when those we care about pass away and we are left with not just their PCs and mobile phones, but their social networking data, online bank accounts, and many other aspects of their 'digital footprints' too.

So we may care about both our physical and our digital possessions, but it is clear that they have very different properties for interaction. Let us first consider how the 'affordances' of physical and digital objects are different from one another. »

Opposite page: Souvenirs can trigger memory.

AFFORDANCES OF PHYSICAL VERSUS DIGITAL POSSESSIONS

Though we can compare and contrast affordances, it is pointless to view any of these characteristics as either positive or negative in a general sense. For example, we have noted in our fieldwork that the lack of physicality of digital objects means that they are easily hidden away, either stored on household or personal computers, or online. Such objects are easily amassed, but have no real presence in the household and so are also quickly forgotten about. In contrast, while we can bemoan the fact that physical objects cause clutter if not carefully managed and arranged, the curation that is inherent to doing so means that they form part of the visual, and practical, landscape of the home.

As another example, a digital object can be easily reproduced. This has important advantages for protecting and sharing digital photos or videos, but at the same time it is sometimes the very quintessence of a physical object that can make it special, even collectible. One man in our research carefully kept the cog from his motorcycle that caused him to have an accident many years before. It was important that this object was the object – the one that caused him so much grief. Another participant, a mother, felt sad that her child's first drawing of the family had faded,

yet she was reluctant to copy or in any way modify the original. Finally, after some time had passed, she carefully traced over her daughter's original lines in what she hoped were the same materials and in the same way. To her, however, this altered drawing was never really 'the same'.

The issues, then, are many and complex: they force us to consider the meaning of objects not just for any person, but for a place, such as a household. The meaning of an object, in turn, is bound up with its material properties (or lack of them). These are the issues that become important when we design new technological systems.

Table: Affordances of physical versus digital possessions

PHYSICAL	DIGITAL
Unique	Easily duplicated
Fixed in form—modification takes work and care	Highly malleable—easy to edit and modify
Physical things play on all the senses	Primarily visual, perhaps audio as well
Take up real space and have presence	Spaceless and placeless
Physical, embodied interaction	Interactive and dynamic content
Objects don't speak for themselves	Can have metadata and layers of information
Gradual change with time	Persistence of content, if accessible
Access control is physical	Sharing and access can be remote and quick
Objects are separate and independent (though they may exist as part of a collection)	Objects and digital resources can be connected and interdependent
Search dependent on physical location	Efficiently searched by keyword and other properties

DESIGNING FOR A HYBRID WORLD

If we consider the different affordances of physical and digital possessions, this may give us inspiration for how we might create new kinds of hybrid objects that work across the boundaries of the physical and digital world.

We can do this in a number of ways. One approach is to rethink digital objects in terms of physical attributes, or vice versa, and tie them together more directly. For example, we might explore what it would mean to create a digital file that is unique, that could form part of a collection, or that would age over time. Likewise, we could begin to generate ideas for new concepts of physical objects in terms of digital affordances. How could we create physical objects that have extra layers of information or stories embedded in them? How could they be made more connected?

Another is to explore new ways to make the transition between physical and digital possessions. For example, in one project called Family Archive, we created a device that allowed people to scan in physical household objects and add them to a digital archive (Kirk et al., 2010). In another project, we built Photobox – a wooden box that would serendipitously print random photos from a household's Flickr account, producing photos over a long period of time to surprise the household (Odom et al., 2014).

Whether we are reconsidering possessions by reconceptualising them in new terms, or reconfiguring the boundaries between the two worlds, both approaches open up a rich design space for new kinds of technologies.

Opposite page: How do we preserve a child's artwork?
Above: Physical family heirlooms change with time.

Physical and digital materials have different affordances. How can both of these be included in the development of new experiences of our possessions, and how might we include both in the design of hybrid objects?

My File
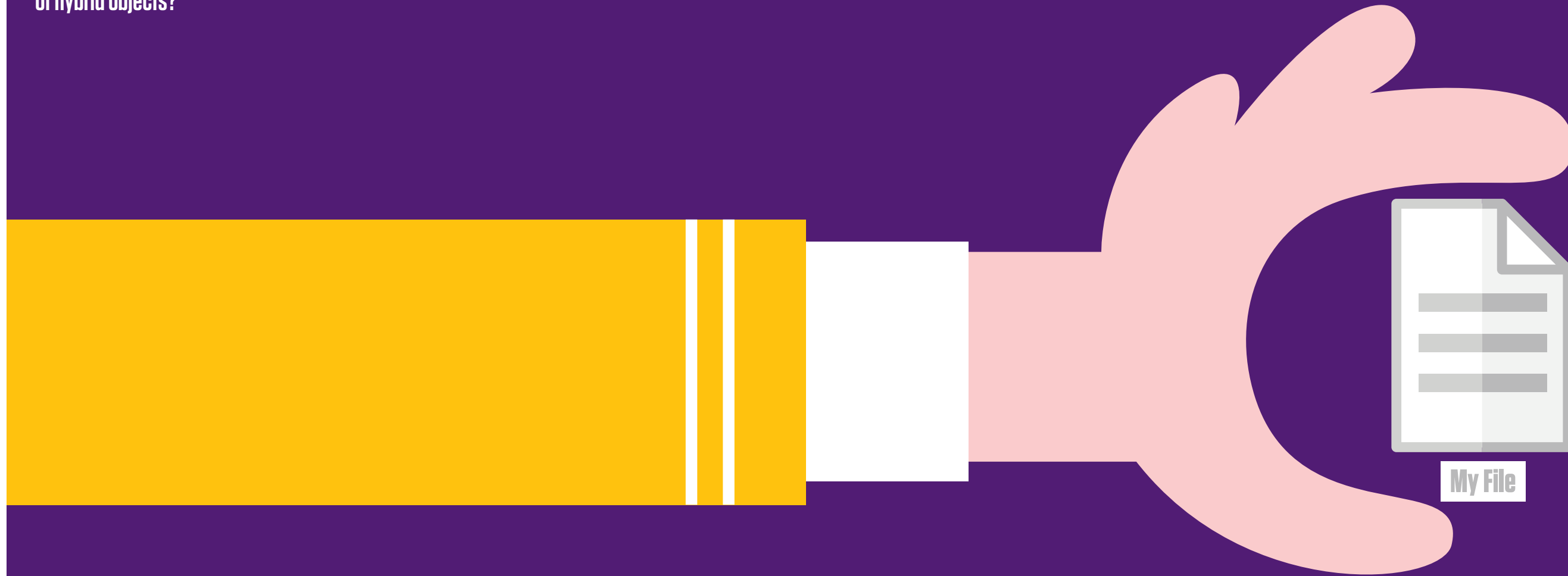
A picture is worth a thousand

Words

The Digital/Physical Picture Frame is designed to showcase photos in the home, and was built to explore ways of bringing together the world of printed and digital images. It does this by providing a connection between the physical and digital versions of the same picture, and exploits this connection to show the properties of the digital version in the context of the physical one.

The device itself is a touchscreen with a small shelf mounted in front of it, and a set of printed photos. Each photo is tagged so that when it is placed on the shelf in front of the display we can identify it and connect it to the digital version it originated from.

We've explored three simple scenarios for this device, each of which uses the connection between the physical and digital versions of the same photo, but in different ways:

EMBELLISHING THE PHYSICAL PHOTO

In this first version, when the physical version of the photo is placed on the shelf of the display, the device finds the digital version, extracts some colour from it and uses that colour to simply create a background that complements the image.
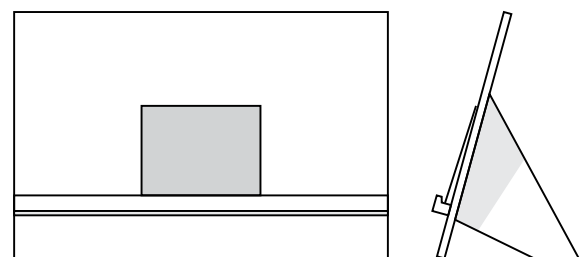
CONNECTING PHOTOS TOGETHER

In this second exploration, when the physical photo is placed on the shelf the system finds all the digital photos that were taken at the same event as the original, and displays them immediately behind the printed version. Viewers can tap on these digital versions, since the display is a touchscreen, in order to flip through them. The physical version acts as a simple entry point to this set.

CONNECTING PROPERTIES TOGETHER

In this final example, when the physical photo is placed on the shelf we look for additional properties of the digital version, beyond the image itself. If the digital version has location data associated with it, we show a map of that location on the screen. If the digital version has been posted to Facebook and been Liked and commented on, we show that content in the background. The social life of the digital photo becomes the social life of the physical version, too.

Before the advent of digital cameras, the physical version of a photo was paramount. We received physical printouts from the developer and if we wanted a digital version we had to scan it into a PC. Now, the tables are turned and physical photos are a neglected form of output. There is so much more we can do with the digital version. Why, though, does the relationship between the digital and physical versions of the same photo end when the Print button is clicked? In the explorations presented here, what we know about the digital version of a photo, those rich properties that come about because of its life online, can also be associated with the physical print.

CHAPTER 3 | KEEPING THINGS ONLINE

HAVING CONSIDERED PHYSICAL AND DIGITAL BELONGINGS, IT IS WORTH PAYING SPECIAL ATTENTION TO THOSE VIRTUAL POSSESSIONS THAT EXIST ONLINE. HOW DO PEOPLE MAKE SENSE OF THEIR ONLINE POSSESSIONS, AND HOW CAN THIS BE USED IN DESIGN?
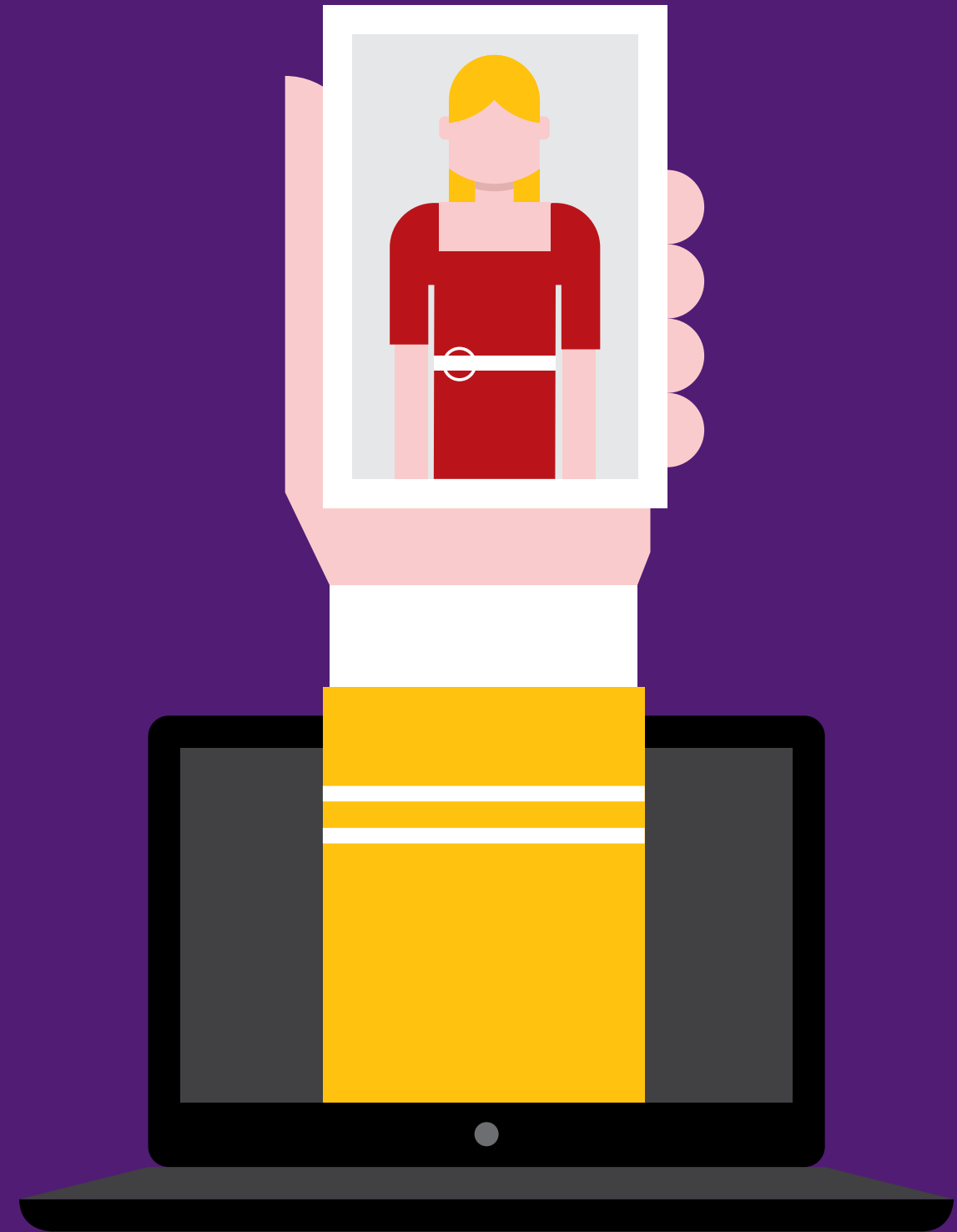
Making sense of
Online Possessions

THE WEB IS A PLACE WHERE MOST OF US LEAVE A SUBSTANTIVE DIGITAL FOOTPRINT, AS WE PUBLISH MEDIA, COMMUNICATE, AND SHARE CONTENT WITH OUR SOCIAL NETWORKS. IN OTHER WORDS, AND WHETHER WE MEAN IT TO OR NOT, THE WEB HAS INCREASINGLY BECOME A PLACE WHERE MUCH OF OUR PERSONAL CONTENT IS ARCHIVED.

How can we support people in dealing with these new digital possessions? Features like Facebook's Timeline acknowledge the potential value of archiving the social media that is generated on the site. However, keeping everything introduces its own problems, as meaningful content gets mixed up with the trivial, and no one site can serve as a complete archive in itself. Our research has shown that keeping all of one's digital possessions in one place simply does not make sense to users (Lindley et al., 2013). Instead, in the same way that material things become enmeshed in the fabric of the home, their meaning reinforced by the places in which they are found, so personal digital things are increasingly integrated in the fabric of the Web.

For example, some sites are understood as a place where cherished content is kept. In our study, Flickr was often cited as a means of sharing a person's best photos, or of backing them up. Either way, the value of the resulting collection of photos was recognised; these are the ones that are worth sharing, or that have been deliberately safeguarded. In contrast, sites like Facebook, where photos range from favourite memories to throwaway pictures of last night's dinner, were not seen in this way. Indeed, some of our participants went so far as to

suggest that there was nothing on Facebook they would like to keep. This is, of course, a one-dimensional way of thinking about online possessions, yet it seems likely that richer strategies quickly become intractable. Unpacking frivolous from worthwhile social media presents huge difficulties, and people would rather lose some of their content than keep, and be overwhelmed by, all of it. Therefore place comes to be of central importance when users try to make sense of their online possessions. Just as people manage their material things by putting it in certain locations (from the mantelpiece to the clutter bowl), so they reach an understanding of their online things in the context of where they can be found.

The Web is also a site for making new collections of content. Pinterest boards are an obvious example of this; online content is explicitly curated through the site. Yet there are also many more subtle instances in which online content is amassed. Folders of webmail evolve over time, as do the social graphs that emerge via social network services. The user has made many incremental choices in this case. Should they store or delete this email? Should they accept this friend request or follow this person on Twitter? The result is a collection of content that
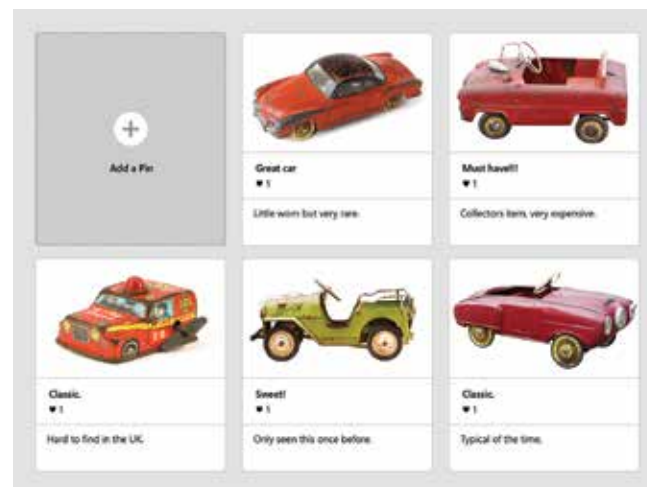
gradually accumulates, and our research indicates that in these cases, the whole is more important than the parts. Keeping Pinterest means keeping the collection, and our research surprised us in revealing that, for social network sites, the social graph is often more valued than the social media. But like the first example in this magazine – that of music – it is difficult to separate these 'possessions' from the sites that host them, or to understand how they can retain their meaningfulness over time. If Twitter can be understood as a collection of people, how can this collection be backed up? And what would this look like if people started to leave?

A final complexity of dealing with online possessions is, of course, that this content can be viewed by others. Users present a certain image to the online world, and if they wish to alter this they must do so through editing or deleting the content that can be found there. It is not uncommon, for example, for users to delete social media featuring ex-partners at the end of a relationship, in an effort to hide it from others and also to avoid being confronted with it themselves. Profiles and personal Web pages are also examples of dynamic content where changes are both difficult to undo and commonplace, as without them the user runs the risk of presenting an obsolete or outdated face to the online world. Although in our own research we have been surprised by the lack of sentimentality with which old profile pages are viewed, we have also seen instances in which users regret having deleted, or lost access to, old profiles. Resolving the paradox of how to keep online content, in the long-term, especially when that content is public-facing and carries expectations of being up to date, is key.

In our research we've identified five types of content that comprise people's online possessions. These differ according to:
- The user's curatorial intent – is the collection shaped and controlled intentionally, or does it accumulate through use?
- The digital original's disposition – is the digital original local or online, and is it fully under the user's control?
- The collection's dynamic nature: Does the collection change additively or are changes necessarily destructive?

Above: Collecting images of objects online.
Opposite page: Part of a physical collection of toy cars.

THE FIVE TYPES OF CONTENT ARE

High value collections of content that are uploaded to an online site, either as a means of sharing a person's best work or to back up particular content. These websites become a means of storage but are also a record of what has been identified as high value.

Collections that are curated online, such as Pinterest boards, and tweets that have been marked as favourites. These collections are hosted online and largely comprise content generated by others. The collection is a means of curating content and offers support for re-finding.

Collections that emerge through use, such as folders of webmail and the social graphs that emerge via social network services, as a consequence of many incremental decisions. Rather than being seen as collections of content, these are often deemed to be useful resources, to be kept just in case.

Content for consumption in the moment, such as user-generated content posted to social network sites. Social media is generally seen as a means of communicating, enacting social responsibilities, and presenting one's face to the world. Rather than something that users choose to keep, it simply persists, but it may accrue value over time.

Profiles and personal pages are examples of dynamic content where changes are more apt to be destructive, as there is no easy way to undo edits. Profiles are resources for action in the present, thus when moving on from old social network sites, users delete, remove or overhaul them in order to avoid setting misplaced social expectations.

The Web, and the values that are associated with different sites, is central to how people manage their online possessions. What is needed to support possession of this content in the long term, as services change and even cease to exist?

Curation over

TIME

dec   jan   feb   may   jun   jul   aug   sept   oct
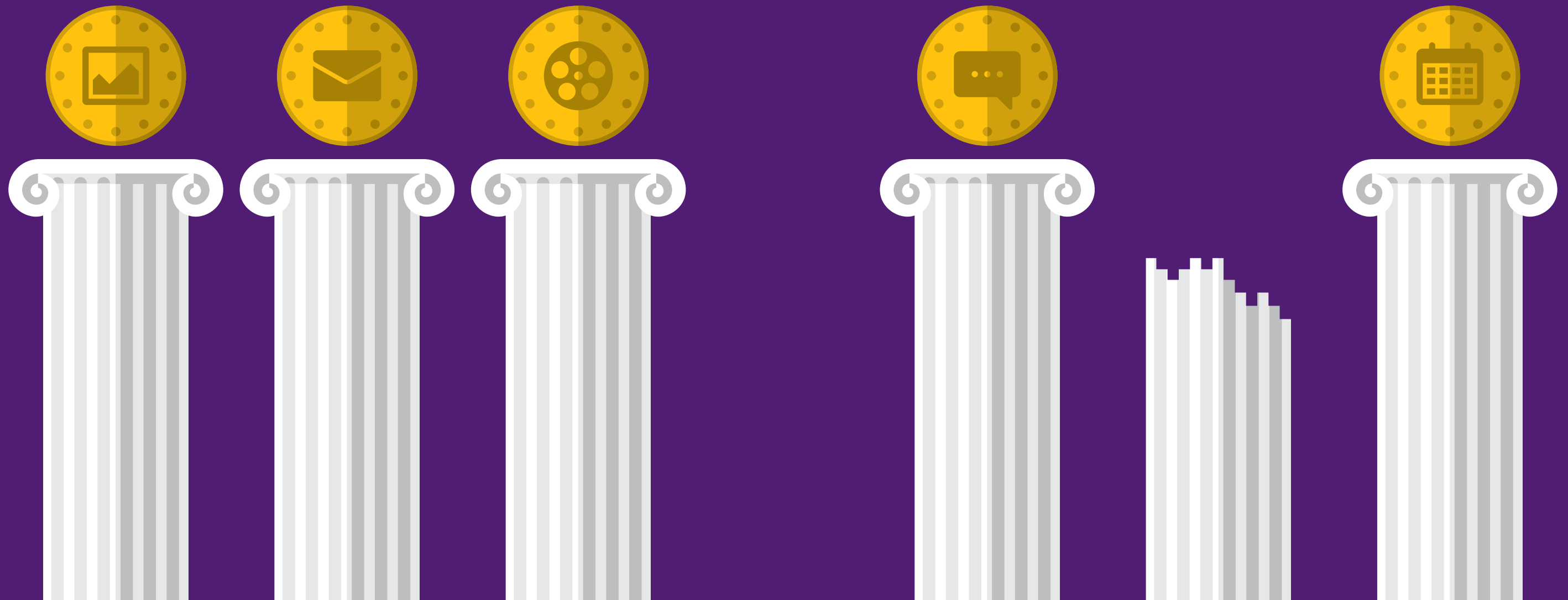
Timecard enables users to create timelines of personal content, which are hosted on Flickr and displayed on a dedicated device in the home. It was developed as part of a broader exploration of technology heirlooms, and is intended to support the production of a timeline about a single individual, which can then be displayed in the home and potentially passed on to future generations. Users can add content to a timeline through the Timecard application or directly via Flickr. That content (typically photos) are then displayed on the Timecard device as a random slideshow, unless the user interact with the device, whereby they can be scrolled through chronologically. Timecard is an exploration of how the same content, when given a persistent presence in the home as opposed

to being hosted online, is perceived – where it is thought to 'live', whether it has a sense of longevity, and how users feel it should be curated over time.

Research with Timecard has shown that the ways in which participants respond to the system depend on whether they use it to build a timeline retrospectively or in the moment, as events happen and are captured using a Flickr app. When Timecard was used to make a retrospective timeline, it was seen as storing a narrative, but a narrative that held its own value and that was distinct from the device. The worth of the timeline was in this case bound up with the work done to produce it; participants carefully constructed timelines to tell a story about a person's life, or about a unique set of experiences.

In contrast, when Timecard was used to display a timeline that was formed from events captured in the moment, the device and content were seen as intrinsically linked by participants. The value of the system here was to give this content a presence in the home, rather than to serve as a way of keeping it safe, and to trigger conversation in the moment, rather than to convey a narrative designed through the careful selection and sequencing of photos. However, the future value of the system was, for these participants, ambiguous. As Timecard held digital content, participants expected to remove content from it only if some limit on its capacity was reached (unlike the printed photos they had on display in their homes, which were regularly updated). This meant that photos taken now would still be appearing in the slideshows in years

to come, including photos that delighted what were small children now, but may later prove embarrassing for the teenagers they had grown into. For Timecard to hold its value, participants felt that some kind of curation would eventually be necessary.

Timecard illustrates how expectations of lasting value are bound up with curation, a quality that is often lacking from social media sites and a practice that is rarely done in relation to digital content, where the emphasis is simply on keeping everything.

Above: Watching a child grow over time.

CHAPTER 4 | THE EXPERIENCE OF A FILE

ONLINE POSSESSIONS ARE AN INCREASINGLY IMPORTANT ELEMENT OF OUR DIGITAL BELONGINGS. BUT THERE ARE FUNDAMENTAL DIFFERENCES BETWEEN THE WAYS IN WHICH DIGITAL CONTENT IS STORED AND EXPERIENCED ACROSS ONLINE AND OFFLINE SPACES. WHAT MIGHT EMERGE IF THESE TWO WORLDS WERE BROUGHT MORE CLOSELY TOGETHER?

Folders vs. Properties

WE STORE OUR DIGITAL THINGS IN TWO WORLDS: THE WORLD OF THE FOLDER HIERARCHY, IN WHICH THE ICON IS A PRIMARY REPRESENTATION OF AN ITEM; AND THE WORLD OF THE DATABASE, IN WHICH OUR PHOTOS, MESSAGES AND OTHER CONTENT FORM AN INTERCONNECTED WEB OF PROPERTIES AND PEOPLE. EACH HAS POSITIVE AND NEGATIVE QUALITIES, CONCEPTUALLY AND FUNCTIONALLY, THAT ARE HARD TO BRIDGE.

To compare the 'old' world of the PC folder and the 'new' world of properties, let's take a simple digital photo as an example. On the PC, photos and other files are single objects, each represented with an icon. That object has a set of properties, such as file size and the date the photo was taken, stored within it. It also has an association with a specific application, such as Windows Paint, and is connected with other files through relationships defined within the folder hierarchy. Photos from the same event, such as a birthday party, are often stored in a folder together.

If an image from that birthday party is posted online, for example to the photo sharing website Flickr, it ceases to exist as a single object. Flickr, and other sites such as Facebook, break the original photo up into a set of constituent parts. On Flickr the image itself is used to generate multiple new pictures, each of which might be used in a different way. They vary in size and aspect ratio, from small thumbnails, great for displaying the item amongst many others, to the 'original' image, which is the same size as the uploaded version. The properties of the original file – the date it was taken, for example, as well as the wealth of data stored in the image by the camera that took the picture originally – are extracted from the file and stored in vast databases. Rather than being used merely to describe a single object, these properties are used to connect it with a myriad of other pictures.

Thus, the file changes state when it is posted online, from being a single object to including a web of associated data that does include images, but also contains details about time, file size and so on. As the photo continues its life online it has new data added to it that didn't originate with the original file. Details such as the place the photo was taken, the people in the photo, the people that have interacted with the photo and so on, are layered into it, as are new forms of content such as comments, and new structures such as sets of photos. Most of these pre-existing pieces of information are used to connect the photo to others like it, and out to other people too.

So the experience of a photo offline, in the folder system, and online, in this 'graph' of relationships is radically different. The argument here isn't that one system is inherently better than the other. Each has positives and negatives. What is interesting is that these two worlds rarely converge.

The following is a list of some ways in which the two experiences are different. When reading this list, ask yourself how you might bleed these experiences together to create new ones. What if the online system was more like the offline, and vice versa?

ENTITIES

Local files are single, self-contained objects. This means they can be easily organized and interacted with. They can be dragged around. They can be copied onto a USB stick, safe in the knowledge that everything is in one package. Online files, by contrast, are a cloud of related data and streams around which it is hard to get a sense of control. What if online files felt more like objects?

PLACE

Local files primarily live on a hard drive, in a known place. This gives us some comfort that we know where they are. This also allows us to take ownership over them. The location of an online file is pretty ambiguous. Files live on a server, but may be distributed and fragmented both geographically and from a data perspective. We have to trust the service to take care of them. What if we had more of a physical sense of ownership over our online files?

PROPERTIES

Local files have a limited number of isolated properties. They aren't really connected to other items in the file system through these properties. We rely on folders to make these relationships. Online, files have a set of properties that can be used to view and manage items in a myriad of nuanced ways – through tagging, through favoriting, through date and place. What if local files could have this rich a set of relationships?

APPLICATIONS

Local files have extensions that are associates with one application. They can also be edited, though, in any other application that supports them. I We have many tools for editing a JPEG picture, for example. Online, files and the services on which they are hosted are bound together. Once a picture is on Flickr the tools for editing it are limited. What if our online files could be managed and edited across any service that supported them?

Left: Digital files are often stamped with a date that can be used to connect them to other items.
Opposite page: A single digital image can be used in a myriad ways and situations.

The files we put online often start out offline, yet the experience of these two worlds is very different. Is this just legacy, or can we combine the best elements of each?

Fluid

FILE
MANAGEMENT

THIS CASE STUDY DESCRIBES A SYSTEM DESIGNED TO ASK THE QUESTION, WHAT IF FILES ON A PC WERE MORE LIKE ONLINE FILES, SUCH AS THOSE HOSTED ON FACEBOOK OR FLICKR, WITH A COMPLEX WEB OF DATA ASSOCIATED WITH THEM ALLOWING INTERCONNECTIONS AND CONSEQUENTLY, NEW WAYS OF VIEWING, ORGANIZING AND SHARING.
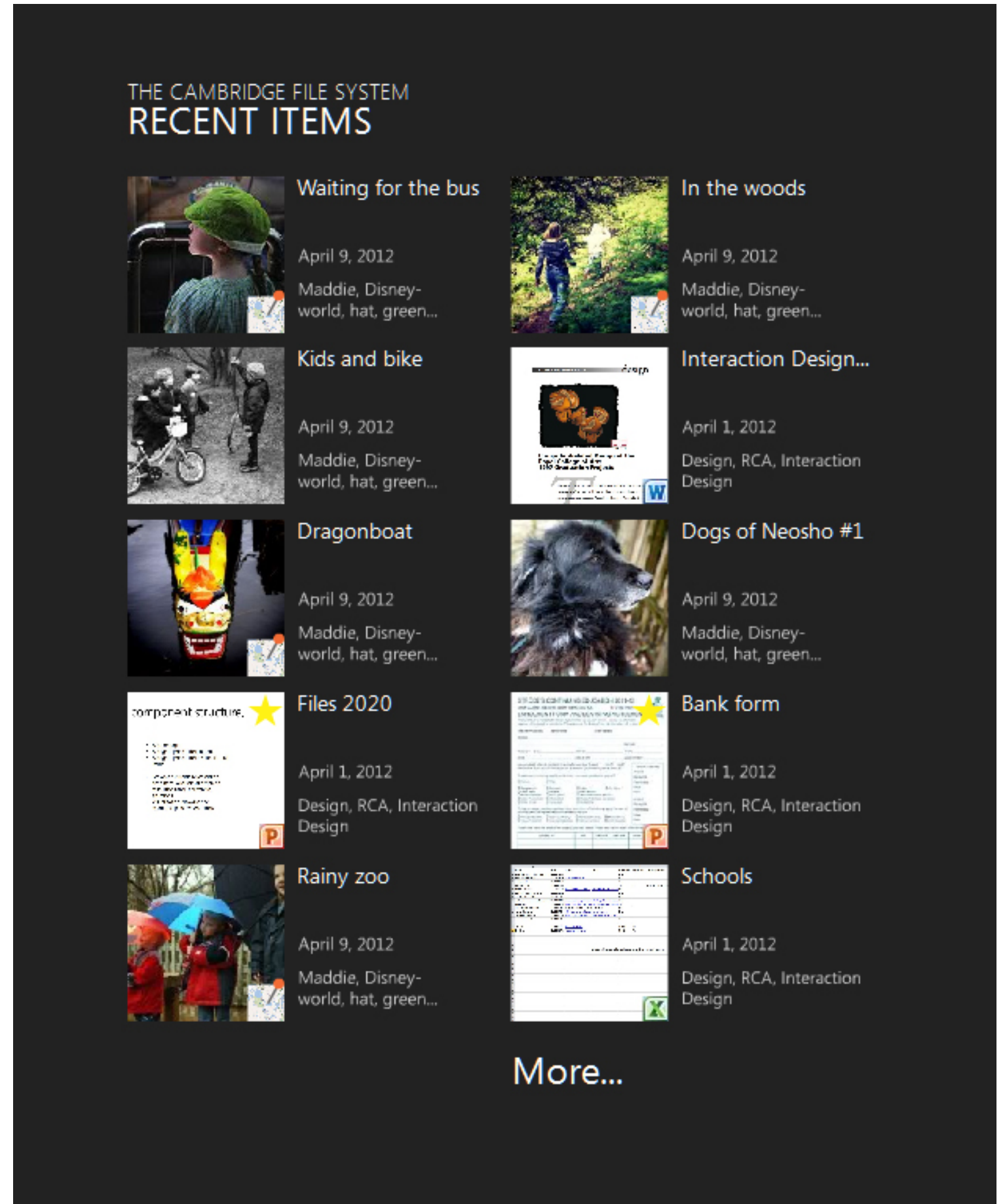
CamFS takes the current file-centric model associated with Windows, and starts to bring in notions of files taken from the Web. It uses a graph model to describe relationships between files, and a key-value store as an index for storing small amounts of information for fast access, that may point at other things. These two elements, the graph and the file store, enable us to build a file system that allows for some of the subtle interconnectivity and extended properties highlighted in Web-based experiences, allowing us particularly to play with aspects of property and structure that are unified under the term key value. These aspects have a fluidity and ambiguity in online 'files' (such as a Flickr photo) which, through CamFS, we can bring to bear on a more traditional file system, on a PC.

The items themselves are presented in such a way as to highlight the graph-like relationships present in the system between file objects. The right hand side of the image shows a predefined set of details of the item, namely owner, date, location, type, and as it is an image, what camera took the picture. In addition to the details, a predefined subset of the sets that it is a member of is also shown. It is a member of the sets Cool architecture, Barcelona and Architecture.

In addition to the sets, a list of 'related items' is given, which is a list of items created before and after the current item. All of the above sets and lists are relationships that are constructed within the graph. If one of the lists, e.g. Image, is clicked, then that set is expanded to give some sense of what is in that set. So each individual item connects not just to the details of that item, but also to the sets of items that are related to it, and these relationships support navigation through the system.

CamFS is an exploration of how file systems could be viewed and managed in diverse ways, with some sense of the interconnection between different items. What new facilities might a system that positions digital objects as graphs rather than as entities offer? What could it tell us about the development of our traditional file systems? What downsides might it create? And lastly, what does it point to as regards files that we want to traffic between the PC and the Web? What abstractions might seem applicable?

Opposite page: Recent items showing metadata in CamFS.

THE CAMBRIDGE FILE SYSTEM
RECENT ITEMS

Waiting for the bus
April 9, 2012
Maddie, Disney-world, hat, green…

In the woods
April 9, 2012
Maddie, Disney-world, hat, green…

Kids and bike
April 9, 2012
Maddie, Disney-world, hat, green…

Interaction Design…
April 1, 2012
Design, RCA, Interaction Design

Dragonboat
April 9, 2012
Maddie, Disney-world, hat, green…

Dogs of Neosho #1
April 9, 2012
Maddie, Disney-world, hat, green…

Files 2020
April 1, 2012
Design, RCA, Interaction Design

Bank form
April 1, 2012
Design, RCA, Interaction Design

Rainy zoo
April 9, 2012
Maddie, Disney-world, hat, green…

Schools
April 1, 2012
Design, RCA, Interaction Design

More…

CHAPTER 5 | IDENTITY AND POSSESSION

IDENTITY SEEMS TO BE ONE OF THOSE THINGS THAT HAS A KIND OF ESSENTIAL QUALITY TO IT, THAT A PERSON IS 'REALLY THIS'. THIS ESSENCE ISN'T FIXED AND PERMANENT, HOWEVER; IDENTITY IS MADE THROUGH ACTIONS, IT IS PRODUCED. HOW ARE POSSESSIONS PART OF THIS PRODUCTION?
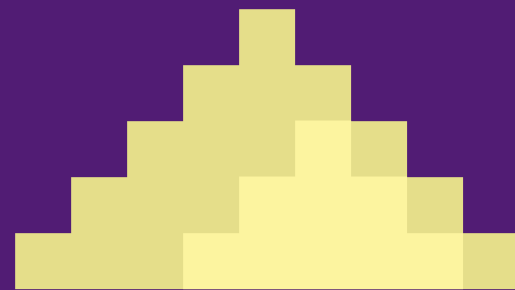
Identity On – and Offline

THE THINGS WE OWN AND PRODUCE, COLLECT AND DISPLAY, ALL SAY SOMETHING ABOUT WHO WE ARE OR WANT TO BE. THEY CAN SAY SOMETHING ABOUT OUR PAST AND SOMETHING ABOUT WHERE WE WANT TO GO. THINGS STAND AS REPRESENTATIVE OF US AND HOW WE WANT TO BE UNDERSTOOD: OUR IDENTITY IS NOT MERELY US, OUR BODIES, IT IS THE THINGS WE OWN AS WELL – OUR POSSESSIONS.

The connection between possessions and identity is not merely a question of things, however. Possessions can also imply something about the reasons why they came to be owned or why they have been kept. Just as real things convey this, so too do digital things. Digital possessions can symbolise the things we have done and want to do. In other words, the digital plays a part in the crafting of identity, allowing us to gather stuff that can articulate who we are, whilst conveying the kind of life that has led to those things being produced.

Yet in other ways, digital possessions, and social media sites especially, make it difficult to revisit the past. A status update encourages one to say what one is doing right now but affords little opportunity to articulate the past. Furthermore, content on social network sites falls out of currency fairly rapidly, after which commenting on or otherwise interacting with it becomes unexpected and goes against social conventions (Harper, Whitworth and Page, 2013). As one of our participants put it, social media simply 'expires' after a short period of time, and looking back through someone else's Facebook Timeline is only done in certain circumstances, such as when making a new Facebook 'friend'.

So how is identity managed through these sites? Rather than developing a narrative over time, people tend to perform different aspects of their identities, in the present, across sites. For example, Twitter might associated with peers and people with shared interests, Snapchat and WhatsApp with small and specific groups of friends, Pinterest for activities considered 'housewifey', and Facebook with an increasingly diverse audience, encompassing friends, but also parents, extended family and even exes. The diversification of this network, from an initial group of 'college friends', means that the site has become the neutral ground where old school or college friends might find you, where new acquaintances might start to navigate into a more personal connection, but it is not the place where you would show and share your most tender

thoughts. It is used to convey important announcements ("Just Graduated!") and for content that is anodyne and neutral, rather than evocative and intimate.

IDENTITY WORK AS A FORM OF CURATION

Understanding these distinctions across sites and services raises implications for how we support people in managing their digital possessions. It is worth noting that, while managing digital archives is known to be a somewhat overwhelming task, social media is curated implicitly as users interact with social network sites. Taking photos as an illustration, users engage in a good deal of curation work when presenting their photos online, through selecting the best pictures to upload, drawing them together in albums, and augmenting them with interesting captions and metadata. The motivation to curate is highlighted as a social one, it is a performance of identity for a particular audience. Yet it results in layers of content, which complement each other. As one of our participants noted: "There is the collection of absolutely everything which is on my computer, there is the collection of everything which is the best of everything on Facebook, and then there is an even smaller one [on Instagram], which is this nice grid view" (Zhao and Lindley, 2014).

This way of thinking about digital possessions resonates with some of our analyses of the 'archiving' of material things in the home. Kirk and Sellen (2010) highlight three types of storage here: objects on display; objects stored for functional use; and objects placed in deep storage. These different types of storage support different values, for example, objects on display can support a performance of identity; objects in functional storage enable the honouring of others through their use; and objects in deep storage can even facilitate 'forgetting'. If we consider a photo album uploaded to Facebook to be on display, and photos on an external hard drive to be in deep storage, we can begin to unpack how these different digital spaces support different values, and allow different expressions of identity, in the same way that different places in the home do.

This points to a set of possibilities that open up if we bridge online and offline spaces. For example, if users find it difficult to curate their digital photo collections, but undertake a form of curation when they choose which photos to upload to the internet, it may be worth reflecting this in the offline collections as well. What if your laptop knew which of your photos were on Facebook, the online albums that you had made there, and the tags you had created? This could help you navigate your offline (higher resolution versions of the same) photos, it could indicate which photos you might want to back up privately elsewhere (in case your social network account disappears or you lose access to it), it could even support 'forgetting'; perhaps those photos that are deleted from Facebook at the end of a relationship could be put into 'deep storage', or otherwise suppressed offline. At the very least, one can imagine that these photos might not be the ones the user wants to see appearing on the live tiles on their Start page.

Through our possessions, real and digital, online and offline, we convey who we want to be, and more so, who we want to be to different people. The updates people post,
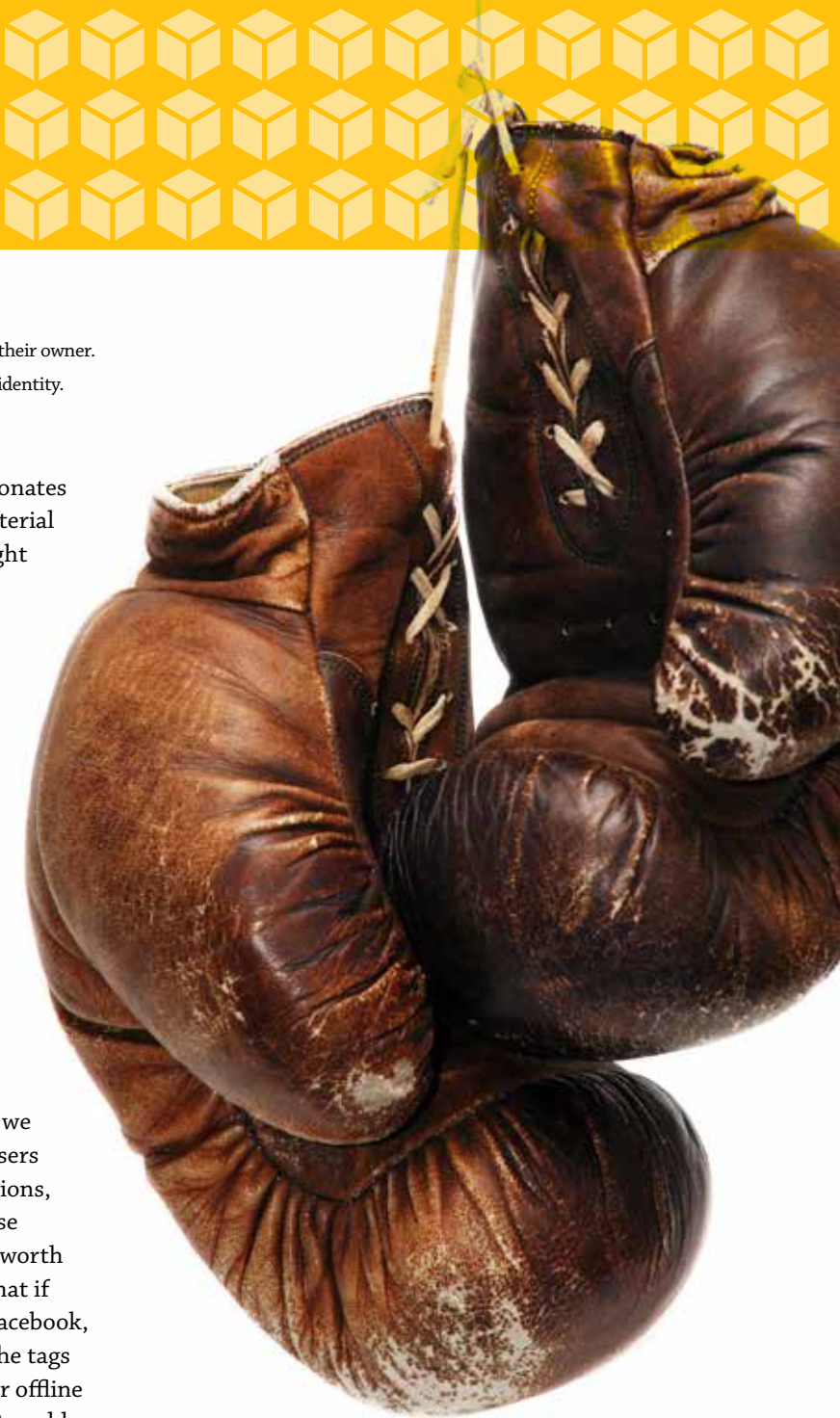
the collections they build, and the photos they upload all convey facets of identity. We suggest that the vehicles for these interactions can become more than a means of reporting what is happening now; they can also be a way of understanding the value of digital possessions kept elsewhere, such as on personal hard drives. In the final chapter, we will consider how a richer set of actions could support this bridging of the online and offline worlds, by returning to the issues of ownership, place and possession that were raised in the opening chapter.

Our possessions – the things we make, collect, and display – convey something of who we are. How can the way we do this with digital content be supported by, and feed back into, design?

A little TAKE AND GIVE

Traditional communication technologies tend to be built on the metaphor of giving or sharing. Letters, emails and text messages are all examples in which content is pushed from one person to another. More recently, blogs, micro-blogs and social networking sites allow people to post content online to be consumed more broadly. We might think of such behaviour as being closer to pulling; 'friends' and 'followers' can access content at their convenience. The system we present here, Take and Give, permits users to take unique content from one another; there is only ever one copy of each file.

Take and Give is a mobile phone application that was designed to provoke reflection on the way people perceive and manage the taking of digital content, and the social outcomes of such behaviour. The mobile phone is converted into a personal web server, called a 'Pocket'. Images placed in this Pocket can be viewed freely by other Take and Give users who, if they wish, can attempt to 'steal' them. Following a metaphor of pickpocketing, users can also protect their content by being vigilant. Content-owners are made aware, firstly, whenever their Pocket is being viewed (or 'snooped'), and secondly, if the viewer is attempting to take a file from them. If they are sufficiently attentive, the content holder can prevent their content from being taken in the moment

by pressing a 'Stop Thief' button. Users can also give files to each other by placing them in each other's Pockets. Thus, the system design supports the transfer of ownership of unique content amongst those within a network, in terms of pull and push.

During a deployment, emerging patterns of use suggested that Take and Give provided a means of self-presentation and supported a sense of awareness, mutual attentiveness and connectedness. The fact that there was only one version of each file within the image pool underpinned a sense of ownership, which resonated with gaming and triggered the development of strategies to hold onto content. This can

be clearly contrasted with systems such as Twitter, where ownership of expressive content is more nuanced and it is perceived as acceptable to copy, proliferate and keep content that originates elsewhere. A sometimes fierce sense of ownership developed around Take and Give content, the wish to hold on to content being bound up with an implicit value system. Certain images were known to be valuable because many others would attempt to take them and so, through interactions via the system, users could learn how their own content was perceived by the wider group. Possession was bound up with self-presentation; it conveyed preferences, and was also indicative of the skill with which people were able to play the game.
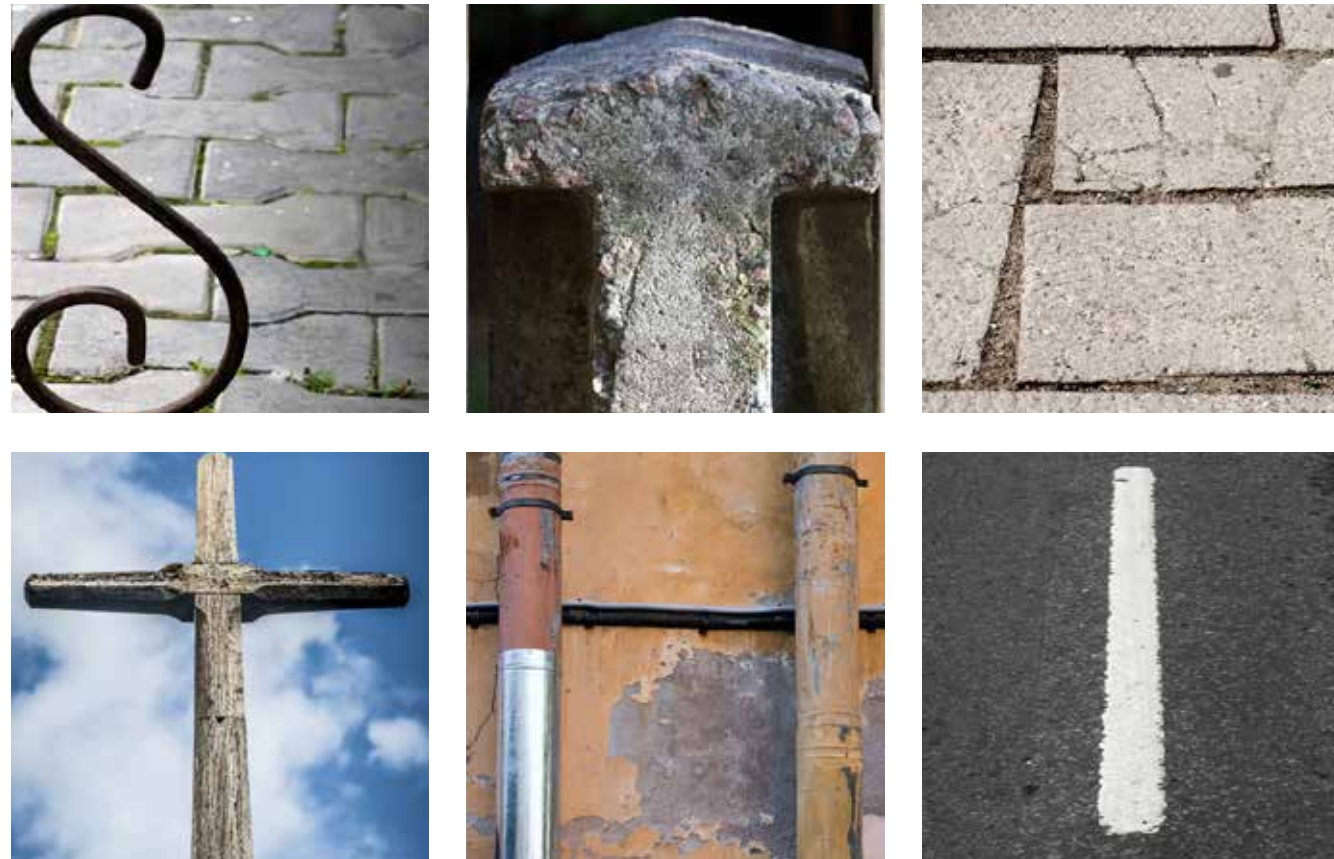
CHAPTER 6 | DESIGNING TO SUPPORT POSSESSION

POSSESSION IS MORE THAN SIMPLY HAVING OWNERSHIP OF SOMETHING. IT IS BOUND UP WITH WHAT WE CAN DO WITH OUR BELONGINGS, WHETHER WE CAN MOVE THEM FROM ONE PLACE TO ANOTHER, WHETHER WE CAN COLLECT AND CURATE THEM, AND WHETHER WE CAN GIFT THEM TO OTHERS, OR DISCARD THEM. DESIGN FOR POSSESSION ENTAILS DESIGN FOR ACTION.

Ownership as action

AT THE BEGINNING OF THIS MAGAZINE WE ASKED THE QUESTION, WHAT DOES IT MEAN TO POSSESS SOMETHING? IN THE CHAPTERS THAT FOLLOWED, WE HAVE CONSIDERED HOW THE THINGS THAT MIGHT MAKE UP OUR POSSESSIONS, DIGITAL AND PHYSICAL, ONLINE AND OFFLINE, OFFER DIFFERENT AFFORDANCES OR OPPORTUNITIES FOR ACTION. WE INTERACT WITH THEM, EXPERIENCE THEM, AND KEEP THEM SAFE IN DIFFERENT WAYS, AND OUR EXPERIENCE OF OWNERSHIP OVER THEM IS DIFFERENT AS A RESULT. IN THIS FINAL CHAPTER WE ASK, HOW CAN WE DESIGN TO SUPPORT A SENSE OF POSSESSION?

One way of posing this question is to ask what we need to be able to do with our possessions, in order to feel a sense of ownership of them. As we have seen, the Cloud and social media bring new complexity to the ways in which we can interact with digital content, and the resulting feeling of control we have over it. In contrast to the ways in which we can interact with computer files, where there is a set of generic and familiar commands (move, copy, delete, etc.), in the online world the actions that can be performed upon content provide no such consistency. Furthermore, the very idea of interacting with a coherent object can be lost. As we have seen, graph relationships shift the notion of interacting with a single piece of content to one of interacting with, and through, a myriad of data and metadata, which would be lost if that content was downloaded. Consider, as an example, what would happen if you downloaded a photo from Facebook. The tags, Likes and comments would be lost.

This points to the fact that users now want to have files and other types of digital content, things that are not file-like. There are now a range of data types that people produce, share and engage with, such as blogs, tweets, comments and Likes, and these go alongside more 'file-like' content, such as photos, music and video. It is not clear how one might save a tweet as a standalone object, or download a Facebook photo along with the metadata that it is related to. Yet if users can upload their photos to Facebook, why can they not download them again, whilst retaining the value they have accrued? Although it is now easier for users to export their data from Facebook, these exports, once represented simply as 'a file' on a hard disk, lose their potency. They are disconnected from the social life they were bound up with; they are the bare bones of the thing that the original file became when it was posted on Facebook. As we

saw in Chapter 4, if in the past a file was a single entity to the user, it might now be seen as a bundle.

So how might we design to better support the ways in which users can interact with their digital possessions, both on- and offline? One theme that we have explored in this magazine is to consider how to bridge these spaces in a way that is compelling, so that users can move their content across online and offline sites, taking advantage of the different values associated with each. Utilising graph relationships suggests one way forward here. Another requires careful thought as to what actions might be permitted when interacting with such content. The online world requires a reinterpretation of even the most straightforward of actions. As we saw in the opening pages of this magazine, the certainty of seeing that something 'is here', and then knowing that it has been removed, is lost in the online world. Putting something online opens up opportunities to others to act on that content, and this can include copying, downloading, and editing it for themselves.

OWNERSHIP AS COLLECTIVE

This points to a need to rethink how ownership takes on a different flavour online, and especially on social network sites, where it takes on something of a collective quality. Take, for example, our interviews with new university students (Bales and Lindley, 2013). They viewed sites like Facebook as hosting content that was beyond their means to personally manage and curate, and this was the case even when that content was their own. The collection of photos that one is tagged in, or that one can browse, is unlikely to be the same as that which a person has the rights to edit, and the possibility that someone might delete a photo you are tagged in reduces your sense of control over it. But secondly, and just as 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. Participants described how what they posted and what they removed was done with a wider view. They removed content from the site not because they didn't like it, but because it didn't 'have very many Likes', or because others had asked them to take it down, thinking it unflattering. Thus, the implications their actions had for others meant that our participants did not feel in control of even their own content when placing it on social network sites.

ACKNOWLEDGING PROVENANCE

Relatedly, we might consider what happens when ownership is shared, or even gifted. Our students saw actions such as tagging as offering a natural way of extending permissions to others, enabling them to copy or even keep content. Implicated here is the management of digital rights to images posted online, and who can do what with them. For instance, should these others be able to copy not only the file but also the associated metadata? Should the person who posted the content be able to keep track of when copies are produced? Related questions can be raised around deleting content. Could new file types be designed so that when a user clicks 'delete', the thing, whatever it is and wherever the entities constitutive of it are, are done away with?

These questions relate to the provenance of digital content, and making this visible could offer further opportunities for design. Digital materials could be designed to become more distinctive; the digital patina they imbue allowing for the creation of unique digital objects that hold their own value. And while this might be especially valuable when sharing cherished possessions or gifting, the history of a file might also provide value in more pragmatic contexts, such as knowledge work. The history of a file might, for example, be accessible while a document is being worked upon, and then locked down once that document is shared, or perhaps published online. In this case, editing might shift from being something that is done internally, involving changing, reviewing, and so on, to something done externally, such as being grouped with others. To return to our discussion of 'copying', these external actions may even be somehow reflected back to the person who uploaded the file in the first place. The graph stores that we discussed in Chapter 4 may offer novel ways of accomplishing this.

CLOSING PAGES

Possession is bound up with knowing where things are, and being able to act upon those things. That things are collected, displayed, gifted to others or even hidden away all are all important. These actions, which are inherently linked to the material qualities and affordances of things, have led us to suggest that rethinking the actions that digital content permits may reinforce and embellish what it means to possess it.

This may mean re-thinking enduring actions, such as copy and delete, as well as introducing new actions. These could, for example, allow users to eradicate a file that is stored in the cloud, or withdraw one from a social network. They could allow them to knowingly place a file in a particular location, to loan or share digital media, or even enable gifting. Although we conclude with these suggestions, we make them tentatively. Rethinking what digital content might be in a world of social media, apps, and the Cloud requires a good deal of thought and experimentation. This is the next challenge.

Possession is bound up with knowing where things are, and being able to act upon those things. Do we need a new equivalent to cut and paste, drag and drop and, if so, what might this be?

SOCIO-DIGITAL SYSTEMS
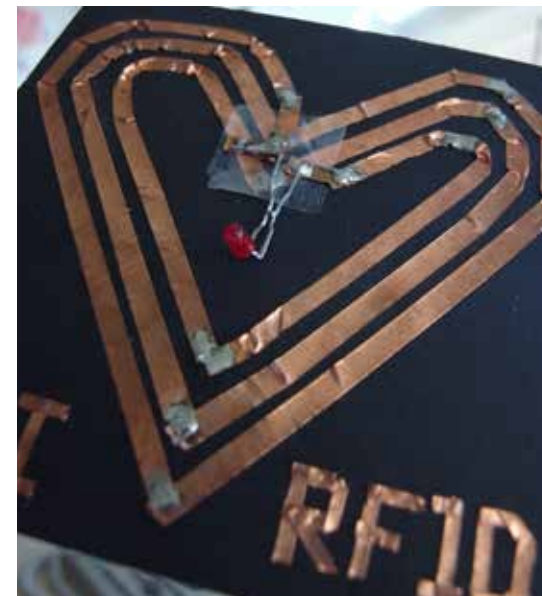
Socio-Digital Systems (SDS) is one of the research groups at Microsoft Research in Cambridge, UK. As a group, SDS aims to use an understanding of human values to help change the technological landscape in the 21st Century. Beyond making us all more productive and efficient, we ask how we can build technology to help us be more expressive, creative and reflective in our daily lives.

Our group considers a broad range of human values, aims to understand their complexity and puts them front and centre in technology development. An important aspect of this endeavour is the construction of new technologies that, in turn, we ourselves can shape. In so doing, we may create new ways that help us to actively realise our aspirations and desires, to engage with or disconnect from the world around us, to remember our past or to forget it, to connect with others or disengage from them. Important here are technologies which ultimately make our lives richer, and which offer us choice and flexibility in the things that we do.

SDS does this through the bringing together of social science, design and computer science. We believe that by understanding human values, we open up a space of new technological possibilities that stretches the boundaries of current conceptions of human-computer interaction.

For more information on our group, and our current themes, projects and publications, please visit research.microsoft.com/sds

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