

Life beyond the timeline: creating and curating a digital legacy

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Abstract: The internet has steadily become integrated with our everyday lives, and it is scarcely worth remarking that the quotidian footprint we leave is increasingly digital. This being the case, the question of what will happen to our digital legacy when we die is an increasing important one. Digital accounts containing emails, photos, videos, music collections, documents of all kinds, social media content, eBooks and the like, all trace the life we have led, and if they are to be conserved and bequeathed, if family and friends are to benefit from this often highly emotive and evocative desiderata, if history is to be recorded, we need to prepare these accounts and assets for the inevitability of death. A difficulty though, is that the demands of curating such a legacy are formidable, the importance of creating digital archives from personal data contained in online accounts is not well-established in the public arena, and the products and services available to facilitate this are largely inadequate. Future generations and future historians are the poorer for this. In this presentation we will point out some of the difficulties involved in curating and bequeathing a digital legacy, and suggest a partial remediation.

Keywords: Digital legacy, digital archives.

Introduction

For the celebrities of the 20th century a life in the public spotlight was a matter of record, with key events, relationships and achievements recognised and documented for private and public purposes. For these individuals, a legacy of letters, sound recordings, videos, private papers, personal records, photos, and films, all stored in many places and in many forms, needed to be captured, managed and curated for the historical record; to perhaps be donated to an institutional archive or given to family members for use in family histories and memoirs.

It is arguable that today this situation has been democratised, and in a sense, everyone with access to digital technologies is a multimedia celebrity. In a digital age, “Evidence of Me...” abounds and Ann-Clare’s carbon-paper is not required (McKemmish 1996). Ordinary people are now routinely creating a digital record of their everyday life. For some, this record is a self-conscious autobiography. Digital media and social network sites are mobilised in order to create a reflexive social and personal identity; images are carefully selected and annotated; “likes” are used strategically; publics of various kinds are assembled to witness, and boundary work is conducted to define these publics; stories are told to create and maintain links between that online identity and those publics. Our personally constructed digital legacy will commonly include the contents of email accounts, the contents of social network accounts on services such as Facebook and LinkedIn, music accounts on services such as iTunes and Spotify, images on services such as Flickr and Instagram, videos on services such as YouTube, and documents of many kinds on cloud storage services such as DropBox.

In parallel, a distributed and diverse record is assembled across hundreds of online sites by default, as our digital inputs and outputs are routinely captured, stored and mined for the personal-profiling data used to inform those with an interest in commodifying our identity as consumers. In both these ways, in the course of everyday life, we are assembling a media legacy of considerable volume, personal importance, and arguably historical importance.

For those with a sense that the accumulation of personal media is a form of self-witnessing, and the aggregation of this media narrates a form of autobiography, it is important not only that it be authored appropriately, but that it be successfully bequeathed. Our digital legacy represents a narrative of a life lived, is of obvious personal, familial and communal value, and is also of wider historical and social value. Histories told through the exploits of

the great, the good and the powerful will no doubt continue to abound, but history also has a profound interest in the lives of ordinary people leading ordinary lives, and to the extent that these lives are digitally mediated, so too is the historical dataset.

There have been a number of practical responses to this relatively new demand, such as changes in policy by Google and Facebook, and the establishment of commercial “legacy management” service providers and private “digital registers” to accompany a last will and testament. However, online service providers could offer much more leadership in this respect, as there are few established mechanisms for re-purposing the digital artefacts of the deceased, or to ensure their long-term preservation. Similarly, professional archivists have paid scant attention to personal records, as compared to institutional and commercial records (Cunningham 1999; Hobbs 2001), and even less attention to the DIY archiving needs of ordinary people.

If capture and preservation is important, it is equally critical that some elements of a digital heritage are destroyed upon death, or at the very least, remain inaccessible. As many have found to their mortification, once moved online, files are reproducible, searchable, are often re-contextualised, and can be extraordinarily difficult to delete (e.g. Mayer-Schönberger, 2009); yet the sensibilities of loved ones, the management of reputation, and a defence against identity theft may well depend upon the ability to remove these records from penetrable digital spaces.

In either case, the question of the curation and bequeathing of a digital legacy must be addressed. The history of ordinary people, as told through their correspondence and their material possessions, has long been a precious resource for families and for historians alike. Businesses, institutions and other organisations have responded to the challenges of the storage and re-use of digital assets by building digital repositories at an institutional level, and at a national and international level. However, personal data - the quotidian data relating to an individual’s life – has until very recently been neglected in the debates and practices about digital archives and access to archives. In this context the problem of what happens to a digital legacy and how it may be passed from one generation to the next have become important questions.

The literature on questions related to death and the Internet is broad, covering many fields and approaches to study. There has been growing interest within the archival, library studies and digital humanities communities about the issues surround the preservation of personal data and the creation of ‘personal digital archives’, but few studies, with one notable exception (Bellamy et al 2013; Gibbs et al 2013b) focus specifically on death and bequeathment of data. The larger body of work on online memorialising has largely been positioned within a research approach that considers the psychology and sociology of grief and support, and this connects with a wider literature in the social sciences that examines death, grieving and memorialisation (e.g. Aries 1983; Hockey, Komaromy and Woodthorpe 2010; Kellehear 2007; Metcalf and Huntington 1991; Robben 2004).

Studies of online memorialisation have examined the extent to which the sites facilitate the sharing of grieving, remembering, commemorating and providing social support (e.g. Jones 2004; Gibson 2007; Roberts and Vidal 2000; Sofka 1997; Veale, 2003, de Veries and Rutherford, 2004; Walther and Boyd 2002). More recently, following the popularisation of social software, attention has turned to social networks with particular focus on the practices of teenagers (Carroll and Landry, 2010; Williams & Merten, 2009). Others have considered memorials and commemoration in other online place such as video games (Gibbs et al, 2012; 2013a; 2013b). More recently, so called RIP Trolling of memorial sites and attendant issues of responsibility have been considered (Phillips 2011, Kohn et al. 2012). Interaction designers have also become increasingly interested in addressing the many design challenges presented by the development of online memorial practices (Brubaker and Hayes 2011; Mori et al 2011; Odom et al. 2010) and have contrasted the way various online platforms shape commemorative practices (Mori et al 2012). Whilst there is a growing literature attending to practices and forms of online memorialisation, studies of the management of digital legacies have been limited (see, for example, Carroll and Romano, 2011).

To examine these issues the authors undertook a project funded by the Australian Communications Consumer Action Network – a peak-body consumer advocacy, research and education group whose work is focused on the Internet and telecommunications services. The project involved empirical research on consumer issues in planning and managing death online, and involved developing accessible educational materials for Australian consumers that summarised the social, legal and economic issues, and offered guidance for action (for the report see: Bellamy et al 2013). The advice offered was informed by primary sources such as the Terms of Use Agreements of popular internet sites and services, many secondary sources from the legal literature and elsewhere, and key-informant interviews with managers and policy makers drawn from relevant industries and professions. These industries and professions comprised telecommunications companies, social network software managers, intellectual property lawyers, professional archivists, online memorial companies, the Victorian State Trustees, and members of the clergy within Australia. The report provided an account of the legal situation as it pertains to a digital legacy, and provided what we were given to understand to be “best practice” in curating and archiving that legacy. In this paper we revisit this advice, and it will be seen in the account that follows, that though the suggestions may make sense in certain legal and archiving discourses and practices, there are significant problems in adhering to it on any sort of popular scale. We conclude that the steps suggested are not likely to produce the desired result.

We turn now to identify some of the issues associated with constructing a personal digital archive, to summarise the advice received on addressing these issues, and point to the problems associated with acting on this advice. We then conclude with a brief gesture towards a potential (if partial) remedy.

Problem: are these files mine, and who can access them?

The issue of who owns what in the digital realm is complex, is an important consideration in determining what may be archived and bequeathed to others, and is a major obstacle to curating a digital legacy. Ownership of emails, photos, blogs, web-sites and URLs, electronic documents, music files, the content uploaded to social media accounts and so on, usually depends in a legal sense upon the particularities of the Terms of Use Agreement that were entered into when the deceased signed-up for the online service. These terms of use set out the conditions of posthumous access to digital assets and their use. Overarching contractual rights, intellectual property rights, and various forms of copyright law, all of which vary from jurisdiction to jurisdiction, further complicate the situation. Should the files in question (or copies of the files) be stored locally on a hard-disc, a USB stick or the like, the letter of the law may not make any practical difference to bequeathing the files, however, the recent stampede towards the use of cloud services makes it increasingly likely that one’s legacy is held remotely on a server, very often in another country and in another legal jurisdiction, and is only under one’s control with the grace of the service provider.

So while there are well-established procedures for locating, valuing and transferring ownership of material property such as real-estate or cars or books, the task of locating, accessing and disbursing digital assets after death is made more difficult by the ambiguity of ownership and terms of use that prevent third-party access. For example, online services such as Yahoo! have Terms of Use Agreements that disallow the transferring of an individual account to another individual, indeed “some [commentators] believe Yahoo!’s policies regarding customer information stored on its e-mail server are stricter than hospital policies regarding medical records” (Tarney 2012 p. 780) . Companies such as Yahoo! have agreed to provide a service to a named individual and the agreement and the service provided terminates upon that individual’s death, generally operationalised through a formal process, or after a minimum period of inactivity. Many years of photos, videos, text files and other digital files and documents uploaded to an online service may be lost forever if posthumous access to them is not arranged, or local copies are unavailable.

A common-sense solution to the problem of ambiguous ownership and granting third-party access is for the individual to provide a list of services (Flickr, PayPal, Facebook, Dropbox, etc.), and, for each service, to provide the relevant username and password, along with instructions for friends, relatives and the executor of the will to execute upon one's death in a so-called "digital register" – further detail on this is provided later in the paper (Bellamy et al. 2013; Gibbs et al. 2013c). Common-sense though this may be, it is against the terms of agreement of many service providers who prohibit the provision of one's username and password to a third party, and forbid any individual from accessing another person's account, deceased or not. Many US based service providers are in this category. Other online service providers (such as Australia's iiNet and Telstra) do allow this use of a digital register and consider an individual who has been given the username and password to be an authorised agent of the account's owner. Of course, for all practical purposes, the identification of the person using the username and password is difficult to verify.

Another common sense solution is to maintain local copies of assets stored on the internet. Local copies are under direct rather than indirect control, and the problem of access is alleviated. In many cases local files pre-exist remote copies, as internet files are in fact copies of local files, but as the use of remote file-servers overtakes the use of local storage devices, and as applications increasingly save direct to these file-servers, this situation is unlikely to remain the standard. The local storage of files in addition to "Cloud" storage also generates its own problems – in particular problems of versioning, and of course does nothing to alleviate the problem of archival management, addressed next in the paper.

Problem: curating and bequeathing a local digital archive

Local copies of your files should be in a format that can be used at a later date and are of the best possible quality. There are a number of considerations here, in a situation where hardware, application software, file formats and operating systems all rapidly become redundant, but generally it is important that the files saved are in popular open-source formats that are in general use, such as JPEG or TIFF for images, or MP4 for video, and are transferred from old hardware to new as the new becomes mainstream. If a MS Word document can be saved as a plain text file or an RTF without losing too much of its structure, then it should be saved as a plain text file to obviate future dependence on proprietary software which may or may not exist for the next generation. Some organisations have published tips sheets on creating and maintaining digital archives (e.g. the National Archives of Australia), and the National Archives of the UK have some good guidance on selecting file types (see, for example, <http://www.nationalarchives.gov.uk/documents/selecting-file-formats.pdf>).

Trained archivists recommend that personal archivists periodically download and archive all digital files (photos, tweets, videos, documents etc.), and store them locally on a removable storage device, such as a thumb-drive or portable hard-disk, in order to have personal control over that archive. Using this method it is possible to curate the storage disks in such a way that only the files that you wish to include are available to friends and relatives, or to future historians; it is possible to use a bespoke organisational structure that suits the files and their content, rather than relying on the default structure of the online service; and your archive is not dependent upon the good grace and continuing viability of a commercial entity.

Once all the relevant files are gathered locally in one place, they should be provided with the context that gives the file meaning and purpose for others. Following Haraway (1991) and others who have explored emergent and situated knowledges (Bhavnani, 1993; Feinberg, 2008; Ihde, 2012; Law, 2009; Sassower, 1994), the epistemological foundation of knowing is relational, and if making meaning and knowing is at all relational, it is relational in the case of legacy objects. For example, a photograph of the London Bridge not anchored by context invokes quite a different meaning when situated as holiday snap taken three weeks before the

death of spouse. A way to begin to provide context is with a simple folder structure. There are no strict rules here, but generally the simpler and more straight-forward the better (such as 'family photos', 'Europe trip 2010', 'Pam's music', 'emails to Gavin' and so on). 'Metadata' or contextual information about the items should also be placed in the folder so others know of its context and potential significance. This may be in the form of a simple text file that describes what is in the folder, where it was created and why, dates, and any other important information considered relevant for use in a family archive, but it can work down to fine-grain detail related to each file. Also consider using face-recognition software such as Google's Picasa to automatically name-tag all the individuals in your photos for the benefit of future generations.

With all the data arranged in folders and in one-place, it may be then placed on a removable storage disk. Storage devices such as DVDs, CD ROMS, and Flash discs should not be used because they are fast-changing formats and may not be accessible in the future. It is recommended to use two removable hard-disks, one to be kept in a safe location and one to be given to a trusted friend. The discs must be updated regularly to make sure they contain relevant information, and also the actual discs should be replaced every 2-5 years, and should be replaced with new storage technologies as they become standard.

Digital preservation is an active and ongoing process and it is important to intervene in the process and manage digital legacies over time. Another tried and trusted method is to print out important documents and images and store them in a filing cabinet as paper remains one of the most enduring preservation formats.

In very recent times, online companies have provided facilities to download and archive personal data. For instance:

- Facebook allows individuals to download all the information they have shared on their timeline including photos, status updates, and comments. There are also expanded options that allow individuals to view cookies, logins, logouts and almost any other way of interacting with the site (See: <https://www.facebook.com/help/131112897028467/>).
- Twitter also now allows individuals to download their entire twitter archive from the beginning (See: <http://blog.twitter.com/2012/12/your-twitter-archive.html>).
- YouTube allows users to download and archive all YouTube uploads in the original uploaded format (See: <http://12starsmedia.com/blog/how-to-download-archive-your-entire-youtube-library>).
- Also, Google's take-out service allows users to download and archive data from many of their Google services (See: <https://www.google.com/takeout/>).
- Downloading and archiving an online Gmail or Hotmail account is a little more difficult as it requires the installation of a local software application such as Thunderbird to download all the emails so that they can be read and stored locally. Once emails have been downloaded, it is possible to export them in different formats and in complete folders. The emails can be associated with a particular project or a particular family member or friend. Other emails that are either personal or irrelevant can be deleted.

These downloading facilities are welcome, as is the advice of archivists, but the task of local archiving remains onerous in the extreme. Can we really expect people to engage in the time consuming and non-trivial task of categorising tens of thousands, or in many cases, hundreds of thousands of files, determining which are to be archived and bequeathed and which are to be destroyed, then providing the metadata for future generations to make sense of the files, then writing them to synchronised hard-disks and ensuring the security and working order of those disks, and of course, doing this time after time, year after year, to ensure currency and completeness? This is not being done on any sort of scale, and there is clearly a lot of work to be done to make this a practicable and commonly performed task.

We move now to consider the particular media that may be included in an archive.

Problems curating and bequeathing digital music and eBooks

We all know that we can learn a lot about a person by flicking through their music collection or by examining their book shelves. We also know that music and literature is precious, and collections spanning decades make for a very valuable legacy for loved ones. Books and music speak of one's sensibilities – intellectual and emotional – and speak of one's shaping by a culture, and are integral to a personal legacy. Passing on physical vinyl records, CDs and books is easy; passing on digital music and eBooks is more problematic.

Digital music is usually licenced for individual use and thus cannot be legally bequeathed to another. Companies such as Apple have complex consumer software licences that once agreed are binding, and certain legal rights are established (as when a document is signed). In effect, when using a service such as iTunes the individual is licenced to listen to the music file, but does not own the music file. The licenses are in place to protect the producers of the music, who pass it to Apple under the provision that Apple will protect their interests over the interests of the consumers.

A few of the important considerations of Apple's Terms of Agreement is that Apple will not replace digital files, files can only be downloaded once, and the unauthorised transfer of files is illegal under copyright law. If a file is lost, Apple will not replace it, and hence personal backups are important.

Other companies have different consumer software licences that set out what can and cannot be done with a digital file (such as Creative Commons licenses), and some digital audio files are in the public domain and have few or no intellectual property rights.

As with digital music, eBook files are usually licensed for individual use and cannot be bequeathed. The terms of service give buyers the right to use the file, that is, read the book, but they do not own the file, their right to read may expire on a certain date, and the file can often only be read with proprietary combinations of hardware and software. On occasions, your license may be extended to friends or family, but the ownership of the file still remains with the publisher. An important exception to this are books that are out of copyright and have been digitised and made available under a Creative Commons licence by organisations such as Project Gutenberg and Google Books.

There are many advantages to eBooks, but bequeathment is not one of them. If an individual is concerned about the inter-generational longevity of their library, it is best to buy physical copies of the book in the first instance, and not the eBook version. The physical copy can then be straightforwardly bequeathed.

Like music, books are an important component of many people's biography, and again, form an important component of family history. As things stand at time of writing, eBooks are lost to legacy, and the seminal books that have contributed to a biography, and should be passed to others, need to be in physical form.

Problems curating and bequeathing images

Passing on digital images is less problematic than digital music or books in so much as the copyright of a photograph is owned by the individual who took the photograph, unless the rights are specifically passed to another. Uploading a photo to the web doesn't change this and copyright is retained by the photographer. Thus photos can be bequeathed to another person in a will and many professional photographers, who earn a living from their photos, do this as a matter of course.

In the case of popular services such as Flickr, users may choose an All Rights Reserved licence for their uploaded photos, or a Creative Commons License. A Creative Commons License is a series of licenses that limits what users may and may not do with photos, such as reusing them for commercial purposes or using them without attribution (For further information see http://en.wikipedia.org/wiki/All_rights_reserved, and http://en.wikipedia.org/wiki/Creative_Commons_licenses). Although online systems are convenient places to share photos, they are often published in a compressed and low-quality format. Again, it is best practice to retain local copies, in the best quality possible, along with

the important information about where they were taken, dates, and people in the photo. Many digital cameras allow ‘metadata’, to be written into the file (such as time and date, GPS, and camera settings for the photo), but this will not provide future generations with social context, which will need to be added once the file is transferred to a computer.

In the case of other popular systems for publishing photos, such as Facebook, the copyright is still owned by the photographer. The terms of service grant Facebook the right to reuse personal photographs in certain features of the system, but this is primarily determined by the user’s privacy settings. Other systems may have differing copyright provisions and it is always prudent to check the Terms of Service before uploading images to a particular service.

In many different cultural contexts, photos reveal a significant component of family history over several generations and considering how they will be maintained and bequeathed is important. In other cultural contexts it is important that photographs not be viewed at all. For example, many indigenous Australian communities do not approve of the display of photographs of deceased people. Use of the names of deceased people is problematic in many of these communities. Other images should only be seen by those in community, and when in community, some should be viewed only with the permission of particular custodians and in particular circumstances.

Even where these cultural sensitivities do not apply, and the personal archivist’s objective is to make as much information known to as many people as possible, the problem of curating and managing an archive of what may be tens of thousands of images remains formidable. These problems may not be new, as anyone who has leafed through an old photo-album will attest (who are these people? where was this taken?). However, the sheer quantity of images generated in digital formats not only exacerbates these problems, it makes them virtually impossible to overcome with traditional manual methods of curating and archiving.

Problems curating and bequeathing video

As with photos, the copyright of videos uploaded to popular systems such as YouTube is usually owned by the person who recorded the video, so videos may be legally bequeathed. However, once uploaded many of the exclusive rights that the individual has over the video are granted to YouTube in the terms of service. YouTube may, for example, republish your videos in other parts of the YouTube system, and use your videos to raise revenue through banner advertisements. However the license that grants YouTube the rights to use uploaded videos is terminated once the videos are deleted from the service (See YouTube’s Community Guidelines and Terms of Service for further guidance: <http://www.youtube.com/static?template=terms>).

Along with photos, videos now form an important part of family history so again, it is important to consider their long term maintenance and bequeathment. As with photos, it is best practice to keep the best possible copies of the digital files in a local folder using popular formats such as Mp4, ensuring that additional contextual information accompanies the videos to enable future generations to appreciate their content. Of course, the previously mentioned curatorial and management problems remain.

Problems curating and bequeathing email

Email is one of the more important communications mechanisms in the digital age; indeed, email is commonly regarded as the internet’s “killer application” and has replaced paper letters, memos and notes in many social contexts. Access to correspondence is a very important issue for family history, community history, and history more generally. Correspondence has long been a primary evidence for the construction of these histories, and the move from paper to email has in some contexts severely compromised this important source of evidence. The archiving and bequeathing of emails poses some of the same problems encountered with paper, but also some new ones.

Like paper letters, emails are usually context-specific, personal in nature, and not meant for broader public consumption. Email services such as Gmail and Hotmail are conscious of

this and have strict rules that forbid access to the email associated with a deceased person's account. Thus emails in general will be inaccessible and destroyed if provision for access has not been made for them before the death of the account holder.

Generally speaking, access to another person's email account is not available except under a court order, even to next of kin (and from a privacy perspective, especially not to next of kin). Also be mindful that although one generally stores one's email on the email server, email service providers will only store emails for a defined period of time, after which expired emails are deleted. This being the case, if one wishes to bequeath one's emails, one must take steps to archive and store them locally, rather than relying upon the service provider to make them posthumously available.

Even though some employers permit the use of their email system for private purposes, many people consider it good practice to use a separate system for private correspondence, perhaps Gmail or Hotmail, rather than using an employer's system. Work-related email systems usually have their own privacy and 'terms of use' policies, and employees using this system for private purposes may have little or no control over these terms and the way they impact email correspondence.

If personal emails are to be archived, they should be appropriately filed and stored offline. A separate email account, or several accounts each with a different purpose, makes this process clearer – though it must be said, this may be more inconvenient than a single account for day to day use. Organising personal and professional correspondence in a thoughtful way is necessary if it is to be effectively archived and bequeathed. Most email clients enable emails and their attached documents to be stored in nested folders, and the structure of these folders should clearly separate out different categories of email, represent the context in which the emails were produced, lay out a coherent history of correspondence, and should be comprehensible in the future not just to the original sender, but to their beneficiaries. This is not a difficult task in itself, but it is time consuming, and requires forethought and motivation.

Problems curating and bequeathing mobile accounts and texts

The procedure for dealing with mobile phones and the SMS texts and data that they contain differs between services providers, but in general, most of the larger service providers have established policies to deal with the death of a client. Procedures usually require the next of kin to contact the service provider on their customer support line and notifying them of the death. The next of kin or authorised representative must provide the appropriate evidence of death, such as a funeral notice, a death certificate, or a statutory declaration confirming authority to act on behalf of the deceased. The next of kin or authorised representative is then required to download, complete, and submit a form outlining what is to happen to the particular accounts.

There are usually two options for dealing with a deceased person's account; the account may be closed, final bills paid and all data (text messages, favourites, contacts, recent calls etc.) is then deleted. However, accounts may also be transferrable to the next of kin by the authorised representative so that the service is continued. This means that the same mobile phone number is retained and call records, text messages and so on may also be available.

Telcos do not provide for a person to request that their phone account be deleted upon their death, which does raise some privacy concerns. However even if this was the case, there is still the possibility that the next of kin and authorised representative will have access to the phone-handset itself, and if unlocked, will be able to access texts, recent calls, contacts and so on, regardless of the telecommunication companies policies.

Problems curating and bequeathing websites and domain names

Web sites and domain names may be bequeathed to another person with instructions given in a Will and accompanying digital register (see the following section for details). In Australia for example, the regulator of domain names (.auDA) has a policy for transferring ownership of domain names to a deceased person's estate that applies to the particular domain registrar

that the domain is housed (such as Melbourne IT or Netregistry). In the event of an individual's death, the domain registrar should be contacted and appropriate evidence of death supplied. It is then a matter of transferring the domain name and the account associated with it to another person (a fee may be charged for this service).

Another important consideration here is that the domain registrar and the web host may be two different companies. If this is the case, the web host will also need to be contacted and again, appropriate evidence supplied. Access to the website files can be granted to next of kin or nominated person and the accounts name and files transferred to the nominated person.

Creating a digital register

A suggested solution to some of the problems mentioned above is to create a digital register (Bellamy et al 2013; Gibbs et al 2013c). A digital register contains the online locations and passwords of online accounts so that the files they hold may be destroyed or bequeathed to friends and relatives as appropriate. This register can be prepared by an individual, or can be arranged with the assistance of a legal specialist in Wills and Deceased Estates and is usually attached as an appendix to the Will. However, in Australia at least, the need to include a digital register as an appendix to a Will is not well-promoted by Wills and Deceased Estate specialists, nor other institutions tasked with managing the affairs of deceased persons, and much more educational work needs to be done in this regard.

Recommended steps needed to create a digital register to accompany a Will are as follows:

- An audit needs to be done of all digital assets. All services should be considered – iTunes, Flickr, videos, Facebook, LinkedIn, domain names, blogs, websites, email accounts, application software, eBay, PayPal, online gaming accounts, YouTube, eBay, phone apps, data held on the cloud, Amazon, Google Docs, Dropbox, and other data storing facilities that may be associated with work, hobby, or personal business. Also there needs to be consideration of offline digital assets stored locally on CDs, DVDs, hard-drives, USB storage, or even on floppy disks.
- A decision needs to be made about who is going to manage the digital assets upon the death of the individual concerned. This is usually the Executor of the Will, if they are technically adept enough to locate and access accounts, to identify the files associated with these accounts, and to carry out instructions in respect of these files. Alternatively, a friend or family member may be nominated to assist in this regard. The digital register and associated instructions may be an appendix to the Will, and like the Will, should be kept in a safe place known to the executor. Commercial service providers (e.g. Security Safe or Legacy Locker) offer specialist services that will store important data and passwords that allow nominated individuals access accounts and files in the event of death or disability.
- Details need to be provided on where to find the 'digital assets', and clear instructions need to be given on how to access files and groups of files, and on exactly what to do with them upon death. It is important that information about locations, usernames and passwords are up-to-date as finding and gaining access to accounts after death can be extraordinary difficult, if not impossible, without this information. Enabling the digital legacy to be disbursed or deleted as appropriate, also reduces the possibility of identity theft and the possibility of reputational damage and distress brought to friends and relatives should privacy be violated upon death.
- All of the above presupposes that a digital legacy is organised, labelled and described in such a way that enables instructions to be executed. There may well be many thousands of files in these accounts, and providing individual instructions for each is impractical. Thoughtful categorisation of files in archives is a useful thing to do for everyday purposes and will also make the job of deletion or disbursement of a digital estate much easier and more effective.

- If accounts are to be closed immediately upon death, most companies require a formal process in which proof of death is provided (usually a death certificate or published obituary notice) by a person authorised to act on the deceased behalf (usually the Executor of the Will). Alternatively, many accounts will be closed at the expiry of a minimum period of inactivity – which may be as long as 9 – 12 months. If an online repository is to be closed and its contents destroyed or made inaccessible, this minimum period may be too long.

Other things to consider when preparing instructions:

- If one opts to establish an online memorial site, should this be a Facebook memorial site or perhaps a separate website built specifically as a memorial for friends and relatives to view and interact with? What kinds of material are to appear on the site? Should one record a final video or write a final note to convey to family and friends posthumously or to post on a memorial site? Who will take responsibility for establishing and maintaining the site?
- Should social-network accounts be closed, or remain open as a place for friends and relatives to converse and reminisce?
- It is always good practice to create local archives of online personal files periodically. This is increasingly easy to do and most of the larger social software companies (e.g. Facebook, Google and its subsidiaries) now offer account downloading facilities.

Conclusions and future implications

Given the size of the digital economy, and the plethora of services and products now available to the public, it is difficult to ascribe a simple fix to the legacy problems that follow when users of these services die. However this is not to say that developers of software products and services could not do much more to consider the issues that will only become much more acute in the future. Some of the issues are as follows:

1. There is no single, established mechanism for archiving and re-repurposing the digital artefacts of the deceased, nor to insure their long-term preservation with appropriate descriptive metadata to designate digital items in context. Best practices are still evolving, and must be assembled from multiple sources.
2. There is no single, established mechanism for establishing and maintaining online memorials. Best practices are still evolving and must be assembled from multiple sources.
3. Many online systems and service providers do not have procedures in place to cater for the death of a user. The ability to designate an inheritor of one's data in the user's preferences or indeed to request the deletion of ones data upon death is missing in almost all systems. This creates unnecessary complications for the next of kin.
4. There are significant internal inconsistencies and recourse to ad-hoc arrangements in how major companies deal with the death of a client. Even where companies have established policies, the transfer of digital assets to another user is often difficult in practice as these policies are hard to find, are expressed in obscure legalese, are difficult to interpret, and they may have no-one in particular whose role it is to manage the situation.
5. Currently, individuals need to take responsibility for their digital assets. Most importantly, this includes creating and maintaining a local archive of one's most important digital assets, making decisions in regard to the disbursement of that archive, and leaving clear and accessible instructions to enable online digital assets to be accessed and then deleted or disbursed as appropriate. This responsibility remains almost entirely unfulfilled.
6. The importance of creating personal digital archives is not well-established in the popular imagination. The products and services available to facilitate this are

inadequate, and digital service providers could offer much more leadership in this respect.

7. Protocols and practices associated with bequeathment of digital assets alongside material and financial assets in the context a legal Will needs to be further developed by relevant agencies.
8. Introducing personal archival practices early in one's life is now an important consideration, given that data is acquired from a very young age, is stored remotely in an ephemeral way, and is easily forgotten.
9. Institutional archives and libraries could provide a lead in terms of educational material and services in regard to best-practice archiving. Personal digital archives often overlap with local or even national histories so it is in the interests of archives to innovate in this area.

Online service providers that store our assets clearly have a role to play in remediating this situation, but institutional archives and libraries could also provide a greater lead. Protocols and practices about the bequeathment of digital assets need to be further developed to take their place alongside those that pertain to material and financial assets. Individuals and families are in need of educational materials and services for the construction of personal digital archives, and communities are in need of these materials and services for the construction of community and national archives, built in part from an aggregation of family archives. The ability to construct an archive, to designate an inheritor of one's digital legacy or indeed to request the deletion of all or some of this legacy, is missing in many systems.

The answer is clearly not to be found in devising manual systems, or encouraging people to use manual systems, and we look to a time when the work required to curate an ever increasing digital legacy held by many millions of people may be addressed by automated or semi-automated systems.

One way forward is to repurpose the automated and semi-automated systems used by intelligence services such as Echelon and Prism; by data-mining companies such as Axiom and Neilson Claritas; and by the data gathering and analytics systems used by Google, Facebook and the like to process and store personal information. Our legacy is out there. It just needs to be selectively culled, organised and brought together. The algorithms used by these surveillance systems can search out, identify, tag, categorise and cross reference the plethora of images, emails, and other digital files we produce in a lifetime, using heuristics based on rules we determine, and behaviours we exhibit, to curate and store these files. Such an "intelligent agent", or "digital curator", might sit in the cloud, watching traffic across our desktop, pad, and smart-phone, tagging and categorising in real time, learning from our filing practices and generalising from our explicit instructions, requesting advice and permission as needed, thus bringing our legacy together in an organised and comprehensible package. Of course, a fundamental shift in the openness and control of online processes in favour of citizens and consumers is required, and the task of repurposing surveillance systems to create such an agent is clearly a formidable one. But so is the problem. Without a "digital curator", our history is dispersed to the digital wind – not gone, and even proliferating, but not in relation, and not to hand.

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