Self Analytics and Personal Digital Archives in University Collections

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Abstract:

As college and university archives grapple with donations of born-digital materials, they have yet to establish best practices and workflows for personally collected data such as that collected by lifeloggers or smartphones. Future acquisitions and accessions may see a shift in selection from what a donor created or collected, to data created about the donor. This article will explore existing practices for collecting and archiving personal digital data, as well as envision future collections and the roles college and university archives will play in preserving personal data.

Keywords:

Collection development, personal digital archiving, self analytics, university archives

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INTRO

In 2014, the World Economic Forum declared personal data as a new economic asset class (Kosciejew 2014). As college and university archives (UA) grapple with donations of borndigital materials, from images to documents to datasets to software, they have yet to establish best practices and workflows for personally collected data such as that collected by lifeloggers or smartphones. Future acquisitions and accessions may see a shift in selection from what a donor created or collected, to data created about the donor. The potential issues that accompany these types of donations are many. Do donors want all of their personal digital data preserved in perpetuity? What formats will this data be preserved in, particularly when so many of our personal devices are built on proprietary systems? How will this information be made available to users in a way that is ethical and does not violate the privacy of individuals? Will libraries and archives increasingly have to educate their donors on digital estate planning? UA whose collection development policies emphasize records management over the collection of personal papers may need to begin accommodating for personal devices used in the order of daily business operations in order to capture valuable information about the university's history. At the same time, archives will need to identify when personal devices are collecting personal data and when they are collecting university-related data as the line between employee's personal and professional devices and communications continues to blur.

These difficulties, however, bely some of the advantages of collecting such data. For example, a heart rate monitor diagram uploaded to the September 11 Digital Archive shows the very personal and visceral effect of witnessing the planes crashing into the World Trade Center. Social media content documents personal and institutional involvement and response to social movements. Digital archives documenting the creative process for writers, artists, and musicians display distinctly different practices than manuscript collections do. And collections of health data created by activity trackers and other wearable technologies have research value not only for research involving individuals, but for large-scale data mining projects as well.

This article will explore existing practices for collecting and archiving personal digital data, as well as envision future collections and the roles colleges and universities will play in preserving personal data.

INSTITUTIONALLY-HOSTED PERSONAL DATA COLLECTIONS

The UA, according to the Society of American Archivists' Guidelines for College and University Archives, "serves as the institutional memory of the college or university and plays an integral role in the management of the institution's information resources in all media and formats" ("Guidelines for College and University Archives" 2018, n.p.). Collections should document both institutional decisions and the evidence used in making such decisions. Users of UA within an institution may include administrative units, students, and faculty. The unique materials preserved by UA are made up of institutional and intellectual history as well as the contributions of individual university staff, faculty, and students. While there are some similarities in collection scope and mission among UA, the collection development policies of UA will vary as some collect only records generated by university departments, and others include the papers of individual scholars, students, alumni, or administrators in their collections. What follows in this paper serves only to speculate on what types of materials UA may find themselves encountering; individual UA will need to consult, and potentially update, their collection development policies in consultation with their organization's mission in determining whether personal data collections are relevant to their holdings.

That said, archives are not new to collecting personal data, and they have been rapidly working to develop new infrastructure and best practices to accommodate the donation of born digital objects. Examples in the scholarly literature range from email, to digital photography, to "interactive news." Considerations that must be taken by archives collecting born-digital personal archives collections include outreach and education to donors, as well as updated accession and collection development policies.

It is important that, prior to collecting personal digital archives collections, UA understand how and why personal records are created. British archival curator Jeremy Leighton John coined the term "archives in the wild" to refer to the personal archives collected by academics, writers, politicians, and every day people, not collected within an institution (Bass 2013, 50). The academic study of personal information management can be an important precursor to UA about to engage in amassing such collections.

An early example of a UA collecting digital personal papers can be found in the Joint Information Systems Committee (JISC) funded "Paradigm" project undertaken by University of Oxford and the University of Manchester (Thomas and Martin 2006). The institutions used existing digital preservation workflows, such as the OAIS model, to preserve the born-digital records of contemporary politicians. Extraction of metadata was identified early on in the project as an essential step towards long-term preservation, as was early intervention with records creators. Also emergent from the project is a need for defining personal archives. While personal archives may simply differentiate the materials collected by a single person from those collected within the operations of an entire institution, there also may be a difference between a single individual's professional archives and the materials that relate to their families, friends, and hobbies. These differing definitions of "personal archives" became apparent in the Paradigm project as some politicians donated collections that included everything from journals to correspondence to literary manuscripts, while others restricted their donations to professional documentation. Ultimately, in addition to post-custodial archiving practices, the Paradigm project recommended the following pre-custodial practices (Weisbrod 2016):

- Preservation specialists capture regular snapshots of creators' digital work while they are still active in creating, and transfer these snapshots immediately to the archive
- Periodically transfer retired hardware and media to the archive
- Creators self-archive under the direction of preservation specialists
- Creators self-archive with IT-assistance

There are many different types of personal data collections that UA may find themselves working with in the not too distant future. The following section discusses some types of personal digital archives that UA are already accessioning along with proposal methods for working with donors.

Email

Many UA already collect email, as it has rapidly moved to the dominant form of communication on college campuses. Where once memos and written correspondence about university meetings, policies, and updates were left in campus mailboxes, now many university staff lament how much of their days are spent simply keeping up with email. The incredible volume of this media poses a challenge in and of itself.

Literature and Scholarly Publishing

Literature and scholarly publishing create new challenges for UA. Unlike physical collections of manuscripts, in which multiple versions of the same work may show the revision process, or a single document may show line edits and notes, digital writing practices may lead to saved over, deleted, or poorly managed files (via file naming and folder organization) to such an extent as to make them invisible (Becker and Nogues 2012). A tangible example can be found in the Thomas Strittmatter archive at the Deutsche Literaturarchiv in Marbach, which included an Atari computer and 43 floppy disks. By the time the collection was received by the archive, 10 years after its last use, the Atari computer data was unretrievable (Weisbrod 2016). A potential solution may be found in a pilot project by the Danish National Library in "self-archiving by email" which allowed scientists at the National Library to forward work to the Library, who then used their existing email service as a self-archiving environment called "My Archive" (Weisbrod 2016). These practices, however, are in contrast to the archives' "traditional" approach of favoring unique materials, as in these methods the "original" digital files remain on the creator's device and surrogates are uploaded or emailed. The difficulty in establishing authority and integrity becomes significantly greater in such approaches.

Community Archives and Social Media

Archives have already begun to grapple with the collection of larger-scale compilations of social media related to community groups and social movements. Early large scale social media archives often occurred within government archives (Littman et al. 2018), but have since branched out to include universities and colleges. The 2011 Occupy movement in particular led to an increase in UA collecting social media (Littman et al. 2018).

At the University of Virginia, librarians and staff from special collections, preservation, metadata services, and digital humanities units have collaborated to form a Digital Collecting Emergency Response Group in response to the need to collect crisisrelated documentation of events. Library archivists scrambled to collect Tweets, Facebook posts, blogs, and personally collected digital media like videos, photos, and audio, in addition to physical artifacts, in order to preserve essential university history.

Attempts to document social media surrounding the Black Lives Matter movement (#blacklivesmatter) have included universities, such as Washington University in St. Louis, the Maryland Institute for Technology in the Humanities, as well as campaigns by the webarchiving service Archive-It (Rollason-Cass and Reed 2015; Foster and Evans 2016). Archivists involved in these projects have noted the difficulty in creating sustainable archives for media that is, by necessity, created extemporaneously; in establishing trust with activists and protesters; and in protecting the privacy of donors who may be penalized or prosecuted for their activist (Foster and Evans 2016).

Tools such as Social Feed Manager (SFM), developed by a team at George Washington University (GWU) Libraries, are possible means for UA to collect Tweets. The SFM project has worked to closely align its process with that of more "traditional web archiving" using web crawlers (usually) to retrieve and store website pages, as opposed to social media archiving which uses social media platform Application Programming Interfaces (APIs).

CHANGING PRACTICES

As the types of collections UA receive change, so too must archives change their approach to the process of accepting and preserving archival material. From using digital forensics tools to develop metadata and collection description, to outreach and education to users on preservation and access of digital data, to how to make born-digital collections accessible, and finally, to the ethical and legal needs of born-digital collections, this section will outline some changing practices that university libraries and archives will need to develop.

Digital Forensics

Digital forensics tools and techniques, developed in the criminal justice sector, are already being adopted by the cultural heritage sector, including UA. Digital imaging and the creation of manifests for new accessions both stem from digital forensics software (Kirschenbaum, Ovenden, and Redwine 2010). Open source and archives-focused tools and preservation environments such as BitCurator (https://bitcurator.net) and AVPreserve (https://www.weareavp.com) have become common place for archives collecting borndigital objects. The digital footprints of collection creators may be spread across multiple devices including desktop computers, laptop computers, smartphones, lifeloggers, and disparate systems such as social media, some of which will reside in the ownership of the individual in question but others of which may be completely out of the creator's control. Digital forensics may provide solutions to uniting these divergent sources, as login names, archived data, and other traces of an online presence may be discoverable on personal computing devices through the use of tools like those included in the BitCurator environment (Lee 2014).

Access

Making UA collections accessible is as important how they are managed. Describing and cataloging personal digital archives is a challenge that has seen little discussion in the scholarly literature. Cataloging and describing born-digital collections is further complicated when the library catalog is not the sole, or primary, means of describing the collection, as access to collections may be provided through digital libraries, digital preservation systems, links within finding aids, or other methods (Langdon 2016). Access to personal digital collections may also benefit from out-of-the-box thinking when it comes to modes of access. Personal digital archives of an individual are rich in research use on their own, and in combination with other archives they may reveal sociological trends. This reveals the need to include personal digital archives in digital humanities-type projects, collaborative community archives, or artificial collections that group similarly themed personal archives together. Collaboration with both donors and researchers on the best methods for presenting personal digital archives will also be necessary, as evidenced in an exploratory study by New York University's Fales Library and Special Collections on best practices and preferences for researcher access to two born-digital art and documentation archives, the Jeremy Blake Papers and the Exit Art Archive (Kim 2018).

Education

More so than information technology or computing services departments, university libraries are leading the way in educating users about best practices for managing digital content (Moulaison et al. 2017). However, guidelines are more often than not targeted at how to manage digital information moving forward, and not on preserving legacy information; this presents an opportunity for UA, in which education for donors on preserving their legacy digital content could determine whether a UA receive a donation.

To best educate donors the UA must understand the practices of potential donors in a range of contexts. As an example, for musicians the DIY-culture and the proliferation of music recording, mixing, and mastering technologies has led to an explosion of selfrecorded and released albums, EPs, mixtapes, and individual songs. In surveying independent record labels in their physical and digital self-archiving practices, Guthrie and Carlson developed a website called Indie Preserves with tips for both digital and physical preservation.¹ However, after presenting on their research and the website at conferences and using social media as outreach, the researchers realized that the archival community was more interested than the music industry community, leading them to reassess their strategy. They surmised that the preservation tips they were recommending put too much onus on already very busy musicians and label owners trying to get their music off the ground and who, therefore, did not see preservation for preservation's sake as a priority at this time. Instead, framing preservation as a necessity for long-term financial stability and timesaving might gain more traction with musicians and label owners (Guthrie and Carlson

¹ http://www.indiepreserves.info, now only available via the Internet Archive Wayback Machine (https://web.archive.org)

2018). UA collecting the work of faculty musicians, student music groups, and recordings of campus music performances may find guidance in the Indie Preserves project in how best to educate and liaise with campus partners to preserve musical heritage.

Legacy Planning

Archivists can also have an important role in educating users about the challenges and importance of legacy planning for photographs, videos and correspondence from social media platforms or other cloud storage sites "subject to passwords, privacy policies, and strong and weak network ties with other individuals" (Acker and Brubaker 2014, 8). A study by Acker and Brubaker (2014) focused on participants' experiences with death on Facebook and their own preferences for what they would like to see happen to their accounts when they die. UA may work with donors to recommend tools like DeadSocial² and Planned Departure³ which make it easier for the loved ones of a deceased person to access their social media and documents. Users of these services designate someone (termed "social media executor" in DeadSocial and "Verifier" in Planned Departure) whose job it will be to notify the service of the user's passing when the time comes. Digital legacy planning education and outreach from UA could include how to use these tools as well as how to articulate what social media content donors want their executors to include in archive collections (Hawkins 2016).

Legality, Ethics, and Privacy

² deadsocial.org

³ planneddeparture.com

Digital preservation of software or hardware that includes proprietary code, digital rights management, and intellectual property rights may lead archivists into sticky territory (Boss and Broussard 2017). Some digital preservation techniques such as emulation, which is considered a form of reverse engineering, may prove more legally viable than others. Technological security mechanisms to prevent hacks, record access by registered users, and prevent unwarranted downloading of materials are all infrastructure needs that UA will need to adopt (Kirschenbaum, Ovenden, and Redwine 2010). Close and exhaustive work with living donors to ensure their privacy will also be necessary to encourage other donors to make their born-digital materials available, and UA will need to take into account the varying needs of different types of donors. For example, the Virtual Footlocker Project proposes an open-source application or platform for dealing with the very specific issues faced by both veterans and active duty military. This research is invaluable to archivists who may accession digital records from military members, and may be of particular interest to archivists at military academies (Benoit 2017). Collecting institutions will need to plan for moving quickly through digital donations as technical obsolescence, bit-rot, and other issues of data degradation may result in the failure of these collections before the archivist ever has a chance to attempt triage procedures (Lee and Woods 2013).

In addition to ensuring up-to-date and reliable infrastructure, UA must also consider the ethics of social media archiving, particularly when a collection is not donated directly by the creator. The *Documenting the Now* project is tackling the essential issue of how to preserve web and social media content with moral integrity and in ways that protect already marginally people, growing out of social media reactions to high-profile police shootings including the victims Michael Brown, Sandra Bland, Eric Garner, Freddie Gray, and Philando Castile, among others (Jules et al. 2018). In these contexts, the privacy and safety of the social media users is imperative and heightened by user unawareness or lack of consent as to how their data can be collected and used by third parties. These same issues will undeniably be faced by UA, if they have not been already, as students, faculty, and staff may face penalization for social media activity while associated with the university or at later times. Though not specific to universities or even to the cultural heritage sector, Marc Kosciejew's "Charter of Personal Data Rights" and similar efforts may be beneficial to UA working to ethically collect personal digital archives. The charter includes the following rights (Kosciejew 2014, 29):

- 1. Everyone has the right to own their personal data
- 2. Everyone has the right to control and use their personal data
- 3. Everyone has the right to privacy regarding their personal data
- 4. Everyone has the right to anonymity regarding their personal data

Finally, universities will need to examine their intellectual property policies to find who owns what aspects of faculty, staff, and student work in order to develop collecting and transfer policies for their archives. User education, in conjunction with institutional information technology staff who manage campus networks and storage systems, in intellectual property and university policy should be undertaken on a regular basis so that employees and students alike are aware of what the university legally can and can not do with any digital data created and/or stored on campus infrastructure.

NEW TYPES OF PDA

Beyond the born-digital objects that the UA is already familiar with, archivists may soon be presented with biometric data about their donors. Personal data that the donor has generated through apps on their mobile phones or activity trackers could become intertwined with a range of other donated digital content. This section outlines the practices, motivation, and technology associated with data collected through wearable sensor technology and imagines how the UA may interact with this type of data. The rise of the Quantified Self Movement and recent popular wearable technology that enables constant detailed bionomic tracking marks a shift in how we think about PDA practices: potentially valuable personal digital information exists without the same level of user curation that characterizes the PDA process for other types of content. Central to this type of data, as in discussions of PDA more generally, is the users' relationship to the data before it gets to the UA. While users may not view their activity tracking practices with the primary purpose of personal archiving, it could still end up being relevant in donations to the UA.

University Archivists should begin to keep abreast of trends related to personal biometric data collection, such as the growing popularity of the Quantified Self (QS) Movement of the last decade. Wearable lifelogging devices and mobile phone applications enable a range of personal data collection: fitness trackers worn around the wrist measure heart rate, diet apps count calorie intake, and sleep trackers log quantity and quality of sleep. The idea behind QS is that using this personal data collected throughout the day can give us needed information for self improvement. The technology has advanced and the intricate lifelogging practices have become far more mainstream. The functionality of cameras, mobile phones and activity trackers, once separate devices, are becoming combined into a single product, such as the Apple Watch⁴. The UA is more likely to come across personal data when a single device serves such a wide ranges of purposes.

Many biometric sensors, and the tools to analyze the data collected, are designed for users to be able to examine trends in their behavior on a short-term basis. Yet through continued use over long periods of time, the data generated from these sensors that are constantly collecting can have different value to the user. It is this analysis of long-term data that may be significant to UA. Elsden, Kirk, and Durrant (2016) examine how people interact with their historical data. They coin the term "quantified past" in response to the "quantified self" movement.

Whereas someone may track and analyze their run today in an attempt to run faster tomorrow, interacting with that data 10 years on presents a different experience entirely - one that we have yet to design for. In this study our approach regards these technologies as more than tools for behavior change or wellbeing. It explores the prospect of their evolving lifelong use rather than temporary use and recognizes their novel role alongside other media, creating what we term a quantified past (Elsden, Kirk, and Durrant 2016, 521).

This concept may help archivists contextualize lifelogging data within the UA. When the study asked long-time users of self-tracking tools to discuss "how they imagined the value and meaning of their records would change in the future" (Elsden, Kirk, and Durrant 2016, 527), they found that users want to save their data, feel attached to it, and would be upset to lose it. However, they describe having no plans for it and thought it would be

⁴ https://www.apple.com/watch/

uninteresting for anyone else because it is too detailed. One participant described taking a screenshot of her activity tracker interface to post on Twitter when she had surpassed her goal. The authors note that selectively sharing data is limited to the practice of taking a screenshot, which flattens complex data into a single snapshot in the form of an image file. This example demonstrates what Elsden, Kirk, and Durrant refer to as "data-work": "the language and 'work' that is required to qualify and make sense of one's data" (538). On this individual scale, without that added context provided by the user, it is difficult to make sense of the heart rate data outside of the app or device where it is being recorded. If the UA chooses to accept into the collection this type of data, considerations will have to be made for how to it will exist outside of the original context of the device that collected it.

Personally collected health data poses unique challenges, potential societal benefits when aggregated, and frightening ethical complications for UA. Lifeloggers can be used by individuals to track their diets, heart rates, blood glucose levels, moods, sleep patterns, and even reproductive cycles (Lieber 2018). The potential for large-scale mining of health lifelogging data could lead to better understanding of the spread of disease and links between various factors such as eating habits, exercise, geographical location, and other environmental factors. As Ellie Bushhousen notes,

This self-data gathering may seem narcissistic yet something good could come from it. Imagine the benefit to a patient and the health care provider if regular feeds of QS data could be uploaded into the electronic health record (EHR). Changes in sleep patterns could be an indication of a potential side effect of a medication. A sudden weight gain or loss could be a precursor to a chronic condition (Bushhousen 2014, 90). In addition to individual health logging devices, like the FitBit or an individual's cell phone, software and cloud-based services like Microsoft HealthVault and WebMD Health Manager allow for the consolidation of health data into profiles (92). The potential for this type of data to be misused, however, is terrifying, and the collection of such materials must only be undertaken with strict guidelines for the archive, the donor, and users. In addition, since much of this data is collected by personal devices such as cellphones, working with individual donors and campus departments on what will happen to personal health data captured by university-purchased cell-phones will be essential to maintaining good donor relations and ethical collecting.

CONCLUSION

While the ever-present nature of cell phones in our daily lives has already meant significant changes in how we record information about ourselves, the technological landscape will continue to broaden. New cell phone apps and types of devices will enter the market that will become even more closely intertwined with our daily routines and shape the environment around us on a larger scale. Generating more types of data and at a higher volume will not automatically translate to an improved PDA environment. A concern is that the increase in the quantity of data could increase the difficulty of people finding value in it. For "digital natives", where do they begin to curate the overwhelming amount of data generated over a lifetime? As new devices enter the landscape, there will be a lag between data collection and knowing how to make use of this personal data in a historical context. The idea of the Quantified Self as a movement has added a social element to the practice of gathering personal data as people share their data-driven goals with each other. The

movement will be valuable in increasing awareness about this born-digital information - a necessary first step to the PDA process and donating to archival institutions.

Universities may already be developing technical infrastructure to aid in the management of born-digital objects for campus departments, such as online image-hosting vendors, proprietary and open digital asset management systems, and institutional repositories (Keough and Wolfe 2012). UA will continue to not only be responsible for receiving and making these collections accessible; they will also increasingly need to be proactive in developing policies and procedures with campus departments that enable departments to continue their workflows efficiently while also streamlining donation of assets to the archives. UA may begin to see an influx of student and/or amateur photography taken by cell phones, tablets, and other personal devices. Student groups will use phones to capture images of events on campus, and collections of faculty research materials may include images taken with personal devices in archives and research facilities. Digital forensics tools will help extract technical metadata from the images such as location, time, and details about the capture device used, but this type of metadata must be treated carefully, and collection creators may not be aware of just how much information they are sharing when they submit these collections.

UA collecting personal archives will need to be attentive in defining what a personal archive entails. While in many ways UA are analogous to other business or institutional archives and may follow their best practices and procedures, they may also accession collections from individuals within their institutions, such as prominent professors or students. In doing so, having a well formed collection development policy will be essential to ensuring that the archive receives materials that fit the scope of their collections. If the "personal papers" of individuals should, in fact, only include materials related to their work at the University, that should be clearly stated. If, on the other hand, donations may include documentation of the donor's family or personal life, hobbies, vacations, and other aspects of their being that occur outside of the jurisdiction of the university, that must be clear. These policies become ever more important when dealing with born-digital archives in order to control the volume of what is donated as well as what to do about hidden or unidentified files that may surface through digital preservation actions. In conjunction, policies and procedures must also clearly lay out UA policies regarding private information and how it may or may not be accessible to researchers. Deeds of Gift and deposit agreements should be clear so that the donor is aware of how their donations may be mined, redacted, or made available to researchers.

Perhaps the most important roles UA will play in the realm of personal digital archives are those of education and outreach. The better equipped personal digital archives creators are with knowledge about preservation actions, proprietary versus open source formats, and social media terms of service and backup practices, the more likely it is that their collections will survive long enough that they eventually do make it into an archive, and the more like it is that the donor can articulate their wishes in regards to uncovering redacted or hidden information in computing systems. Efforts to develop standards and best practices for personal data rights in the corporate sector, such as Kosciejew's "Charter of Personal Data Rights," should also be used in developing best practices for making personal data available, or redacted, in UA.

The question of how to best equip archivists to utilize digital forensic tools and techniques is an important one. While some archives-centric tools and environments such

as BitCurator and AVPreserve utilize these practices, will the training of archivists increasingly include digital forensics? Or is collaboration between archivists, technologists, and forensic experts a more practical approach? (Kirschenbaum, Ovenden, and Redwine 2010). Scholars, too will need to exercise professional and ethical judgment as to the appropriateness of using born-digital objects, especially those that may have been thought hidden but then uncovered through digital forensics.

As they always have, UA will need to adapt to an ever-changing landscape of types of donations that may be coming their way in the not-so-distant future. However, now more than ever before, the rapid evolution of technology and the increasing adoption of wearable technologies, in particular, require that UA implement reliable and safe technological infrastructure, flexible but clearly defined policies, and engage in outreach and education to existing and future donors concerning legal, ethical, and privacy concerns. Preparation for this work necessitates collaboration between archives and industries outside of the cultural heritage sector to ensure that personal data collections are preserved and accessible for future researchers.

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