Integrating personal digital archiving (PDA) into the Missouri School of Journalism curriculum: The new Missouri Method

Edward McCain, Reynolds Journalism Institute and University of Missouri Libraries, Columbia, Missouri, USA; mccaine@rjionline.org
Dorothy Carner, University of Missouri Libraries, Columbia, Missouri, USA; carnerd@missouri.edu

Abstract:

The University of Missouri (MU) School of Journalism is one of the leading institutions for media training and industry-oriented research. In collaboration with MU Libraries, a personal digital archive (PDA) learning model is being developed in order to prepare journalism-school students, faculty and staff for their ongoing information storage and access needs. This paper outlines the who, what, when, where, why and how of integrating PDA ideas and practices into the hands-on learning process at MU. This exemplifies the Missouri Method of learning by doing, which has been practiced for over a century at the School of Journalism on the University of Missouri System flagship campus in Columbia.

Keywords: personal digital archives, journalism, curriculum, learning models, media, news

Introduction

In 2002, a *Columbia Missourian* server crashed and wiped out fifteen years of text and seven years of photos in the blink of an eye. Those obliterated born-digital stories and photographs represent a loss to the University of Missouri's School of Journalism, which publishes the newspaper, especially to the students and faculty who created the content for those editions. The "Missouri Method" of learning through hands-on training has become a signature feature of this top-rated journalism program in the United States, but no one was prepared for this type of digital disaster.

Contemporary journalistic enterprises have no strategy or means to preserve their born-digital output for more than a few years. Just as the news industry's business and technology models have been disrupted, print-centric methods for preservation and access of journalistic content have become unworkable. The long-term consequences have yet to be fully revealed, but early indicators show cause for alarm. Phrases such as "digital dark age" attempt to describe the potential loss of the "first rough draft of history" from the past few decades. Journalists are already experiencing loss of their own content. They need these stories, photos, videos and other digital objects for their portfolios. Without the ability to refer to past work, job hunting becomes exceptionally difficult in a diminished marketplace.

Following the Missouri Method, we advocate teaching students pragmatic foundational skills for preserving their own digital creations. To help tomorrow's journalists assure the long-term availability of their work, we have developed a learning model (deliberately avoiding the use of the word "curriculum") based on personal digital archiving standards and practices that can be integrated with existing School of Journalism coursework. Additionally, by introducing this generation of journalists to the importance of digital preservation, we hope to eventually facilitate such practices within news enterprises at a larger scale.

The following approach is meant only as a guide to implementing PDA in a community that has had little or no exposure to the concepts and applications involved. We continue to learn as we go but are eager to press onward in hopes of providing our faculty, staff and students with key skills to prosper as they navigate the ever-evolving digital work environments today and tomorrow.

One of the basic tenets of journalistic reporting is the use of the Five W's: Who, What, When, Where, and Why. In this case, it is also useful to include an H for How. This paper will employ those same questions as it investigates the fundamental elements necessary to teach personal digital archiving to students at a school of journalism today.

First of the Five W's: Who?

The need for individual journalists to preserve a record of their work in digital formats does not rise organically from journalism-school coursework or even the practical work students perform at the school's news outlets. These include the *Columbia Missourian* daily newspaper, KBIA radio station, an National Public Radio affiliate and the KOMU television unit, a local affiliate of the NBC network. It is not that personal digital archiving is not needed or even wanted; rather, there is a general lack of awareness of the problems associated with the ephemeral nature of digital content in general and digital news content in particular.

As a result of the long-term involvement of the University of Missouri Libraries with the School of Journalism, several MU librarians have offices at the school's complex, including the Journalism Library, *Columbia Missourian* and Donald W. Reynolds Journalism Institute. The head librarian of the Journalism Library, Dorothy Carner, has been an advocate for preserving news archives – including born-digital content – since her arrival at MU in 2007. The digital curator of journalism position at RJI was created as a joint appointment of MU Libraries and the School of Journalism in 2013 with a mandate to preserve born-digital news content.

The head librarian and digital curator of journalism have worked closely on born-digital news preservation and recognize that the systems for saving news content are breaking down when it comes to journalism created and distributed through digital means. We see personal digital archiving as one of many ways to advance digital preservation of news and thus introduced the topic of PDA to Lynda Kraxberger, associate dean for undergraduate studies and administration as well as chair of the convergence journalism faculty. With the associate dean's support, we also met with other journalism school faculty on an informal basis, and our ideas about including information about PDA in journalism classes were well received. Faculty meetings included discussion about how best to integrate additional information into the existing curriculum structures, beginning with large introductory courses and reinforcing those ideas by practicing PDA in higher-level classes until, and perhaps after, graduation.

Any such implementation would, of course, require instructional support for the instructors involved. Broadly, we propose the following four-phase process for introducing personal digital archiving into the Missouri School of Journalism curriculum:

- **Phase 1**: Determine needs of convergence faculty teaching Journalism 2150: Multimedia Journalism (J2150) class lectures and labs for teaching best practices of PDA for journalism.
- **Phase 2**: Teach PDA best practices to J2150 students.
- **Phase 3**: Recruit and educate journalism faculty: locate champions of the idea of personal digital archiving in each area/department and develop instructional support for PDA.
- **Phase 4**: Integrate PDA practices seamlessly throughout the curriculum.

As we embark upon this research undertaking, we have collected some baseline information about the communities involved and their needs, practices and beliefs associated with PDA. This should help us assess the effects of introducing PDA concepts into journalism school classes. Following and throughout this paper we present some of the highlights of our survey of 111 students, faculty and staff

from the Missouri School of Journalism in March and April of 2016. Details about the survey are available in the appendices.
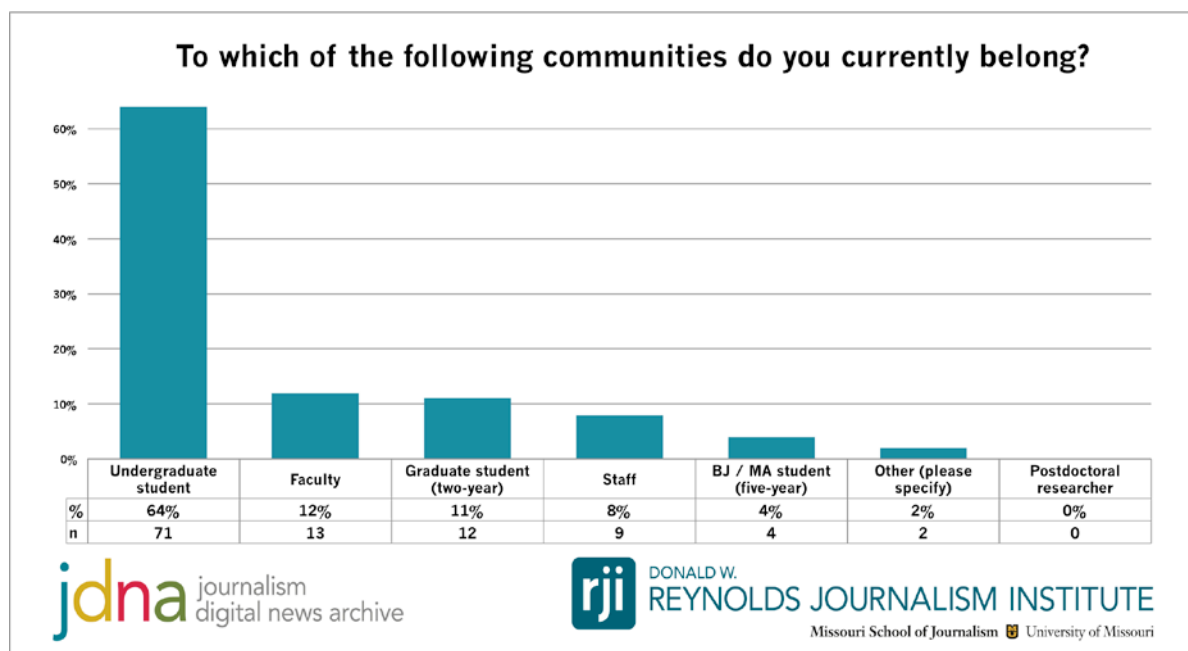

Figure 1: Question 2: To which of the following communities do you currently belong?

About two-thirds of the respondents were undergraduate students, by far the largest group. Next came faculty and two-year graduate students, representing almost a quarter of those polled. Staff, five-year BJ/MA students, and Other combined accounted for less than 15 percent of the remaining responses, with no response from postdoctoral researchers.

Second of the Five W's: What?

The fundamental question may be "What is personal digital archiving?" The answer is complicated and far from clear.[1] The "personal" part of PDA signifies that this is not the kind of digital archiving being done at an institutional level, but other than that, the answer isn't clear. In large part, it depends on what we ultimately want to do with the items involved.

Archives

It may help to take a look at the meaning of the word "archive." The Society of American Archivists (SAA) gives a primary definition of archive as: "Materials created or received by a person, family, or organization, public or private, in the conduct of their affairs and preserved because of the enduring value contained in the information they contain or as evidence of the functions and responsibilities of their creator, especially those materials maintained using the principles of provenance, original order, and collective control; permanent records."[2] For our purposes, SAA's vernacular meaning may be more applicable: "any collection of documents that are old or of historical interest, regardless of how they are organized; in this sense, the term is synonymous with permanent records."

The definition of personal versus professional may also be difficult to tease apart, since there may be a mix of content that is produced for a client versus what is produced on a journalist's own time. Given

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[1] *A Report On the Personal Digital Archiving 2014 Conference, 2014, Ashenfelder,*
https://blogs.loc.gov/digitalpreservation/2014/04/a-report-on-the-personal-digital-archiving-2014-conference/
[2] *Society of American Archivists, http://www2.archivists.org/glossary/terms/a/archives#.VwvJlxMrKEJ*

the strong projected growth of the on-demand workforce or "gig economy,[3]" this looks to be an increasingly important consideration for successful navigation in the current and future job marketplace.

What to save?

What do journalism students need to know about PDA? The answer depends on what they want and need to access, and when. According to our survey, the top categories of digital content students want to keep for one to five years includes, in order of ranking: images/photos (91%); documents (91%); videos (87%); audio recordings (68%); websites (63%), emails (61%); social media accounts and data (57%); text messages (23%); code or programs you've written (20%); voicemails (10%) and other (1%).

Figure 2: Question 5: What types of digital files do you have that you might want to maintain
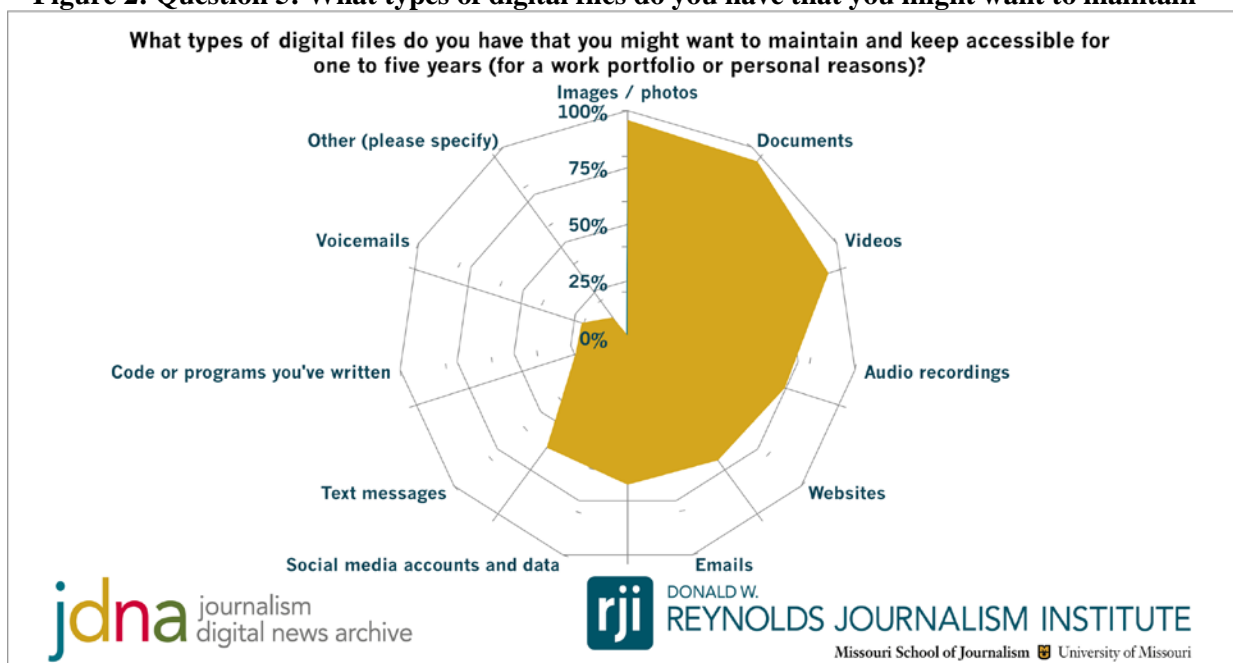
and keep accessible for one to five years (for a work portfolio or personal reasons)?

What is the preservation life cycle?

In order to understand the basics of working with digital content, journalism students need to be familiar with a simplified digital content life cycle such as the one identified by the DigitalNZ initiative led by the National Library of New Zealand.[4] An abbreviated version of this model identifies five main stages in the life cycle of digital objects as follows:

1. **Creating/Selecting:** producing new content and/or gathering and selecting what should be made digital
2. **Describing:** describing content so it can be organized and documenting decisions about the logical structure of your system
3. **Managing/Preserving:** managing content to keep it usable and available as long as it is needed
4. **Discovering:** organizing content to make it findable
5. **Using & Reusing:** ensuring content can be used and re-purposed

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[3] *Intuit Forecast: 7.6 Million People in On-Demand Economy by 2020*
http://www.businesswire.com/news/home/20150813005317/en/
[4] *Make it Digital, Getting Started with Digital, The Digital Content Life Cycle: http://www.digitalnz.org/make-it-digital/getting-started-with-digitisation*
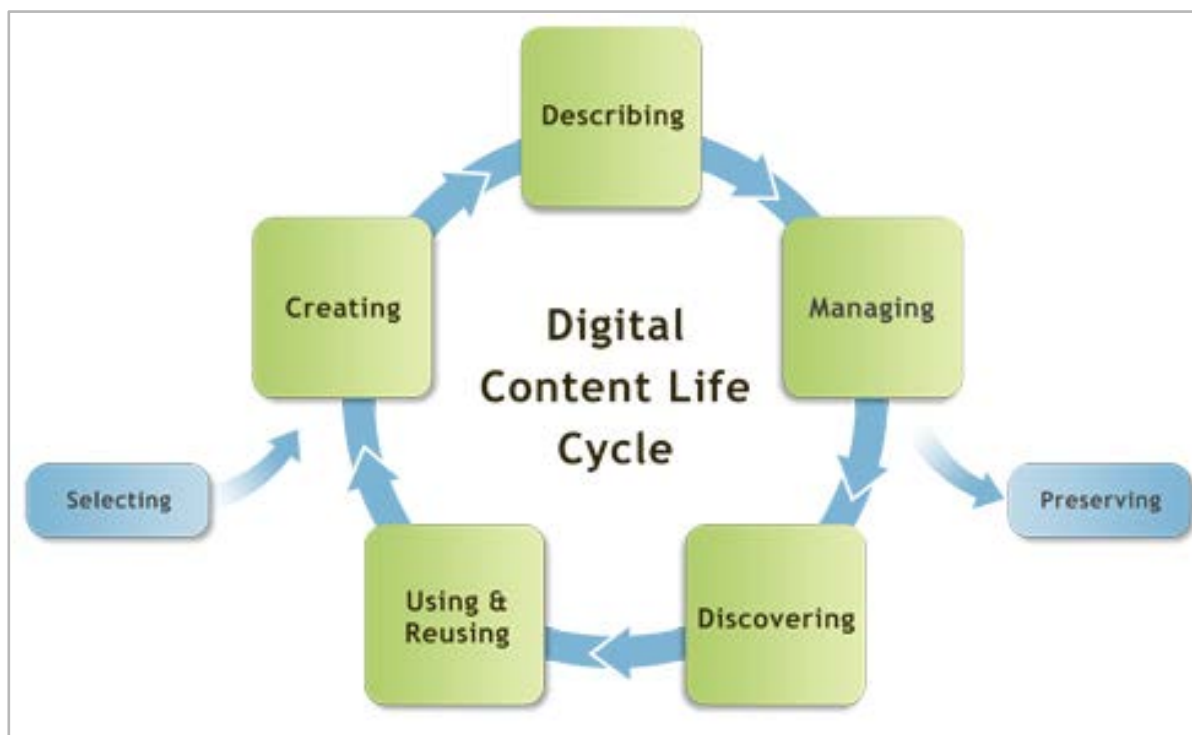
Figure 3: DigitalNZ, Digital Content Life Cycle, http://creativecommons.org/licenses/by/3.0/nz/

Each of the digital life cycle stages identified in this chart corresponds to an important area of discussion for learning about the basics of digital preservation and PDA. The DigitalNZ site has a well-developed set of resources based on this model available on its website.

What are standard preservation formats?

Journalists today are creating content in a variety of ways, often for the same story but tailored to a specific media channel such as desktop, mobile or social. As a result, they end up with a baffling set of text, audio, video, graphics, web and database files, mostly in proprietary formats. Clearly, this provides a use case for introducing standard (especially openly documented) formats for use in PDA. Based on the U.S. Library of Congress's Recommended Formats Statement of 2015-2016[5], this might eventually be simplified into something similar to the following table:

Text	PDF
Photos	TIFF, JPEG2000, DNG
Audio	WAVE (uncompressed)
Video	Final production version
Database/datasets	JSON, XML data format in well-known schema, CSV

Figure 4: Example of possible PDA recommended formats table

What are metadata standards?

Teaching journalism students effective ways to add information using file names, descriptions and tags is vital to their success in the modern information landscape. Whether they realize it or not, most journalists are already familiar with the essential function of metadata: adding data to find more data.

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[5] *Library of Congress Recommended Formats Statement,*
http://www.loc.gov/preservation/resources/rfs/index.html?loclr=blogsig

For example, most document creators will name their digital files in a way that provides a shorthand reference to its contents. This becomes increasingly useful as the number of files increase and our efforts to find a particular piece of information are stymied by a plethora of similar documents that are returned by our query – the proverbial problem of finding a needle in a haystack.

It may be useful to introduce them to the International Press Telecommunications Council (IPTC) standards[6] as a foundation for approaching journalistic metadata at a professional level. Although it is not likely that students will fully employ the large and complex taxonomies and schemata available from IPTC, exposure to it should provide a useful insight into the thinking behind such organizational tools.

What are storage implications?

The ease of creating digital content has fostered an expansion in the amount of information being offered on any given day. Much of this content comes in the form of large audio, video or database files. As a result, the demand for digital storage continues to expand.
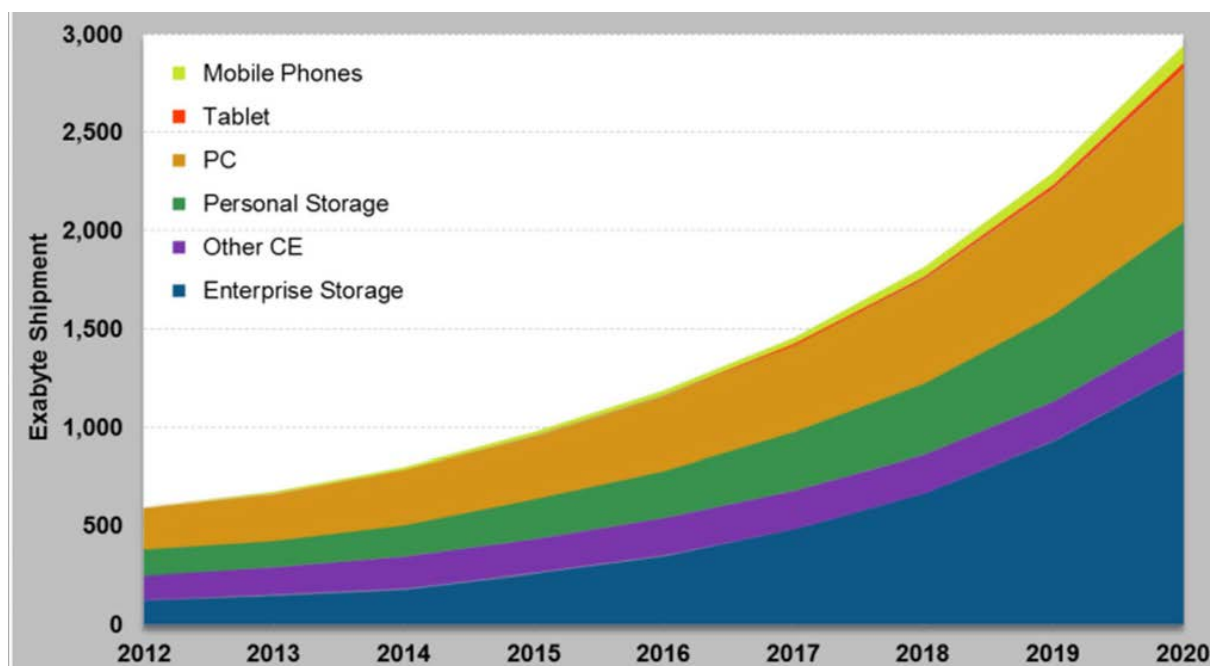
Figure 5: Growth in global demand for storage capacity[7]

The prevalent use of distributed backup methods compounds many issues surrounding PDA, such as: cost, tracking document versions (especially when collaborating), synchronizing among services or devices, maintaining access to assets in multiple locations and the ability to transfer or share information easily and securely.

Some 70 percent of those surveyed indicate that they employ cloud-based technologies to store their content. Indeed, the University of Missouri Division of Information Technology (DoIT) provides students with 50GB of disk space on the Box platform. Faculty and staff can purchase additional space at a discounted rate. Box provides backup and collaboration services through desktop, mobile and browser-based interfaces.

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[6] *The IPTC is the global standards body of the news media. https://iptc.org/*
[7] *Anandtech:http://www.anandtech.com/show/9866/hard-disk-drives-with-hamr-technology-set-to-arrive-in-2018*

Figure 6: Q6: What methods do you use to store your digital files? Please check all that apply.
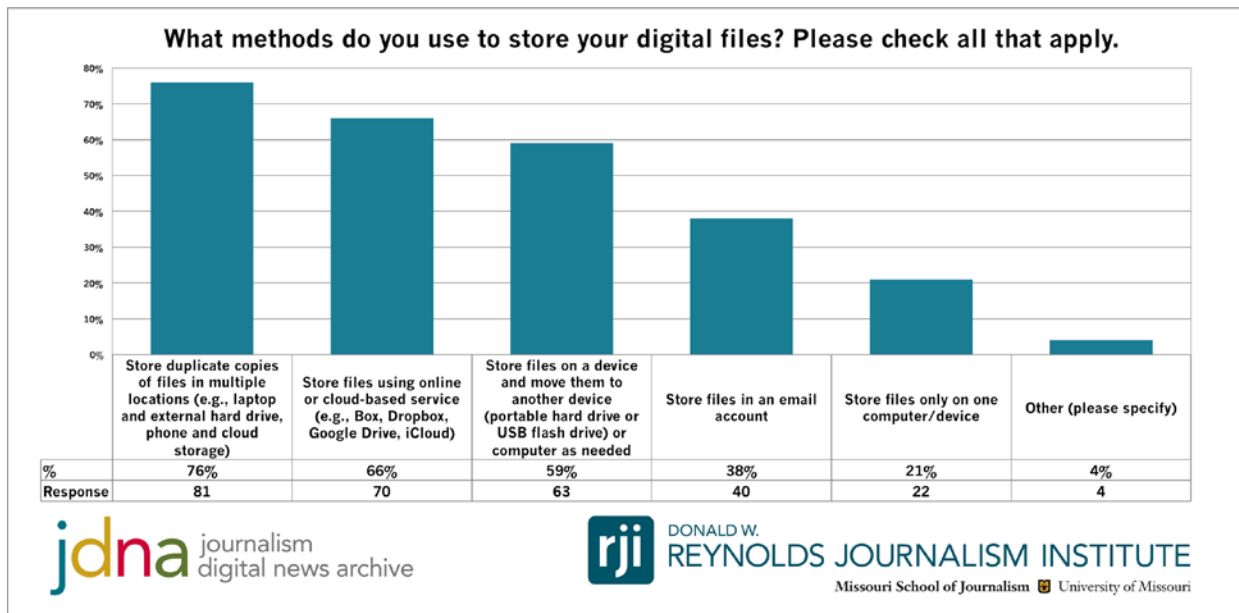
A small committee of faculty, librarians and DoIT staff are currently working to provide flexible solutions for digital archiving at the School of Journalism and, eventually, the entire campus. Such a system would ideally include an option for students to pay for continuing service after graduation.

Understanding the concepts of ownership and copyright

Large segments of our economy, including journalism, increasingly depend on the production of intellectual property to generate revenue. The need to understand and appreciate copyright, trademark and patents is now indispensable, especially for those who earn their living from it.

From a PDA perspective, journalists will need to understand what they own, what their employer or other entities own and how that affects their ability to use their digital creations. These issues of ownership and usage rights can be complicated and require diligence in order to stay clear of possible infringement claims. As such, the use of metadata to document ownership and licensing of intellectual property becomes critical to the professional practice of journalism.

Assessment – formative and summative

Basic assessment principles employing formative and summative methods should be used to guide learning and to comparatively evaluate how students have incorporated knowledge about PDA. Formative exercises should be developed to provide feedback to students and instructors so that gaps in understanding can be easily identified and addressed. Summative assessments in the form of exams can help confirm the effectiveness of instruction along with student aptitude and effort.

Third of the Five W's: When?

Following the four-phase model outlined earlier, we propose to follow the following schedule for rolling out PDA as part of the School of Journalism learning agenda:

- **Phase 1:** Shortly before the beginning of the fall 2016 semester, the librarians will provide a workshop for faculty teaching J2150. The workshop will provide essential PDA teaching concepts and assess the support needed for effective learning.
- **Phase 2:** PDA concepts will be integrated into the J2150 class curriculum for the fall 2016 semester.

- **Phase 3:** Learning from the experience gained in augmenting the J2150 classes, the librarians will invite other School of Journalism faculty to learn about how PDA could benefit their students. Opportunities to deliver this message will include an introductory "brown bag" lunch presentation on a weekday during the fall 2016 semester and additional workshops for faculty during the spring 2017 semester.
- **Phase 4**: Based on faculty interest, we anticipate adding PDA concepts to more classes in the fall 2017 semester.

Fourth of the Five W's: Where?

The Missouri School of Journalism is located at the University of Missouri – Columbia, the flagship of the four-campus UM System. Founded in 1908, the school is one of the oldest professional journalism programs in the world. It consistently scores top ratings for academic excellence and learning by doing. The "Missouri Method" relies on practical hands-on training in real-life scenarios including in newsrooms and communication agencies.

As one of the top programs in the UM System, the School of Journalism is well positioned to take a leadership role in advancing the knowledge and practice of PDA on campus. We anticipate that, as the benefits of PDA learning are demonstrated throughout the journalism school, other academic units and DoIT will incorporate these concepts and learning methods into their curricula. With more than 35,000 students enrolled at the MU campus alone, the total impact on individuals promises to be substantial.

Fifth of the Five W's: Why?

Journalists can be a skeptical lot. They are also very busy chasing the next emerging story, so they need a good reason to spend time doing something else. Good editors tell their students that the key to engaging any audience is making a case for why they should care. In the case of PDA for journalism students and faculty, there are many good justifications, including:

- **Creating portfolios for employment applications:** Throughout their coursework, internships, assistantships and other experiences during journalism school, students are producing examples of abilities that are useful in the job marketplace. In most cases, these artifacts are produced and accessed digitally. Having persistent and reliable access to these digital assets gives job seekers a competitive edge by allowing them to confidently rely on their PDA as they customize their portfolio to highlight skills related to the employment opportunity.
- **Retaining evidence of academic output:** The ability to access writing, photos, video, websites and other digital creations produced for classes provides students with documentation of their achievements. This can also provide a valuable reference for reviewing what has been learned and how much progress has been made over time.
- **Developing lifelong digital preservation practices:** Developing an understanding of how to discover, evaluate and apply best practices is a skill that will serve journalists throughout their personal and professional lives. This skill set includes the ability to orient transient situations into a knowledge map that evaluates issues such as proper formats, metadata and technical platforms that are suitable for ensuring long-term preservation.

The benefits of PDA extend well beyond the academy. Once employed in a news media or strategic communication organization, chances are good that little or no attention will be paid to archiving digital materials. A 2014 national survey by the Journalism Digital News Archive program at the Donald W. Reynolds Journalism Institute indicates that about 30 percent of news organizations don't know if they have a backup of their content or have none at all.

What % BDNC Backed Up Last 25 Years

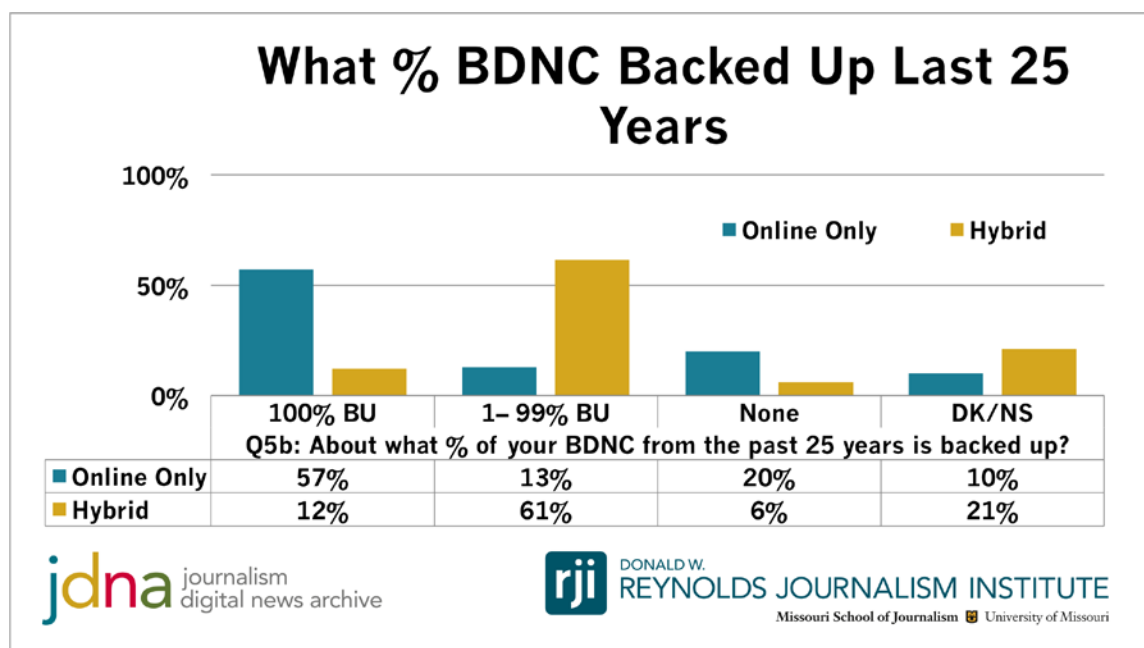| Q5b: About what % of your BDNC from the past 25 years is backed up?	100% BU	1– 99% BU	None	DK/NS
■ Online Only	57%	13%	20%	10%
■ Hybrid	12%	61%	6%	21%

Figure 7: What percentage of your born digital news content from the past 25 years is backed up? 2014 national survey from the Journalism Digital News Archive and the Donald W. Reynolds Journalism Institute, Missouri School of Journalism.

The consequences of benign neglect of digital news archives occur much more rapidly than for print formats but aren't as easily detected without technological assistance. The disruption of paper archive models for news has created "memory holes" of our own making. Unlike the memory holes in George Orwell's *Nineteen Eighty-Four*, losses of "the first rough draft of history" today are largely unintentional, notwithstanding reports of wholesale erasure of news content.[8]

Our hope and belief is that the next generation of journalists, once aware and trained in PDA, will preserve news content that would otherwise be lost by the organizations for which they work. This may raise issues surrounding their ability to use content journalists have created but that are copyrighted by their publisher. Once in the workplace, those who have awareness and knowledge of PDA will likely share their journalism school training with others, magnifying the effect of this educational effort. This sharing will be especially important for freelance journalists working in the "gig" economy, where they will need to manage and preserve their own copyright for economic viability. Eventually, when the number of journalists trained in PDA becomes sufficient and they move into executive roles in their organizations, they will see the value in applying born-digital preservation practices to their content on an enterprise level.

An addition to the Five W's: How?

Collaboration is key to a successful academic and professional program. The Missouri School of Journalism is a fertile environment for this sort of collaborative laboratory model. For over a century the school has developed and refined a hybrid program marrying professional training programs with the academy. Industry professionals make up a large part of the editorial staff in our media outlets, while scholars provide theoretical context. The Journalism (academic) and *Columbia Missourian* libraries, specialized libraries in the University of Missouri Libraries division, have enjoyed a symbiotic partnership with the school throughout their history. The journalism library manages core class media equipment and teaches information-gathering skills in every section of the news writing course as well as teaching research skills in every section of the core graduate research course.

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[8] *Al-Monitor: After seizing Zaman newspaper, what's next for Turkey? http://www.al-monitor.com/pulse/originals/2016/03/turkey-what-next-after-seizure-of-newspaper.html*

The Reynolds Journalism Institute (RJI), launched in 2004 as a major research partner of the school, demonstrated that symbiosis with shared funding (RJI and MU Libraries) for the digital curator of journalism position. Consequently, soliciting buy-in from journalism administration and faculty to teach best practices in personal digital archiving to journalism students has not been a difficult task. It is actually being embraced as launching a new Missouri Method to fill both an unmet need and new skill set for journalists and strategic communicators. As with any Missouri Method, it is understood that students learning skills will share them with future colleagues and employers, thus influencing the advocacy for digital preservation best practices in the media and strategic communication industries.

We plan to begin integrating the PDA learning model into courses at the Missouri School of Journalism during the summer of 2016 to be phased in over a three-year period by:

- Providing training for faculty, tutorials, in-class sessions, research guides and syllabus language
- Offering "train the trainer" sessions for faculty
- Creating toolkits for faculty and students
- Assessing the process and results of the process throughout student's academic career

Armed with these skills, we anticipate that our faculty, staff and students, as well as the future colleagues with whom we hope they will share these skills, will have a much better chance to prosper in tomorrow's digital work environments.

References

References will include cited references, figures and an annotated bibliography of articles, books and websites consulted for this paper.

Annotated Bibliography

Paralleling the exponential growth of technology, we have also seen a growth of content in all media and formats. As digital formats overtook analog, scholarly literature about digital curation and preservation began to appear. Studies using terms "personal information archiving" "curation of digital information," and "digital preservation" began to increase. The term "personal digital archiving" recently has been defined very differently. Kim (2013) adds a psychological motivation of preserving one's self with a PDA. The JISC-funded Paradigm Project assigned archivists to individual politicians with the intent to digitally archive the personal papers of said politicians. Nilsen (2012) investigated the possibility of creating a national repository in Norway for personal digital archivists.

Marshall's (2008) two-part D-Lib series were the seminal scholarly articles that defined PDA as an action by an individual to preserve his/her digital content. Ashenfelder (2013) and Lazorchak (2013), both under the auspices of the Library of Congress, moved PDA into the realm of genealogy, assisting in the creation of tools to train individuals to become personal digital archivists. The primary channel for this training has been public libraries and the audiences: individuals and genealogists. Redwine (2015) provides an overview of key issues of PDA as well as current practices.

To date, no one has investigated the personal digital archiving practices of journalism students.

The following annotated bibliography is divided into three categories:

1. CONCEPTS AND CHALLENGES OF PERSONAL DIGITAL ARCHIVING
2. THEORIES, BEST PRACTICES AND TOOLS
3. ASSESSING STUDENT PDA IN THE ACADEMY

Donald Hawkins, ed. *Personal Archiving: Preserving Our Heritage* (Medford, NJ: Information Today, Inc.*,* 2013), 35.

This book is an exploration of the emerging field of PDA, using multiple contributors to cover projects, individual and family histories, software, social media and email issues, legal issues, LC initiatives, Internet Archive, Microsoft and case studies.

Sarah Kim. *Personal Digital Archives: Preservation of Documents, Preservation of Self.* (PhD diss., University of Texas at Austin 2013). Accessed March 23, 2016, https://repositories.lib.utexas.edu/bitstream/handle/2152/21134/KIM-DISSERTATION-2013.pdf?sequence=1

Sarah Kim. "Landscape of Personal Digital Archiving Activities and Research," in *Personal Archiving: Preserving our Digital Heritage*, ed. Donald T. Hawkins,. (Medford, NJ: Information Today, Inc., 2013) 35.

Kim' dissertation explores the act of preservation of one's documents as an act of preserving one's self. In the Landscape chapter of Personal archiving…, she provides an overview of the landscape of PDA activities and research.

Although Catherine Marshall wrote about personal digital loss before 2008, the two articles on PDA that she wrote for *D-Lib magazine* seemed to catalyze scholarly research on the PDA topic. Most works associated with PDA point to these 2008 seminal articles. The following articles by Marshall were consulted for this paper.

S. Lindley, C. C. Marshall, R. Banks and A. Sellen. "Rethinking the Web as a Personal Archive." In *Proceedings of WWW 2013*(New York: ACM Press, 2013)749-760. Accessed March 24, 2016. http://www.csdl.tamu.edu/~marshall/www2013_fp014-lindley.pdf

C. C. Marshall. "Social Media, Personal Data, and Reusing our Digital Legacy. In *Personal Archiving: Preserving Our Digital Heritag*e, ed. Donald T. Hawkins (Medford, New Jersey: Information Today, 2013) Accessed March 24, 2016 http://www.csdl.tamu.edu/~marshall/marshall-v6.pdf

C. C. Marshall. "Challenges and Opportunities for Personal Digital Archiving. In *Digital: Personal Collections in the Digital Era*, ed. C. Lee. (Chicago, IL: Society of American Archivists 2011), 90-114. Accessed on March 23, 2016. http://www.csdl.tamu.edu/~marshall/I-Digital-Marshall.pdf

C. C. Marshall. "Digital Copies and a Distributed Notion of Reference in Personal Archives, in *Digital Media: Technological and Social Challenges of the Interactive World,* ed.M. Winget and W. Aspray. (Lanham, MD: Scarecrow Press, 2011). Accessed on March 23, 2016. http://www.csdl.tamu.edu/~marshall/Digital-Media-Marshall.pdf

C. C. Marshall. "From Writing and Analysis to the Repository: Taking the Scholars' Perspective on Scholarly Archiving". (Proceedings of JCDL '08, Pittsburgh, PA, June 16-20, 2008)251-260. Accessed on March 23, 2016. http://www.csdl.tamu.edu/~marshall/p251-marshall-final.pdf

C. C. Marshall. (2008, March/April). "Rethinking Personal Digital Archiving, Part 1: Four Challenges From the Field," *DLib Magazine* 14 (2008): ¾, doi:10.1045/march2008-marshall-pt1. http://www.dlib.org/dlib/march08/marshall/03marshall-pt1.html

This article (part 1) and the one following (part 2) appear to be the most highly cited articles about the need for personal digital archiving. Marshall explores a set of issues emerging from

past studies (most of them hers from 2006-2008). "These studies suggest a broadened view of how we might undertake personal digital archiving, both broadly (for consumers) and more narrowly (for academics, scholars, researchers, and students) …"

In part 1, Marshall lists four challenges of PDA:
1. Accumulation
2. Distribution
3. Digital stewardship
4. Long-term access

In part 2, she explores:
1. What should we keep?
2. Where should we put it?
3. How should we maintain it?
4. How will we find it again?

Most of the scholarship on PDA seems to really start here.

C. C. Marshall. "Rethinking Personal Digital Archiving, Part 2: Implications for Services, Applications, and Institutions. *DLib Magazine*, 14 (2008): 3/4. Accessed March 24, 2016. doi:10.1045/march2008-marshall-pt2. http://www.dlib.org/dlib/march08/marshall/03marshall-pt2.html

F. McCown, C. C. Marshall, and M. L. Nelson. "Why Websites are Lost (and How They're Sometimes Found). *Communications of the ACM*52 (2009): 11, 141-145. Accessed March 24, 2016. http://www.harding.edu/fmccown/pubs/lost-website-survey-cacm-all-in-one.pdf

      McCown discusses loss and tools to recover websites lost from software changes or benign neglect.

T. R. Nilson . "Digital Archiving: Contemporary Preservation" (Master's thesis, Ostfold University College, Norway, 2012). Accessed March 24, 2016. http://brage.bibsys.no/xmlui/bitstream/id/109182/Nilsen1.pdf

Nilsen suggests that a national archive of PDAs might be a solution to personal digital content loss.

G. Redwine. "Personal Digital Archiving," *DPC Technology Watch Report* 15 (2015): Accessed March 24, 2016. http://dx.doi.org/10.7207/twr15-01

"The report provides an overview of the key issues related to personal digital archiving, arguing for the importance and urgency of preserving personal files, while also acknowledging the difficulty of managing digital files that include a combination of digitised and born-digital materials." There is a short introduction to the role of cultural heritage organisations in the history of personal digital archiving, as well as current initiatives, which sets the stage for resources and recommendations for individuals who want to be proactive about saving their own digital materials."

THEORIES, BEST PRACTICES AND TOOLS

Mike Ashenfelder. "The Library of Congress and Personal Digital Archiving," in *Personal Archiving: Preserving our Digital Heritage*, ed. Donald T. Hawkins, (Medford, NJ: Information Today, Inc., 2013), 35.

This book is an exploration of the emerging field of PDA, using multiple contributors to cover projects, individual and family histories, software, social media and email issues, legal issues, LC initiatives, Internet Archive, Microsoft and case studies.

N. Brown. "Helping Members of the Community Manage their Digital Lives: Developing a Personal Digital Archiving Workshop." *D-Lib Magazine* 21(2015):5/6. Accessed March 23, 2016, DOI: 10.1045/may2015-brown

This article provides a good literature review of personal digital archiving. While its aim is the library audience, it provides a good overview of what should be included in a personal digital archiving workshop.

Butch Lazorchak. "Four Easy Tips for Preserving Your Digital Photographs," in *Perspectives on Personal Digital Archiving: National Digital Information Infrastructure and Preservation Program*. (Washington, D.C.: Library of Congress, 2013), 6-7.

Library of Congress. *Perspectives on personal digital archiving*. (Washington, D.C. National Digital Information Infrastructure and Preservation Program, Library of Congress, 2013). Accessed March 23, 2016. http://purl.fdlp.gov/GPO/gpo35595

A digital publication from NDIIPP, Library of Congress, this book provides perspectives, tips and outreach suggestions for PDA from a variety of professional archivists and librarians.

B. Winston. *Personal Digital Archiving: Guidance and Perspectives*. (New York : Novinka, 2014).

This book provides a selection of short guides on the whys and hows of personal digital archiving from leaders in the field: Mike Ashenfelder, Jefferson Bailey, Ellysa Stern Cahoy, Erin Engle, Leslie Johnston, Sarah Kim, Butch Lazorchak, Bill LeFurgy, Susan Manus, Keri A. Myers, Tess Webre and Barry Wheeler. The second chapter is devoted to tips for archiving various formats.

Paradigm: Workbook on Digital Private Papers. (A project of Oxford University and the University of Manchester, funded by the JISC programme Supporting Institutional Digital Preservation and Asset Management, 2008). Accessed March 23, 2016. http://www.paradigm.ac.uk/workbook/index.html

"The **P**ersonal **Ar**chives **A**ccessible in **Dig**ital **M**edia (paradigm) project saw the major research libraries of the Universities of Oxford and Manchester come together to explore the issues involved in preserving digital private papers through gaining practical experience in accessioning and ingesting digital private papers into digital repositories, and processing these in line with archival and digital preservation requirements."

The workbook approaches archiving personal digital archives from the perspective of an institution who might want to accession personal archives. Although the perspective is different, the approach is very similar to Marshall's and the Library of Congress'.

Chapter of Interest:

Guidelines for creators of personal archives http://www.paradigm.ac.uk/workbook/appendices/guidelines-eleventips.html provides suggestions for handling personal information as well as digital media assets.

H. Marcetic. "Exploring the Methods and Practices of Personal Digital Information Archiving Among the Student Population." (Revised version of paper presented at BOBCATSSS Conference 2015). Accessed on March 23, 2016. http://www.phil.muni.cz/journals/index.php/proinflow/article/view/1105

A survey was conducted on undergraduate and graduate information science students at the Croatian Universities of Osijek, Zagreb and Zadar. The aim was to see how many students employed digital curation, digital preservation and digital stewardship; what formats and practices they used; how students create digital copies of objects and their use of portable flash drives, CDs, DVDs and Blu-Ray discs; whether they employ the cloud to digitally archive their content; and whether they create backups for objects they have identified as important to preserve. Even though it queries information students rather than journalism students, it is the only scholarly research currently cited that attempts to identify student personal digital archiving habits for the purpose of changing future student behaviors.

Appendix A - Personal Digital Archiving survey

Personal Digital Archiving survey

MU Libraries and the Reynolds Journalism Institute are conducting this confidential survey to help us understand personal digital archiving needs at the School of Journalism. The information you provide will guide us as we seek to define the knowledge and services necessary to keep your hard work available for personal and professional use even after you leave MU.

You have been selected for this survey because of your status as a student, faculty or staff at the MU School of Journalism. Your participation is voluntary. All the information that you will provide will be kept completely anonymous, so that you cannot be identified unless you indicate otherwise. The survey only takes about three minutes to complete.

If you have questions or concerns about the study, or if you feel under any pressure to enroll or to continue to participate in it, you may contact the University of Missouri Health Sciences Institutional Review Board at (573) 882-3181/irb@missouri.edu or the Principal Investigator, Edward McCain, Digital Curator of Journalism at (573) 882-8049/mccaine@rjionline.org. The Campus IRB oversees all research activities carried out at the University.

1. To which of the following communities do you currently belong? Check all that apply.
- Undergraduate student
- Graduate student (two-year)
- BJ / MA student (five-year)
- Postdoctoral researcher
- Staff
- Faculty
- Other (please specify)

2a. (*for undergraduates*) Which of the following is (or will be) your School of Journalism major?
- Convergence Journalism
- Magazine Journalism
- Photojournalism
- Print and Digital News
- Radio-Television Journalism
- Strategic Communication
- Don't know / Not sure
- Other (please specify)

2. (for Postdoctoral researcher, Staff, Faculty, Other) What is your major area of School of Journalism teaching or expertise?
- Convergence Journalism
- Journalism Studies
- Magazine Journalism

- Photojournalism
- Print and Digital News
- Radio-Television Journalism
- Strategic Communication
- Don't know / Not sure
- Other (please specify)

3. What types of digital files do you have that you might want to maintain and keep accessible for a long time (for a work portfolio or personal reasons)? Check all that apply.
- Documents
- Websites
- Audio recordings
- Videos
- Emails
- Social media accounts and data
- Images/photos
- Voicemails
- Text messages
- Code or programs you've written
- Other (please specify)

4. What methods do you use to store your digital files? Check all that apply.
- Store duplicate copies of files in multiple locations (e.g., laptop and external hard drive, phone and cloud storage)
- Store files using online or cloud-based service (e.g., Box, Dropbox, Google Drive, iCloud)
- Store files on a device and move them to another device/computer as needed
- Store files in an email account
- Store files only on one computer/device
- Other (please specify)

5. Why do you save your digital files? Check all that apply.
- It takes more work to delete them.
- I want my files to be available for future research.
- I want my files to be accessible to future generations so they can know what my life was like.
- I have to preserve digital files for my job.
- I save my files so I can use them in the future.
- My professor recommended or mandated that we do.
- I don't care about preserving my digital files.
- Other (please specify)

6. What concerns or frustrations do you have about your current storage methods, or storage options that currently exist? Check all that apply.
- I worry that my digital files might not be backed up adequately.
- It's difficult to load my files into my storage location. (Example: It's difficult to copy files from a device onto my hard drive or to upload them to an online storage provider.
- I worry about losing a stored file due to my own error.

- I worry about losing a stored file due to another party's error.
- I dislike being dependent on a company or service that stores files I would like to keep or control. (Example: I am dependent on my cellular provider to store valuable voicemails.)
- I worry that my privacy might not be respected by companies that store my digital files.
- I worry that my files might not be stored securely and that they could be accessed by third parties such as advertisers, the government or identity thieves.
- It's difficult to export or pull files out of my storage location.
- I don't have the time and/or resources to store my files in the way I would like to.
- Other (please specify)

7. Have you experienced a serious loss of your digital files during the past few years? Check all that apply.
- Documents
- Websites
- Audio recordings
- Videos
- Emails
- Social media accounts and data
- Images/photos
- Voicemails
- Text messages
- Code or programs you've written
- No recent losses
- Other (please specify)

Thank you for your participation. The information collected will help us make the University of Missouri School of Journalism even better.

Appendix B - Personal Digital Archiving survey results

Personal Digital Archiving survey

1. MU Libraries, the Reynolds Journalism Institute (RJI) and the School of Journalism are conducting research through this confidential six-question survey to help us understand personal digital archiving needs at the School of Journalism. Personal digital archiving consists of a series of activities that allow individuals to keep their digital materials usable for as long as they are needed. The information you provide will guide us as we seek to define the knowledge and services necessary to keep your hard work in digital formats available for personal and professional use even after you leave MU. You have been selected for this survey because of your status as a student, faculty or staff member at the MU School of Journalism. Your participation is voluntary. All the information that you will provide will be kept completely anonymous, so that you cannot be identified individually. The survey takes about three minutes to complete and involves only six questions. If you have questions or concerns about the survey, or if you feel under any pressure to enroll or to continue to participate in this study, please contact the University of Missouri's Campus Institutional Review Board (which is a group of people who review the research studies to protect participants' rights), 489 McReynolds Hall or at (573) 882-9585 or the principal investigator, Edward McCain, Digital Curator of Journalism, 218 RJI or at (573) 882-8049. The Campus IRB oversees all research activities carried out at the University. Please respond below to indicate your choice about participating in this survey:

#	Answer		Response	%
1	No, I am younger than 18 years old.		0	0%
2	No, I do not agree to participate.		0	0%
3	Yes, I am at least 18 years old and agree to participate.		111	100%
	Total		111	100%

Statistic	Value
Min Value	3
Max Value	3
Mean	3.00
Variance	0.00
Standard Deviation	0.00
Total Responses	111

2. To which of the following communities do you currently belong?

#	Answer		Response	%
1	Undergraduate student		71	64%
2	Graduate student (two-year)		12	11%
3	BJ / MA student (five-year)		4	4%
4	Postdoctoral researcher		0	0%
5	Faculty		13	12%
6	Staff		9	8%
7	Other (please specify)		2	2%
	Total		111	100%

Other (please specify)
Administeatir
Staff and 2yr Gead Student

Statistic	Value
Min Value	1
Max Value	7
Mean	2.16
Variance	3.48
Standard Deviation	1.87
Total Responses	111

3. Which of the following is (or will be) your School of Journalism major area?

#	Answer		Response	%
1	Convergence Journalism		24	28%
2	Magazine Journalism		4	5%
3	Photojournalism		16	18%
4	Print and Digital News		9	10%
5	Radio-Television Journalism		10	11%
6	Strategic Communication		18	21%
7	Don't know / Not sure		1	1%
8	Other (please specify)		5	6%
	Total		87	100%

Other (please specify)
Visual Editing & Management
Documentary
Convergence (Undergrad)/ Arts and Entertainment Criticism (Graduate)
Radio-Television Sports Journalism
Documentary

Statistic	Value
Min Value	1
Max Value	8
Mean	3.69
Variance	4.77
Standard Deviation	2.19
Total Responses	87

4. What is your major area of School of Journalism teaching or expertise? Please check all that apply.

#	Answer		Response	%
1	Convergence Journalism		9	39%
2	Journalism Studies		0	0%
3	Magazine Journalism		0	0%
4	Photojournalism		5	22%
5	Print and Digital News		3	13%
6	Radio-Television Journalism		1	4%
7	Strategic Communication		1	4%
8	Don't know / Not sure		1	4%
9	Other (please specify)		6	26%

Other (please specify)
Not a teacher
Library
n/a
libraries
Reynolds Journalism Institute
RJI

Statistic	Value
Min Value	1
Max Value	9
Total Responses	23

5. What types of digital files do you have that you might want to maintain and keep accessible for one to five years (for a work portfolio or personal reasons)? Please check all that apply.

#	Answer		Response	%
1	Documents		96	91%
2	Websites		67	63%
3	Audio recordings		72	68%
4	Videos		92	87%
5	Emails		65	61%
6	Social media accounts and data		60	57%
7	Images / photos		96	91%
8	Voicemails		11	10%
9	Text messages		24	23%
10	Code or programs you've written		21	20%
11	Other (please specify)		1	1%

Other (please specify)
Raw Metadata/EXIF files

Statistic	Value
Min Value	1
Max Value	11
Total Responses	106

6. What methods do you use to store your digital files? Please check all that apply.

#	Answer		Response	%
1	Store duplicate copies of files in multiple locations (e.g., laptop and external hard drive, phone and cloud storage)		81	76%
2	Store files using online or cloud-based service (e.g., Box, Dropbox, Google Drive, iCloud)		70	66%
3	Store files on a device and move them to another device (portable hard drive or USB flash drive) or computer as needed		63	59%
4	Store files in an email account		40	38%
5	Store files only on one computer/device		22	21%
6	Other (please specify)		4	4%

Other (please specify)
Store files on a shared server that is backed up by my institution.
Multiple hard drives
Local Network storage
Store files on classes /EVO servers

Statistic	Value
Min Value	1
Max Value	6
Total Responses	106

7. Why do you save your digital files? On a scale of one to five, how much do you agree with the following statements:

#	Question	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Total Responses	Mean
1	It takes more work to delete them.	46	15	10	21	8	100	2.30
2	I want my files to be available for future research.	4	5	8	32	51	100	4.21
3	I want my files to be accessible to future generations so they can know what my life was like.	17	19	27	19	18	100	3.02
4	I have to preserve digital files for my job.	1	4	5	30	60	100	4.44
5	I save my files so I can use them in the future.	0	0	1	21	78	100	4.77
6	My professor or supervisor recommended or mandated that we do so.	15	3	25	36	21	100	3.45
7	I don't care about preserving my digital files.	75	15	8	1	1	100	1.38
8	Other (please specify)	2	0	9	0	3	14	3.14

Other (please specify)
I save files for benefit of general historical records.
To use in my portfolio
Stock Photos

Statistic	It takes more work to delete them.	I want my files to be available for future research.	I want my files to be accessible to future generations so they can know what my life was like.	I have to preserve digital files for my job.	I save my files so I can use them in the future.	My professor or supervisor recommended or mandated that we do so.	I don't care about preserving my digital files.	Other (please specify)
Min Value	1	1	1	1	3	1	1	1
Max Value	5	5	5	5	5	5	5	5
Mean	2.30	4.21	3.02	4.44	4.77	3.45	1.38	3.14
Variance	2.05	1.12	1.80	0.71	0.20	1.64	0.58	1.52
Standard Deviation	1.43	1.06	1.34	0.84	0.45	1.28	0.76	1.23
Total Responses	100	100	100	100	100	100	100	14

8. What concerns or frustrations do you have about your current storage methods, or storage options that currently exist? On a scale of one to five, how much do you agree with the following statements:

#	Question	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Total Responses	Mean
1	I worry that my digital files might not be backed up adequately.	4	8	7	36	45	100	4.10
2	It's difficult to load my files onto a hard drive.	25	20	27	17	10	99	2.67
3	It's difficult to upload to an online storage provider.	17	22	20	30	11	100	2.96
4	I worry about losing a stored file due to my own error.	5	9	9	32	45	100	4.03
5	I worry about losing a stored file due to another party's error.	1	9	10	39	41	100	4.10
6	I dislike being dependent on a company or service that stores files I would like to keep or control. (Example: I am dependent on my cellular provider to store valuable voicemails.)	9	10	16	39	25	99	3.62
7	I worry that my privacy might not	6	16	24	33	20	99	3.45

	be respected by companies that store my digital files.							
8	I worry that my files might not be stored securely and that they could be accessed by third parties such as advertisers, the government or identity thieves.	3	16	16	30	32	97	3.74
9	It's difficult to export or pull files out of my storage location.	13	40	20	21	5	99	2.65
10	I don't have the time and/or resources to store my files in the way I would like to.	12	9	18	41	18	98	3.45
11	Other (please specify)	0	0	7	3	2	12	3.58

Other (please specify)
Large files can be hard to store on the cloud without significant $
Old files can become impossible to open as software gets upgraded to newer versions.

Statistic	I worry that my digital files might not be backed up adequately.	It's difficult to load my files onto a hard drive.	It's difficult to upload to an online storage provider.	I worry about losing a stored file due to my own error.	I worry about losing a stored file due to another party's error.	I dislike being dependent on a company or service that stores files I would like to keep or control. (Example: I am dependent on my cellular provider to store valuable voicemails.)	I worry that my privacy might not be respected by companies that store my digital files.	I worry that my files might not be stored securely and that they could be accessed by third parties such as advertisers, the government or identity thieves.	It's difficult to export or pull files out of my storage location.	I don't have the time and/or resources to store my files in the way I would like to.	Other (please specify)
Min Value	1	1	1	1	1	1	1	1	1	1	3
Max Value	5	5	5	5	5	5	5	5	5	5	5
Mean	4.10	2.67	2.96	4.03	4.10	3.62	3.45	3.74	2.65	3.45	3.58
Variance	1.20	1.69	1.65	1.36	0.96	1.50	1.35	1.38	1.23	1.55	0.63
Standard Deviation	1.10	1.30	1.29	1.17	0.98	1.23	1.16	1.18	1.11	1.24	0.79
Total Responses	100	99	100	100	100	99	99	97	99	98	12