Envisioning the Archival Commons

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Abstract

This article proposes an archival commons to support networked documentation efforts. It envisions a peer-based framework for the assembly, arrangement, and representation of related resources within the context and systems of archives, libraries, and cultural heritage organizations. The commons will expand involvement of users, leverage existing discovery tools, and reduce the cost of coordination associated with the documentation strategy. Using Giddens's theory of structuration and the roles of human agency and social structure, the authors propose basic functionalities to be provided by an archival commons. These functionalities would broaden the ability to form social memory in a commons-based environment supported by the economic idea of archival materials as nonrival goods.

Introduction

An archival commons would be a space where cultural professionals, researchers, and interested members of the general public could contribute narrative and links among objects of interest held by archives, libraries, and/or museums and *systematically reflect those activities within the primary repository itself.* Archival arrangement and description (reflected primarily via the finding aid) would be reoriented from a hierarchy focused on the records to a *network-oriented structure.* Public domain or creative commons rights could govern the commons space;[1] it should offer the ability to generate and associate links between objects using accepted Web standards, to aggregate or (re)arrange disparate cultural objects together into discrete forms regardless of genre or

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[1] Creative Commons, http://wiki.creativecommons.org/, accessed 30 June 2008.

repository, and to describe, disambiguate, annotate, or contribute corrections and clarifications. Such a commons should allow users to engage with archival materials as they pursue their own needs regardless of repository or institution. Changes, additions, and updates to the repository and associative history of the commons would be transparent and usable for filtering, provenance, recommendation, and discovery.

We propose interactive functionalities situated in a distributed but integrated archival commons. We base our proposal on an archival postmodern frame of reference[2] where peer-based functionalities can improve contextual positioning of materials within the traditional delineation of a collection but also within the global view of a universe of cultural artifacts and human knowledge.[3] Such a commons could support the goals of a documentation strategy by relying on a decentralized market-based approach[4] to archival representation, appraisal, and retention[5] rather than the more centralized approach that has proven to be pragmatically unworkable.[6] We rely on Anthony Giddens's Theory of Structuration[7] as a framework for a new decentralized, access-oriented structure applied to archival arrangement and practice. Specifically, we claim that the ongoing process of documents or materials gaining new meaning through use or interaction is a process of structuration.

Structuration

Giddens says, "Structuration Theory views agency and structure as a duality in which human agents draw upon understandings of interpretive schemas, norms, and power during social action, and in so doing, produce and reproduce social structure."[8] *Agency* is the human ability to interpret information, which may

[2] Terry Cook, "Fashionable Nonsense or Professional Rebirth: Postmodernism and the Practice of Archives," *Archivaria* 51 (Spring 2001): 14–35; Terry Cook, "Archival Science and Postmodernism: New Formulations for Old Concepts," *Archival Science* 1 (2001): 3–24; Terry Cook, "What Is Past Is Prologue: A History of Archival Ideas since 1898, and the Future Paradigm Shift," *Archivaria* 43 (Spring 1997): 17–63.

[3] Michel Foucault, *Archeology of Knowledge and the Discourse on Language* (New York, N.Y.: Pantheon, 1972).

[4] Max. J. Evans, "Archives of the People, by the People, for the People," *American Archivist* 70 (Fall/Winter 2007): 387–400.

[5] Elizabeth Yakel, "Archival Representation," *Archival Science* 3 (2003): 1.

[6] Terry Abraham, "Collection Policy or Documentation Strategy: Theory and Practice," *American Archivist* 54 (Winter 1991): 44–52; Elizabeth Snowden Johnson, "Our Archives, Ourselves: Documentation Strategy and the Re-appraisal of Professional Identity," *American Archivist* 71 (Spring/Summer 2008): 190–202.

[7] Anthony Giddens, *The Constitution of Society: Outline of the Theory of Structuration.* (Berkeley: University of California Press,1984); S. R. Anderson, R. B. Allen, and J. Steele, "Structuration, Social Theory and the Digital Archive" (in preparation).

include software-based applications working on behalf of humans. *Structure* represents archival practice or tools that facilitate the organization and interpretation of the materials and any associated information.

This working definition summarizes the three dimensions that Giddens lays out as most important for analyzing a situation:

1. Signification, which addresses the theoretical domain of coding and the symbolic orders or modes of discourse that are associated with the human interaction of communication.
2. Domination, which addresses the theoretical domain of resource authorization and allocation associated with how humans are able to wield power to effect change.
3. Legitimation, which addresses the theoretical domain of normative behavior or regulation of human activities normally through legal or rule-based means.

This statement also alludes to the relationships among these dimensions as indicated in Figure 1, which illustrates the idea that all of the relationships associated with the process of forming a social structure are multidimensional and depend on each other. As a brief example, archival repositories are the legitimate long-term holders of records (setting aside how that came to be), therefore they are able to determine the norms of use and access, and therefore they have the ability to level sanctions against those users who do not abide by those rules. However, someone with sufficient power to effect change could dampen or dispense with sanctions for violations and potentially form new normative behaviors or

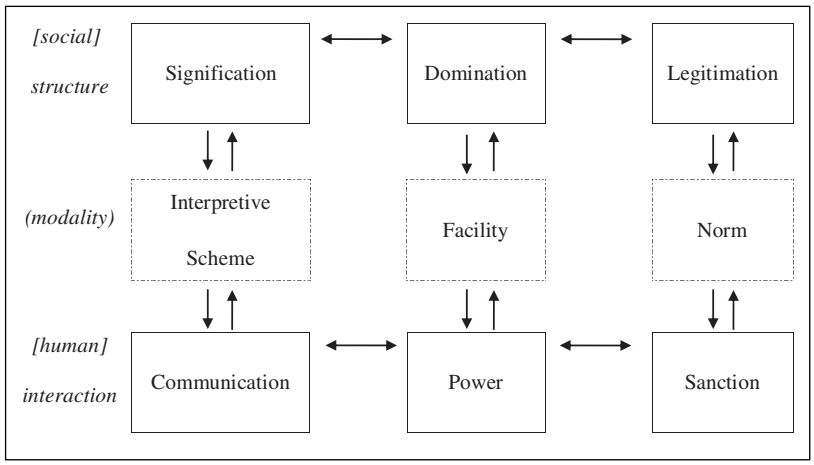

FIGURE 1. Grid of the major concepts from structuration theory and their relationships. *From Giddens*, Constitution of Society, *29.*

[8] Kalle J. Lyytinen and Ojelanki K. Ngwenyama, "What Does Computer Support for Cooperative Work Mean? A Structural Analysis of Computer Supported Cooperative Work," *Accounting, Management and Information Technology* 2 (1992): 19–37, page 29 in particular.

expectations for interactions between the archives and the users. If that person had sufficient power and could utilize some facility (usually economic or political), he or she could possibly alter the dominant social structure that legitimizes the archival repository as the holder of records. In this example, the relationships are bi-directional and able to move in either direction in a continuous flow or *durée*.

Agency is a basic concept of structuration theory that imparts human actors with two specific attributes: *knowledgeability* working in conjunction with *intentionality*.[9] Manuel Castells defines a network society as "the social structure that results from the interaction between social organization, social change, and a technological paradigm constituted around digital information and communication technologies."[10] Following Michelle Light and Tom Hyry[11] and Magia Krause and Elizabeth Yakel,[12] we propose leveraging social interaction to add value to the connections between objects through overt peer-based contribution, discourse, and structuration.[13] From an organizational standpoint, this approach would be similar to Henry Mintzberg's diversified or professional corporate configuration, which Victoria Lemieux identifies as a possible model for understanding and focusing appraisal efforts.[14]

The functionalities outlined below allow post-appraisal context and meaning to be *socially* formed, and then systematically capture (or at least allow for the possibility of) the "discourse formations"[15] that develop over time. These formations are the basis for a commons setting where the meanings associated with archival materials can be formed in a broader social space (Castells's social organization and social change). Formations are conceptualized over time based on particular contexts or purposes and recognize that no "one" record conveys all of the conceptualized meanings for archival materials.[16]

[9] To participate or experience something is to have knowledgeability of it. That knowledge can be used to continue to legitimate the status quo or leveraged in a new or different way to be a change agent to alter the dominant or significant aspects of the social order. Intentionality is a process, normally, but not always associated with routine intentional behavior. The unintentional aspect is an intentional activity that is a mistake. Also, when an agent begins the process of changing something with either intentional or unintentional acts, both are forms of intentionality.

[10] Manuel Castells, *The Network Society: A Cross-Cultural Perspective* (Cheltenham, U.K. and Northampton, Mass.: Edward Elgar Publishing, 2004), page xvii in particular.

[11] Michelle Light and Tom Hyry, "Colophons and Annotations: New Directions for the Finding Aid," *American Archivist* 65 (Fall/Winter 2002): 216–30.

[12] Magia G. Krause and Elizabeth Yakel, "Interaction in Virtual Archives: The Polar Bear Expedition Digital Collections Next Generation Finding Aid," *American Archivist* 70 (Fall/Winter 2007): 282–314.

[13] Giddens, *The Constitution of Society*.

[14] Victoria L. Lemieux, "Applying Mintzberg's Theories on Organizational Configuration to Archival Appraisal," *Archivaria* 46 (1998): 32–85.

[15] Richard Brown, "Macro-appraisal Theory and the Context of the Public Records Creator," *Archivaria* 40 (1995): 122.

[16] Victoria. L. Lemieux, "Let the Ghosts Speak: An Empirical Exploration of the 'Nature' of the Record," *Archivaria* 51 (2001): 81–111, pages 82 and 91 in particular.

The Archival Commons

The Idea

Our proposal for an archival commons combines the ideas of social memory, of a commons, and of nonrival economic goods (goods that are shared and are not consumed by use). A commons can be defined as "those assemblages and ensembles of resources that human beings hold in common or in trust to use on behalf of themselves . . . which are essential to their biological, cultural, and social reproduction."[17] Such a commons would be a democratic culture "in which individuals have a fair opportunity to participate in the forms of meaning making that constitute themselves as individuals. . . . [and] it is about each individual's ability to participate in the production and distribution of culture" that would also influence a commons.[18]

Unlike "natural" goods, non-rival intellectual goods are not consumed by use and can be infinitely repurposed in numerous settings. Because archival materials are nonrival goods,[19] they are susceptible to "glomming on"[20] where the objects and documents in an archives can form the basis of uses that are not confined by archival practice. The postmodern idea that an archives can invoke and reflect constantly changing views and meanings[21] without change to the items themselves can be implemented in a digital environment. Nonrival goods held by archives and cultural heritage organizations are subject to ready "glomming on" because one person's use or interaction with any particular item does not in a practical sense preclude another person from also utilizing that item to the same extent.

Archival Commons and the Networked Environment

There are two parts to the motivation for an open, interactive archival commons: first, the recognition that the volume of records simply does not allow for extensive contextualization by archivists to the extent that has been practiced in the past;[22] and, second, a desire to see archival materials of all types integrated

[17] Donald M. Nonini, "The Global Idea of 'the Commons'," *Social Analysis* 50, no. 3 (2006): 164.

[18] Jack M. Balkin, "Digital Speech and Democratic Culture: A Theory of Freedom of Expression for the Information Society," *New York University Law Review* 79, no. 1 (2004): 3–4.

[19] Donald M. Nonini, "Reflections on Intellectual Commons," *Social Analysis* 50, no. 3 (2006): 206.

[20] Balkin, "Digital Speech and Democratic Culture," 10.

[21] Tom Nesmith, "Reopening Archives: Bringing New Contextualities into Archival Theory and Practice," *Archivaria* 60 (2005): 259–74.

[22] Mark A. Greene and Dennis Meissner, "More Product, Less Process: Revamping Traditional Archival Processing," *American Archivist* 68 (Fall/Winter 2005): 208–63.

into the general social, cultural, and educational discourse by improving opportunities for exposure, interpretation, and inclusion.

The high-level functionalities described below support an archival commons within a broader society. We outline four general assumptions. Collectively these assumptions represent a sea change in how users engage with the increasing quantities of digital objects.

1. Digital objects will generally exist in a highly networked environment. Benkler summarizes the implications of this environment nicely.[23]
2. Archival and primary source materials will remain spread throughout society. Terry Abraham's directory of 5,000 repositories serves as evidence for the current and presumably continuing dispersion of primary source materials.[24] This dispersion may be more "logical" than physical as service computing begins to take hold throughout society.
3. Materials will be heterogeneous. Many objects will become "opaque" when originally encountered and will require some decoding mechanism to derive their intended purpose.[25]
4. Transparency and participatory options will be common and expected. Rosenzweig[26] suggests a peer-based approach to historical endeavors may have usefulness similar to the open-source software movement.[27]

Functionalities of the Archival Commons

We embrace and seek to extend efforts like the Next Generation Finding Aid group,[28] the desire for a more participatory archival practice and interaction,[29] while utilizing the Model of Archive Web Development of a "Type 6: Interactive User Community" archive,[30] within a generally networked environ-

[23] Yochai Benkler, *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (New Haven: Yale University Press, 2006).

[24] Terry Abraham, *Repositories of Primary Sources,* available at http://www.uidaho.edu/special-collections/Other.Repositories.html, accessed 30 June 2008.

[25] *GDFR Global Digital Format Registry,* available at http://hul.harvard.edu/gdfr/, accessed 30 June 2008, and *PRONOM The Technical Registry,* available at http://www.nationalarchives.gov.uk/pronom/, accessed 30 June 2008.

[26] Roy Rosenzweig, "Can History Be Open Source? Wikipedia and the Future of the Past," *Journal of American History* 93 (June 2006): 117–46.

[27] Glyn Moody, *Rebel Code: The Inside Story of Linux and the Open Source Revolution* (Cambridge, Mass.: Perseus Publishing, 2001).

[28] Krause and Yakel, "Interaction in Virtual Archives."

[29] Evans, "Archives of the People," 387–400; Mary Jo Pugh, *Providing Reference Services for Archives and Manuscripts* (Chicago: Society of American Archivists, 2005).

[30] Ian G. Anderson, "Necessary but Not Sufficient: Modelling Online Archive Development in the UK, *D-Lib Magazine* 1, no. 1 (2008): 1.

ment. These functionalities also support the postmodern idea of archives and reflect changing use and meaning of materials rather than a static end state of arrangement and implied meaning.[31] Below, we outline functionalities intended to improve access to archival materials without immediate regard for how these functionalities would be implemented.

Linking

From the early ideas of Vannevar Bush[32] to the thoughts of Foucault,[33] linking works and statements together in a web of connectivity[34] to organize and interpret the state of human knowledge has been a key concept at theoretical, philosophical, and practical levels.

Linking facilitates the possibility of determining how archival materials fit into broad research networks and where they assume their relative position in the information universe at any given point in time. Subsequent analysis of such pathways between materials and use (by tracing links backward or forward) similar to previous social research[35] could prove useful to scholars for understanding when and where these materials obtained their position in a networked environment.[36]

Linking Out

Links out could be virtually co-located at the collection, folder, or item level. Conversely, these links could be contained in a distinct area within a traditional finding aid such as the common abstract or descriptive overview. For example, if a finding aid exists for materials, users would have the ability to register a link to existing works or announcements. These works could be a tradi-

[31] Terry Cook, "Fashionable Nonsense or Professional Rebirth," 14–35.

[32] Vannevar Bush. "As We May Think," *The Atlantic* 176, no. 1 (July 1945).

[33] Foucault, *Archeology of Knowledge and the Discourse on Language.*

[34] Tim Berners-Lee, J. Groff, and B. Pollermann, "World-wide Web: The Information Universe," *Electronic Networking: Research Applications and Policy* 2, no. 1 (1992): 52–8.

[35] Mark S. Granovetter, "The Strength of Weak Ties," *American Journal of Sociology* 78, no. 6 (1973): 1360–80.

[36] Albert-Laszlo Barabasi, *Linked: How Everything Is Connected to Everything Else and What It Means for Business, Science, and Everyday Life* (New York: Plume, 2003); Erzsébet Ravasz and Albert-Laszlo Barabasi, "Hierarchical Organization in Complex Networks," *Physical Review E. Statistical Physics, Plasmas, Fluids, and Related Interdisciplinary Topics* 67, no. 2, article no. 026112(2003). Retrieved from 10.1103/PhysRevE.67.026112; Duncan J. Watts, *Six Degrees: The New Science of Networks* (London: Vintage, 2004).

tional monograph, an article, a data-set, an oral history, a movie clip, or ephemera such as an announcement of an event posted on a listserv or blog. Even if the linked-to item were to disappear, the trace would indicate a relationship to some other object. Within any given section in a finding aid, links could be established to commercial or nonprofit databases or entries in more bibliographically oriented materials such as dictionaries, encyclopedias, gazetteers, geo-references, or map-making services to provide additional context for subsequent users.

Linking In

In a networked environment, linking in is the ability to target a particular item, folder, or series so that algorithmic linking conventions, such as OpenURL, can be fully utilized. The ability to mechanically expose or target archival materials (or their surrogates) that are or become available by a broadly defined community of interested persons will be important for addressing the abundance issue systematically while allowing archival materials to be incorporated into other environments for the purposes of enhancing contextualization.

Linking and establishing the "place" of any object or document in a networked space of other objects necessitates establishing links between and among objects both inside and outside of the archival commons. The ability to establish links between primary source items (or their surrogates) in various repositories as part of the research and discovery process could be very valuable for establishing contextualization. While it is common for authors to cite "backward" to primary source materials, at present, researchers or casual users have little opportunity to "give" contributions to an archival commons or a repository by facilitating linking "forward" to objects within the same repository, to other repositories of interest, or to more traditional publications such as articles, books, and encyclopedia entries that are *about* or *relate* in some way to the object.

Improving the ability to link objects together provides additional opportunities for users to assemble groups of objects for their own purposes and to facilitate sharing that effort (even if incomplete or not exhaustive) for future users of the materials in question or for subsequent study of how the materials were being utilized.

Continuous (Re)arrangement

Finding aids for archival materials reflect a singular arrangement of materials at a particular point in time. While it can (and has been) argued that the original order or arrangement upon accession into an archives is worthy of preservation and is informative for providing contextual understanding, it is

only one vantage point into the materials in question.[37] A single arrangement at a single point in time does not inherently allow or facilitate a continuing story of use or a narrative about the materials in question as a result of their subsequent use or incorporation into other systems or contexts. We propose the ability to virtually sequence, resequence, and interleave the materials themselves (or their surrogates) with other archival materials from within the same or other repositories so enabled in the broader information space for the purposes of presenting alternative arrangements.

These additional arrangements could be based on other criteria such as chronology/timeline, themes (subject or genre), folksonomies, or persons (real or corporate) to allow the incorporation of archival materials in postarchival, downstream activities. It would be similar to utilizing the "Australian" series system[38] by allowing materials to move virtually into a new series (or multiple series) instead of continuing a particular series with a new administrative structure wrapped around it. Given the established importance of finding aids,[39] the ability to create or form an aid for a specific purpose would seem to have additional value. Other areas and disciplines are already starting to explore how to establish new and permuted value chains for records (articles, data-sets, etc.) and scientific discovery in new peer-based ways to expose or assemble new views of extant information or data.[40]

Traditionally, archival arrangement has held *respect des fonds* and the original order of documents as near givens to be altered as little as possible. In a networked world with vast quantities of electronic records and objects, rearrangement can be virtually invoked for a specific purpose. A typical commons-based finding aid could be instantiated, added to, commented upon, expanded, and so on for just about any purpose. For example, students or researchers doing their own or group research could attach objects or documents (newspaper articles, photographs, building plans, reports, minutes, etc.) from various archival collections or repositories to a chronologically themed

[37] Theodore R. Schellenberg, *Modern Archives: Principles and Techniques* (Chicago: University of Chicago Press, 1956).

[38] Chris Hurley, "The Austrialian ('Series') System: An Exposition (Clayton, Victoria, Aus.: Ancora Press, 1994), available at http://ourhistory.naa.gov.au/library/pdf/Records_Continuum_Hurley.pdf, accessed 1 July 2008; Chris Hurley, "Relationships in Records: A Retrospective, *New Zealand Archivists* 15, no. 4 (2004): 9–13.

[39] Wendy Duff, Barbara Craig, and Joan Cherry, "Historians' Use of Archival Sources: Promises and Pitfalls of the Digital Age," *Public Historian* 26, no. 2 (2004): 7–22.

[40] Herbert Van de Sompel, Carl Lagoze, Jeroen Bekaert, Liu Xiaoming, Sandy Payette, and Simeon Warner, "An Interoperable Fabric for Scholarly Value Chains," *D-Lib Magazine* 12, no. 10 (October 2006), available at http://www.dlib.org/dlib/october06/vandesompel/10vandesompel.html; Open Archives Initiative Object Reuse and Exchange, available at http://www.openarchives.org/ore/, accessed 1 July 2008; R. J. Boland, Jr., R. V. Tenkasi, and D. Te'eni, "Designing Information Technology to Support Distributed Cognition," *Organization Science* 5, no. 3 (August 1994): 456–75; R. J. Boland, Jr. and R. V. Tenkasi "Perspective Making and Perspective Taking in Communities of Knowing," *Organization Science* 6, no. 4 (July/August 1995): 350–72.

finding aid. Links to outside materials (articles, artwork, books, photographs, student work, websites, etc.) or events could be added in as well. Similar materials could be associated with a finding aid for specific buildings on a campus, community events, people, streets, groups of local interest, and the like without regard for where those materials reside in the extant records management or archival structures of the organization. The ability to virtually co-locate items and associations for specific purposes as an added layer would leave a trail of activity (the process of structuration captured in a systematic fashion) so future users of the archives could build on the activities of those who have gone before. This would allow future researchers the ability to see when and where prior connections between objects were made. Who associated what objects when as reflected in the activities within the communal archives becomes not just a means of conveying associative knowledge over time, but could itself become an object of future study. No longer would generations of students or groups of students passing through institutions be forced to repeat the laborious process of assembling the same materials for similar purposes either virtually or physically from disparate archival collections. Rather, prior efforts could be captured for future researchers investigating similar (or the same) topics or events who could consider additional perspectives raised by previous connections and activities. Students could stand on the shoulders of their predecessors as part of their own educational experience.

As the ratio of hands-on archival expertise to content declines given the abundance of materials, affording guidance[41] based in part on those who have gone before is a practical, possible, and ready way of leveraging and fostering subsequent conversation and discovery. The rearrangement of archival objects in a virtual and networked environment need not destroy original order, but rather provides users the ability to utilize contextual tools to provide their own perspective by applying their mind to the matter.[42]

Tagging and Folksonomies

Peer-contributed metadata intended to facilitate retrieval via descriptive keyword tagging has become an established practice over the last several years.[43] Tagging functionality in use ranges from highly popular communities such as

[41] Wendy Duff and Allyson Fox, "'You're a Guide rather than an Expert': Archival Reference from an Archivist's Point of View," *Journal of the Society of Archivists* 27, no. 2 (2006): 129–53.

[42] Terry Cook, "Mind Over Matter: Toward a New Theory of Archival Appraisal," in *The Archival Imagination, Essays in Honour of Hugh A. Taylor,* ed. B. L. Craig (Ottawa, Ont.: Association of Canadian Archivists, 1992).

[43] Jakob Voss, "Tagging, Folksonomy and Co-Renaissance of Manual Indexing?" (2007), available at http://arxiv.org/abs/cs/0701072v2, accessed 1 July 2008.

Flickr to academic and research-oriented efforts such as Connotea.[44] This type of activity is in keeping with the broad implications of a network-based society as outlined by both Castells and Benkler, which dramatically expands the ability of people to contribute, interpret, and shape at least part of the cultural context. Tagging actively engages[45] the broader community in building a more robust knowledge base around the materials in question.[46] Given a sufficient number of contributions over time, a distributed folksonomy classification scheme or schemes will emerge.[47] What appeared to be chaotic or capricious contributions by users will begin to obtain a structure of knowledgeability if not overt intentionality.

Tagging items, websites, books, links, or video clips is now a common and inexpensive means of adding descriptive terms to abundant content. We envision researchers or groups of users (local communities, classes, special project groups) tagging items to facilitate granular organization of their work and associated documents from a commons-based repository. Volunteers associated with a historical society or groups of students performing university- or campus-related research could easily tag items as part of projects or assignments. Vernacular terminologies or place-name designations could be associated with items or people that are not "official" but form an integral part of a local culture.[48] While the potential of efforts on this scale may not be initially obvious to those not directly involved, it is easy to see how a small group might organize items of interest in a communal setting without being constrained by traditional precoordinated organizational schema that may not support the specific work at hand.

Furthermore, once items of interest have been identified and tagged, they could be readily re-assembled by query or link to facilitate sharing or exposure to other groups in other contexts. Given a sufficiently large set, a folksonomic structure may emerge. While these folksonomic structures tend to be messy, why not allow users to shape the folksonomy itself? Let users go beyond the typical type-size differentiated-weighting by enabling or disenabling tags used more or

[44] http://www.connotea.org/, accessed 27 April 2009.

[45] Heather L. O'Brien and Elaine G. Toms, "What Is User Engagement? A Conceptual Framework for Defining User Engagement with Technology," *Journal of the American Society for Information Science and Technology* 59, no. 6 (2008): 938–55.

[46] Elizabeth Yakel, "Thinking Inside and Outside the Boxes: Archival Reference Services at the Turn of the Century," *Archivaria* 49 (2000): 140–60.

[47] Marieke Guy and Emma Tonkin, "Folksonomies," *D-Lib Magazine* 12, no. 1 (2006): 19–33.

[48] While contributing these names to official registries such as the Name Authority Cooperative Program of the Library of Congress (NACO) would be ideal, we think that a flat folksonomic implementation will be more useful and accessible to a larger group of moderately interested people and more likely to effectively capture the local nuance. Contributing authority records to official registries is likely to exceed the abilities or interests of most people making a contribution or clarification about a name or place.

less than some specified number of occurrences or within a specific time span as a form of mining the communal provenance associated with the use of the archival objects.

Names Service

Various types of names are primary means of entry for researchers in an archival setting.[49] Given the importance of names, it seems logical to provide a way of contributing, annotating, and/or linking to names from within an archival system. Utilizing disambiguated forms of names from resources that adhere to recognized standards, such as the U.S. Library of Congress authority files[50] or ICA's *ISAAR (CPF)* standard,[51] would be preferable. A mechanism that allows users to incorporate links into biographically oriented commercial products or organizations that have established biographical databases could also be useful. Other repositories or databases of place names, historical gazetteers, or directories of significant cultural objects could also be considered for facilitating disambiguation. Many governmental organizations or agencies provide open access to databases and resources that would be informative for establishing additional contextual points associated with archival materials. Providing the opportunity for people interested in local history to add, clarify, associate, or disambiguate names appearing within a document resident in a repository leverages social capital. Linking to or integrating such generally recognized name databases as mentioned above or allowing users to submit what they perceive to be corrections to names embedded within documents and then subsequently tagging them as "user contributions" and including them in searchable indexes would enhance identification and description. Allowing genealogical researchers at historical societies to establish or contribute links (or family relationships) between names and families and/or roles might also be of considerable interest to subsequent users.

Annotation and Contribution with Narrative Tools

Archival materials don't naturally tell their story. Their presence in an archives indicates some importance, as do the subsequent care, handling, and effort that go into their maintenance and availability to interested parties, but

[49] Susan Hamburger, "How Researchers Search for Manuscript and Archival Collections," *Journal of Archival Organization* 2, no. 1 (2004): 79–102; Helen R. Tibbo, "Primarily History in America: How U.S. Historians Search for Primary Materials at the Dawn of the Digital Age," *American Archivist* 66, no. 1 (Spring/Summer, 2003): 9–50.

[50] http://authorities.loc.gov/, accessed 1 July 2008.

[51] *ISAAR (CPF)*, International Council of Archives, 2nd ed., available at http://www.ica.org/en/node/38475, accessed 1 July 2008.

those are covert signals not well understood by most users.[52] Providing a mechanism for users to contribute what they have discovered or know (either personally or elsewhere) about particular archival materials would be a way for an archives to "listen to users" and leverage what they learn and experience on behalf of future users. While many tools are now available[53] and while they will no doubt change, the idea is to make them overtly available so that users of the archives can use them intentionally to contribute. We propose that a narrative space aligned with whatever degree of description already exists (collection, folder, series, etc.) be made available so that users of an archival commons can annotate, contribute, transcribe, correct, or elaborate on materials that may otherwise be sparsely described. The end result would be commentary similar, though more specific and/or additive (item level), to the colophons and annotations outlined by Michelle Light and Thomas Hyry.[54]

Provenance of the Narrative

Upon issuing such a broad invitation to make use of archival collections,[55] who is contributing content for future users will require clear documentation. What is said and by whom will become part of the overall representation of the materials and will no doubt influence subsequent interactions with them. Transparency and attribution related to the narrative activity associated with the materials will be critical for preserving the authenticity of the materials themselves versus subsequent additions about them. Capturing and documenting the who, what, where, and when of peer contributions aligns with the call for documenting documentation about the historical activities associated with the materials that "support archives administration and serve the needs of users."[56] Within the archival commons, researchers could use whatever additions have been contributed as part of the investigative process or electronically "strip away" those comments and interact directly with the archival materials themselves.

[52] Elizabeth Yakel, "Listening to Users," *Archival Issues: Journal of the Midwest Archives Conference* 26, no. 2 (2002): 111–27.

[53] Marostella Agosti and Nicola Ferro, "A Formal Model of Annotations of Digital Content," *ACM Transactions on Information Systems* 26, no. 1 (2007): 3.1–3.57.

[54] Light and Hyry, "Colophons and Annotations," 216–400.

[55] Evans, "Archives of the People," 387–400.

[56] David Bearman, "Documenting Documentation," *Archivaria* 34 (1992): 33–49, page 34 in particular.

Reputation of the Agents

If archives embrace "archives for everyone,"[57] allowing users to contribute and engage actively and independently with archival materials and leave traces of their use,[58] the reputation of those who have gone before will become very important to users who follow over the long term (or *durée* in the Annales School of thought)[59] for what the contextual use might convey. Resnick and Varian state that a "reputation system collects, distributes, and aggregates feedback about particular participants' past behavior."[60] While an archival setting is not (for the most part) the e-commerce setting that they address, the three requirements to make a reputation system work still apply. First, an archives is a "long-lived entity" that will be around to support this service long enough (at least within the retention schedule) to facilitate future interaction. Second, it is able to "capture and distribute" the fact that current or past visitors have actually made use of materials. Even the generic "downloaded N times" could be informative to future users. Third, it presents the information collected by the two previously noted mechanisms to inform and guide "trust decisions" by future users.

Recommendations and Collaboration

Recommendation systems can improve the ability of users to find particular items of interest, but we also propose spreading this functionality throughout the archival commons. We propose this strategy not because pervasiveness is inherently good, but simply because there is so much stuff. Recommendations can be based on extant relationships established by professional archivists and utilized by users or mixed in with user-contributed content such as names, narratives, tags, or links to outside content. Much like the Tapestry email system,[61] users would be able to issue queries with filters in place (or not) based on content (keywords), collaboration (materials rated, tagged, narrated about, associated, viewed, or activated) or structure (original archival arrangement, subsequent arrangement) and obtain some recommendations. Once a populated commons is in place, the ability to develop any number of useful permutations and queries for finding relevant materials is open to imaginative inquiry. The converse of this ability to make recom-

[57] Evans, "Archives of the People," 2007.

[58] Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford and New York: Oxford University Press, 2005).

[59] Fernand Braudel, *On History* (Chicago: University of Chicago Press, 1980).

[60] Paul Resnick and Hal R. Varian, "Recommender Systems," *Communications of the ACM* 40, no. 3 (1997): 56–58, pages 46–47 in particular.

[61] D. Goldberg, David Nichols, Brian M. Oki, and Douglas Terry, "Using Collaborative Filtering to Weave an Information Tapestry," *Communications of the ACM* 35, no. 12 (1992): 61–70.

mendations is the ability to identify, at least in a coarse fashion, what cannot be recommended. What records are present, what records are missing, and what records need to be identified are hallmarks of the archival documentation strategy. Working under the premise of a wider collaborative approach similar to that of the Polar Bear Expedition Digital Collections,[62] we propose that if, after a period of time, items or records cannot be recommended or discovered by a wide collaborative effort, an opportunity for filling in a documentary gap has been identified.

Collection-to-Collection Association

Many readers have no doubt experienced the power of recommendations and the collaborative filtering process at e-commerce environments such as Amazon and Netflix.[63] These sites and many others are built on the use or purchase relationships that an item has to another item or user rather than on a distinct classification mechanism, subject heading, or ontology in the traditional cataloging sense. While there are lists of archival institutions and repositories of primary resources,[64] there does not appear to be a means for *users* to make overt direct *collection-to-collection* associations. A common online functionality similar to "check and compare" could be used to establish relationships in support of a broad-based documentation strategy. Collections represented within the WorldCat infrastructure have a modicum of associative ability with a shared list but that requires a record for each collection to be contributed to WorldCat.

Visualization

There will be a need in the electronic world for mechanisms to help users discover particular items but also to identify opportunities for organizations to build more representative bodies of documentary evidence. Ware[65] suggests five distinct benefits of information visualization that apply to the archival abundance issue: comprehending huge amounts of data; allowing the perception of unanticipated emergent properties; enabling problems with the data itself to become apparent; understanding features of the data; and facilitating hypothesis

[62] http://polarbears.si.umich.edu/, accessed 2 June 2008.

[63] http://www.amazon.com/, accessed 1 July 2008 and http://www.netflix.com/, accessed 1 July 2008.

[64] The *National Union Catalog of Manuscript Collections (NUCMC)*, available at http://www.loc.gov/coll/nucmc/, Terry Abraham's Repositories of Primary Sources at http://www.uidaho.edu/special-collections/Other.Repositories.html, the Smithsonian's listing of Library and Archival Exhibits on the Web at http://www.sil.si.edu/SILPublications/Online-Exhibitions/, and OCLC's WorldCat service configured to search for archival materials at http://www.worldcat.org/advancedsearch, all accessed 1 July 2008.

[65] Colin Ware, *Information Visualization Perception for Design* (San Francisco: Morgan Kaufman, 2004).

formation. A number of specific visualization techniques[66] and interfaces[67] could be applied to an archival commons to facilitate a documentation project. Geographic visualization in particular holds promise for archival materials in a documentation effort. The Web implementation of "many eyes"[68] is a readily accessible version of this type of functionality. Users may manipulate extant data-sets or register themselves, upload a data-set, and then perform various types of analysis on their own data to formulate hypotheses and/or provide additional views of the underlying data.

Using a "many eyes" application or something similar, the value of facilitating "new views" of traditional or user-added content lies in providing users with a mechanism to generate an overview of selected materials. "Bubble views" of the aggregate number of documents (using any unit of measure) in one part of a collection as compared to another or between related collections could be very informative for discovering relative holdings in the archives. Likewise, a network diagram utilizing the relationships inherent among the objects in the archives could be instrumental in clearly indicating how documents or relationships between series or organizational structures manifest themselves in the archives as compared to the more formal organizational chart. One could also consider visualizing user contributions (user-added links) or actions (viewed N times) about an archival collection as a mechanism to understand how integrated or "explored" various collections or parts of collections have been in the past. For example, a brief study of holdings (or formats of holdings) could be visualized among institutions to compare the strength of holdings in a genre—pamphlets, posters, diaries, music, or whatever one might want to aggregate—and then rendered visually to users as a guide to the location of various materials.

Being Practical

Of course, most cultural heritage organizations do not have great financial or technical expertise at their disposal. However, these organizations have materials that have been deposited into their care for various reasons and are of interest to various people. Therefore, simplicity, openness, and low technical complexity for making these materials and the associated descriptive tools more accessible and

[66] Robert Spence, *Information Visualization* (Harlow, Essex, U.K.: ACM Press and Addison-Wesley, 2001).

[67] Robert B. Allen, "Using Information Visualization to Support Access to Archival Records," *Journal of Archival Organization* 3, no. 1 (2005): 37–49.

[68] http://www.many-eyes.com/, accessed 1 July 2008. Many Eyes offers about a dozen different visualization options. These range from common line and stack graphing functionality to comparisons of sets of data, relationship mapping, parts of a whole (including tree mapping) functionalities, and word manipulation.

interactive are critical requirements. They would afford ample opportunities for people outside the archives itself to fully document what those materials are and mean. In addition, interactive elements that become common in the future could also be integrated into this new interactive layer to allow people to engage with, (re)arrange, and represent materials in newfound ways.

These technologies should be scalable, widely utilized "off-the-shelf" components or services supported by entities or practices *beyond and outside* the archival world. Ideally, these components or services should be available for free or at very low cost to archives (in part because they are being used by more than just the archival world). This would leverage the development work of other information or content managing groups while lowering the burden on the archival world to shoulder all of the development work associated with these mechanisms. Thus, we propose

- That cultural organizations begin assembling a networkable and malleable layer of functionality for interaction so that people can form meaning and express their interest and knowledge of the materials in their care;
- That the collective knowledge of the people who know of or about these materials and are willing to offer their knowledge be systematically captured as part of what these organizations do; and
- That those organizations with the resources to develop software or applications for *specific* needs in an archival setting or collection have the option of contributing that effort into a broader networked information infrastructure through technical standards and modular development practices that already exist.

Let us begin moving what the archival community knows and holds from behind partially closed doors in subscription databases, records-centric formats, or past practice into a more open, inviting, and interactive environment. Extant open and free software and systems offer abilities to manage content and presentation; wikis and blogs offer the potential to harness the knowledge of the crowd through attribution, annotation, and explanation; and social networks and sharing services afford interested users the ability to inject links and commentary about archival materials into the realm of common knowledge. It is time to think about moving the archives of the people, by the people, and for the people into the hands of the people.

Summary

We elaborate the idea of an archival commons in a highly networked environment. This commons could support significant *cross-repository linking* and peer contribution, analysis, and commentary and would support an archival

project utilizing a documentation strategy. While aspects of the interactive commons overlap with Web 2.0 applications, we go beyond those by utilizing Giddens's theory of structuration and a postmodern archival approach to archival practice. The archival commons would be an interactive, hands-on environment offering users the ability to interact with objects by contributing linking between objects, (re)arrangement, tagging, naming, annotation, and narration, with provenance tracking, recommendations, and collaborative, associative, and visualization opportunities throughout. It would allow users to contribute their knowledge or experience actively to a project, thereby shaping the interpretation and ensuing cultural meaning. Interactions, contributions, and attributions of content and commentary would be transparent and layered onto extant archival materials to form a traceable history of use and engagement for future users. We hope this article will help move the archival imagination to a point where archives are not singular destinations for research and inquiry, but are integrated into the daily fabric of activities by improving the ability of any interested persons or groups to engage with and utilize archival materials.