Mary E. Samouelian. Embracing Web 2.0: Archives and the Newest Generation of Web Applications. A Master's Paper for the M.S. in L.S degree. April, 2008. 66 pages. Advisor: Christopher Lee

Recently archival professionals have undertaken projects to convert their physical collections to digital format and display the surrogates of these primary sources on their websites. Simultaneously, the Web is moving toward a shared environment that embraces collective intelligence and participation, which is often called Web 2.0. This paper investigates the extent to which Web 2.0 features have been integrated into archival digitization projects Although the use of Web 2.0 features is not widely discussed in the professional archival literature, this exploratory study of college and university repository web sites in the United States suggest that many archival professionals *are* embracing Web 2.0 to promote their digital content and redefine relationships with their patrons. Of 213 archival repositories examined, 85 hosted a digital collection, and of those, 38 employed at least one of the five types of Web 2.0 applications under consideration. The data suggests that the type of Web 2.0 application being employed is related to the type of content management system a repository is using to manage and display the digital collection. Based on eight interviews with staff responsible for the sites, motivation for implementation varied among respondents, but promoting and sharing content with current and future users stand out as the most common reasons.

Headings:

      Archives

      Archives -- United States -- Information Services

      Libraries -- Information Technology

      Libraries and the Internet

EMBRACING WEB 2.0: ARCHIVES AND THE NEWEST GENERATION OF WEB
APPLICATIONS

by

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A Master's paper submitted to the faculty of the School of
Information and Library Science of the University of North
Carolina at Chapel Hill in partial fulfillment of the
requirements for the degree of Master of Science in
Library Science.

Chapel Hill, North Carolina

April 2008

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Introduction

As the World Wide Web gained popularity in the 1990's, archival repositories began developing websites, many of which were populated with information about the nature of the repository's collections, conditions for use, finding aids, and administrative details such as location and hours of operation. Although the degree to which archives make use of the Web varies, many archives regardless of size have at least published a homepage announcing their existence (Yakel and Kim, 2003). Recently archival professionals have undertaken projects to convert their physical collections of photographs, documents and audio/visual materials to digital format and display the surrogates of these primary sources on their websites. They are doing so with the promise of making "information accessible that was previously only available to a select group of researchers" and thus allowing "users to search collections rapidly and comprehensively from anywhere at any time" (Jones).

Concurrently, the Web is moving toward a shared environment, presently labeled "Web 2.0", that embraces collective intelligence, participation, and affords previously passive recipients of content the opportunity to engage, combine and "mash up" information in new and imaginative ways. Coined by Dale Dougherty and popularized in 2004 following the first O'Reilly Media Web 2.0 conference, Tim O'Reilly explains Web 2.0 as:

> The network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from

multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an "architecture of participation," and going beyond the page metaphor of Web 1.0 to deliver rich user experiences (O'Reilly).

In other words, this latest generation of applications is allowing users to create, interact with, and share information on the World Wide Web in ways that were not possible just a few years ago. Blogs, wikis, podcasting, RSS (Really Simple Syndication) feeds and collaborative tagging are all Web 2.0 terms that are becoming more familiar to both online users and mainstream society, and social networking websites such as YouTube, Flickr, and Facebook are showing us an environment in which users can easily contribute -- not just view -- content. Data gathered in 2007 from the Pew Internet & American Life Project suggests that, of the approximately 142 million Internet-using Americans, many have actively participated online by blogging (12% of online adults), sharing personal files (22% of online adults), uploading photos to the Web (37% of all users), and creating a profile on a social network (20% of all online adults) (Rainie). Although these numbers are unlikely to approach 100% any time soon, it is likely that the percentage will rise, and participation will become a more pervasive aspect of our online lives (Miller). As Mary Madden and Susannah Fox conclude, "whatever language we use to describe it, the beating heart of the Internet has always been its ability to leverage our social connections" which enables direct access to the person, as well as "access to his or her own world" (Madden).

Archives and Web 2.0

Given the potential benefits of the World Wide Web to archival repositories, a

natural question is: To what extent are Web 2.0 features integrated into archival

digitization projects? The answer to this question is not obvious. There is some initial

discussion of the topic of Web 2.0 on the wiki associated with the 2007 Annual Meeting

of the Society of American Archivists,[1] under the heading of "SAA 2008 Ideas" that

emerged from an "informal" Web 2.0 session at the 2007 Society of American Archivist

(SAA) Annual Meeting (http://ibiblio.org/saa2007/index.php/SAA_2008_Ideas). These

ideas include:

- A pre-conference workshop introducing 2.0 technologies;

- A session exploring the perceived resistance to new technologies in archives--
  is it just about cost and resources, or is it about authority? Resistance to
  adopting popular methods? Other ideas?

- A session showing how archives have adopted new technologies to support
  their own internal processes (such as internal blogs for communication or
  wikis instead of manuals or binders);

- A session showing the value of incorporating user comments as a supplement
  to cataloging (particularly in the context of minimal processing); and

- A session on issues with appraising and preserving the products created with
  2.0 tools.

While it is noteworthy that a contingent of meeting participants appear to be

interested in how archives have adopted new technologies, it is important to stress that

there is no mention of digital collections or that the discussion has moved beyond the

original posting in September 2007.

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[1] The wiki "**is not** provided, hosted or officially endorsed by SAA as an organization".

In addition to the wiki, there are a handful of archivist bloggers, including ArchivesNext, (http://www.archivesnext.com/), archivematica (http://archivemati.ca/), Accidental Archivist (http://accidentalarchivist.blogspot.com/) and thesecretmirror.com (http://thesecretmirror.com/), who are openly discussing the impact on and potential benefit of Web 2.0 to archival repositories. ArchivesNext is perhaps the most "Web 2.0-centric", by devoting a page of the blog to "Archives and 'new technology'". The blog's author, Kate Theimer, writes that this is "a first attempt to collect examples of archives using 'new' technologies. I use the quotation marks because these really aren't new technologies, but I think some archives still consider them with some wariness" (ArchivesNext) . While it is significant that Web 2.0 is gaining some discussion on blogs, it is difficult to infer the number or type of individuals reading and actively participating in these discussions.

The professional literature suggests that while some members of the archival community recognize the importance of embracing new technology to remain vital to users in the digital era, there is little evidence as to what archival repositories are *actually* doing to fulfill this critical mission. In contrast, the library community appears to be more engaged in the discussion of Web 2.0 and its possibilities as evidenced by the popularity of the topic in the professional literature. This dichotomy in the professional literature raises further questions about the archival community's commitment to this latest generation of web applications.

The purpose of this exploratory study is two-fold. The first phase is to conduct a content analysis of archival repository websites, with the goal of shedding light on the extent to which archival repositories are using the Web's next generation of applications

to support access, use and interactions associated with their digital collections. Based on these findings, the second phase entails selecting a subset of the archival repositories which have implemented Web 2.0 applications and conducting one-on-one interviews with archivists or special collections staff who are primarily responsible for the implementation. These interviews will address reasons for implementation, challenges associated with implementation, and the success or failure of implementation, providing evidence of what archival repositories are doing to remain vital to users in the digital era.

As there are many applications that fall under the umbrella of Web 2.0, it is necessary to narrow the list to a manageable size. The four "social media tools" recommended by Darlene Fichter in her article "How Social is Your Web Site? Top Five Tips for Social Media Optimization" and a bookmarking definition provided by Elizabeth Yakel and Jihyun Kim (Yakel and Kim) suggest the following list of tools for fostering user engagement:

- Blogs (short for weblog) – enable person-to-person communication on a variety of topics. Most are written by individuals who share information, ideas, experiences and recommendations and "make it easy for the reader to move from reading web pages to creating their own web content" (Courtney 6). Comments on blogs are another form of interactive user-generated content.

- Community sites – include wikis and social networking sites (e.g., MySpace, Facebook, LibraryThing). These forums are focused on a particular topic or niche and allow for a high level of participation, a rich user experience and "illustrate the dynamic shift away from the static web and leap toward the next generation of user-created content" (Courtney 80).

- Ratings and Reviews – website features that invite user participation and contribution. These sites (e.g., Digg, Flickr) invite participation by enabling sharing, creating favorites, collecting, tagging and organizing.

- Podcasting – individuals can download, upload, share, record and edit audio clips and/or radio-type shows. The ability to record and distribute audio content via the Internet "affords everyone the chance to be the producer and host of their own 'radio show'" (Courtney 35).

- Bookmarking – enables sharing and reuse of links to sites or pages, facilitating "shared discovery and new ways of understanding the content" (Courtney 8).

Literature Review

The literature produced by the archival community in the last several years has tended to focus more on the general adoption of technology by archivists in order to remain vital and essential to current and future users in the digital era (e.g., Hickerson 2001; Fleckner 2004; Jimerson 2004; Pearce-Moses 2007).

First presented in 2000, Hickerson's piece casts an insightful eye to what he feels are the most pressing challenges for archivists at the beginning of the 21st century and the scope of their impact on the profession. With the tenet of "use is our reason for being", he advocates archivists making their archival holdings more accessible to and usable by their core constituencies and broadening their use by an expanded audience no matter their location. He specifically addresses both digital resources and their users by asserting that in "developing digital resources, we initially focused on content, but we are now beginning to turn our attentions to designing and implementing the services necessary to

support effective collection use in a networked environment" (11). While Hickerson concludes that "retrospectively converting more materials to digital form gives us the capacity to better serve existing audiences and reach new audiences, and enables more flexible and creative use of our holdings" (12), he does not provide any examples of archives developing or implementing these "new" services nor any tangible solutions on how to accomplish this mission.

Both Fleckner and Jimerson take a similar approach when addressing the archivist-technology relationship; they not only reaffirm the concerns of Hickerson, but similarly fail to include concrete solutions to the issues raised in their articles. Fleckner dramatically calls the 1990s the "archival revolution" (10), explaining in some detail how the Internet and World Wide Web were catalysts for archives inasmuch as they afforded them the opportunity to put the most basic information about archival materials to the widest public at minimal expense. With technology advancing at a dramatic pace and with more virtual users discovering repository websites (many for the first time), Fleckner admits that the relationship with users has changed and that archivists are "called upon to meet new user expectations and take on new roles" and that "our long-term health, perhaps even survival, will turn on how we meet these challenges from the outside environment" (11).

Jimerson takes a comparable perspective as he contends that the adoption of the MARC cataloging format for archival description and the Encoded Archival Description for online access to archival records have made archives and manuscripts substantially more accessible to researchers of all kinds. With these new initiatives, archivists need to remain vigilant "to the needs of our users and ensure that technology enhances rather than

obscures accessibility" (12). While he recommends that archivists remain savvy about technology for access to archival materials, he concedes that the compounded challenges of time, money and resources could negatively affect this broad perspective of the profession. His solution to this struggle is to keep learning "new techniques, new professional concepts, and new strategies for success" (13) .

In contrast to the general call to technology by these authors, Richard Pearce-Moses' 2007 article in the *American Archivist* does make an *indirect* reference to the latest generation of the Web. Pearce-Moses states that "wikis, Amazon, and Google show us how people can work asynchronously and collectively to build useful resources and we'll see more and more on-line collaboration tools" and in particular "we'll see changes in public expectations for access to information" (1). While Pearce-Moses is one of the few archivists in the published literature to acknowledge the possible impact of this recent technology on the archival profession, what is surprising and perhaps disappointing is that like the former authors he does not provide any examples of repositories experimenting with Web 2.0 applications nor provides any solutions of how to capture this technology to meet users' changing expectations. Instead, he presents a scenario of what archives might look like in the digital future, from the worst case of the archival profession failing to adapt to the digital era and "losing our social memory" to the best case of a "society that has a rich cultural record and documentary heritage because archivists have mastered the skills to thrive in the digital era" (16). In the end, he concludes that archivists need to be excited, rather than intimidated by new technology and innovations.

Much of the literature on the use of archives dates back to the mid to late 1990s

when archival repositories were establishing their presence on the World Wide Web in attempts to exploit this technology to cater to the needs of users (e.g., Landis 1995; Craig 1998; Cox 1998). It was not until 2002 that both Helen Tibbo and Margaret Hedstrom examined how current and future generations of users may approach archives through this type of computer interface.

As the first phase to a much larger study, Tibbo surveyed a sample of 300 American historians from 40 U.S. universities to explore how historians locate archival materials in the digital age. From the response rate of 33.3%, Tibbo was able to draw some preliminary conclusions:

- Although 98% of the historians indicated they found materials by following lead and citations in printed sources, the study revealed that a fairly high use of a wide range of new information retrieval technologies (including Google) were being employed. Tibbo suggests that a range of information-seeking behaviors must be supported by archival repositories – both online and in print.

- Many respondents asked for digital collections to be placed online. Tibbo advocates archivists continuing their work on web exhibits, digitizing meaningful segments of collections, and providing access to them in a way that users would find helpful. (9)

She concludes by saying that "it is essential that archivists embrace this [electronic access] technology to make their materials more readily available to users" and equally important to "assess what their users want and need and how they go about locating information" (1).

While Tibbo's study only focused on a specific set of users and only reports

preliminary results, it illustrates the importance of offering a variety of ways for users to access and use archival materials, as they have different information retrieval behaviors. As user sophistication within the virtual environment increases with respect to accessing and using and sharing information, it seems that an archival repository should anticipate those needs by evaluating and perhaps adopting the most current technology available.

Hedstrom's thought-provoking article "Archives, Memory, and Interfaces with the Past" begins to imagine a "generation of users, with fundamentally different perspectives on the past, who will approach archives through computer interfaces, rather than visiting physical archives and interacting with tangible documents" (24). She argues that as human-mediated archives (i.e., the onsite visit of the researcher to the archival repository to use archival materials and the archivist acting as the mediator between the researcher and the materials) yield to computer-mediated archives, it is critical that archivists re-examine their role between the user and the materials. By examining the archival activities of selection, appraisal and description, Hedstrom attempts to illustrate how archivists exercise power over documents and interfaces[2] in both the physical (i.e., the archival repository itself) and online environment by determining what constitutes legitimate evidence of the past and shaping social memories. She confidently asserts that archivists can use technology to "declare and share power" with each other and with current users and future generations. Many of her recommendations for accomplishing this shared power focus on the archivists shaping interfaces and providing innovative tools that allow the virtual user the opportunity to "navigate, explore and make their own

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[2] Hedstrom uses the concept of interface both as a metaphor for archivists' roles as intermediaries between documentary evidence and its readers and as a term which describes a tangible set of structures and tools that place archival documents in a context and provide an interpretative framework. (Hedstrom 22)

interpretation of archives" (33). Several of these suggestions are more abstract than concrete, leaving the reader to wonder how this power-sharing could be accomplished or whether any repositories have attempted to address this issue and have been met with success or failure. Despite this shortcoming, Hedstrom provides a series of provocative questions[3] for archivists to confront before proceeding with interface design. These perhaps are the most valuable facet of this article as they give a glimpse into what an archival repository *could* become in the future.

An examination of the literature reveals that the potential effects of Web 2.0 have not gone unnoticed in the library community as there is a greater body of literature about the topic than in the archival community (e.g., Casey 2006; Benson 2006; Harris 2007). This is not to say that the library community has yet completely deciphered what Web 2.0 is or how its potential can be harnessed, nor does it mean that the entire library community has embraced the concept of Web 2.0. What is significant is that librarians and academic researchers are beginning to recognize the potential -- and possibly inevitable -- impact of Web 2.0 on libraries and, therefore, are more widely discussing it in professional journals and online forums than are archivists.

At the center of the library literature about Web 2.0 is the call for librarians to: (a) recognize that the Web has moved from simply being static websites and search engines to a shared network space that "drives work, research, education, entertainment and social activities – essentially everything that people can do" (Story); (b) evaluate the potential value of Web 2.0 technology for their respective libraries as a means to bring

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[3] Two of these questions are "should our interfaces reinforce archivists' perspectives on what constitutes an archives or should we enable users to construct their own notions archives based on the needs or values that matter most to them?" and "how much power do we, as archivists, wish to share?" (Hedstrom 42)

their services to users; and (c) be proactive and experimental with this type of technology in order to improve the range of services available and meet the needs of users. Many authors argue that libraries are in the habit of providing the same services and programs to the same groups and as a result are growing complacent and failing to change. Many call for librarians to "explore popular new types of internet services such as Facebook instead of quickly dismissing them as irrelevant to librarianship" and "learn new ways to reach out and communicate better" with a larger segment of users (Casey 13). While there are not a great deal of implementation solutions provided, several of these articles include the web addresses of library websites (such as the Darien Library website: http://www.darienlibrary.org/ and MyLibrary at North Carolina State: http://my.lib.ncsu.edu) experimenting with Web 2.0 applications. This is particularly beneficial for those who are thinking about or looking to implement web applications of their own.

Where the library and archival literature differ most significantly is in the effort of the academic library community to research the potential benefits, shortcomings, and challenges associated with using and implementing these recent social networking applications (e.g., Matusiak 2006; Charnigo, et al 2007; Wilson 2007).

Matusiak explores the challenges and usefulness of social tagging and its potential implications for developing user-oriented indexing of digital collections. Her study consists of comparing the level of indexing of two photograph collections. One collection is displayed on a more traditional University of Wisconsin-Milwaukee website using the CONTENTdm® digital media management system, Dublin Core metadata schema, and a

number of controlled vocabulary tools. The other collection is displayed on Flickr[4],

which relies heavily on the user providing details about the collection. Matusiak sees

advantages and disadvantages to both approaches. She concludes that the more traditional

approach provides more consistency and detail of images in a structured, hierarchical

manner, however, concedes that the social classification system in Flickr gives users the

freedom to "describe the world in which they see it" (294).

There are two serious flaws to Matusiak's study. First, Matusiak admits several

times that her comparison is "brief". As her sample size is only two websites, her

conclusions do not have the same generalizability as if she had compared additional

commercial social navigation applications to the University's website. Additionally, the

comparison of the level of indexing does not seem to be comparable. The University's

website relies heavily on sophisticated indexing tools used by professional librarians to

provide information, whereas Flickr relies on its user community to provide the

information. The author is comparing two different systems instead of two similar

systems. Her study may have been more beneficial if the University website had allowed

its users to add the indexing information instead of the librarians. With that said,

Matusiak does offer some insight to the potential benefits of social tagging as it considers

an opportunity for greater user engagement with the library's digital collections.

Wilson takes a more systematic approach to user supplied information for digital

collections by evaluating the use of contributors as viable high-quality metadata creators

contributing to the Répertoire International de Littérature Musicale (RILM) database (an

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[4] The author explains the choice of Flickr from other photo-sharing websites by stating that "Flickr is unique and popular in its classification and networking application that allows assigning tags, commenting, and sharing images and associated tags with a community of user" (Matusiak 288).

international database of scholarly works about music) (16). Her study is based on the premise that one of the most expensive components of digital projects is metadata creation, and suggests that one of the possible solutions to reduce cost is to allow external users to participate in the creation process.

She evaluated 104 "raw data" contributor-supplied records created in 1998, 2000 and 2004 by comparing them to the final high quality RILM record (i.e., after being edited by the professional staff) on a variety of characteristics including completeness of information, format and content. The findings show that the quality of contributor metadata from the records evaluated was semantically good, yet opportunities for structural improvement exist. Wilson concludes that the "onus is on the metadata community to build systems and interfaces that harvest contributor semantic content, while leveraging a contributor's discipline knowledge" (26). While Wilson makes a compelling argument for the use of contributor-supplied metadata, the results of her study do not really supply strong evidence in support of her conclusion. The limitations stem primarily from the records evaluated; Wilson discloses that they did not represent a random sample of records from the RILM database and some of the contributors submitted multiple records at one time for the same issue. In addition, she did not say how long the institution had been accepting contributor metadata and whether it had a positive or negative effect on the quality of the records in the database, nor did she mention whether or not the professional metadata creators thought this type of user-generated content was useful.

In 2005 the Houston Cole Library (HCL) at Jacksonville State University became a popular hangout for students in search of computers to access Facebook. While some

librarians at HCL were excited and intrigued by this trend (e.g., creating their own

Facebook accounts just to see how it worked, how to connect with students and to keep

up with the latest internet fad), others viewed the site primarily as just another "dating

service" (Charnigo 24). Charnigo et al. set out to survey librarians throughout the United

States to find out what impact, if any, the social networking site had had on other

libraries. They sought information including librarians' perspective on Facebook, their

perceived roles associated with it, and their awareness of Internet social trends and their

place in the library. With a response rate of 51%, the authors found that for the most part,

librarians were neither enthusiastic nor disapproving of Facebook, and that only a handful

were positive and excited about the possibilities of online social networking.

Interestingly, 51% of the respondents indicated that "librarians needed to keep up with

Internet trends, such as Facebook, even when such trends are not academic in nature"

(29), and 34% of the respondents who had heard of Facebook had created a personal

profile (3% indicated the Library had a profile). While the authors acknowledge

limitations to their study -- in particular, some of the participants of the survey who had

never heard of Facebook could not answer any of the questions except that they were not

familiar with the site and thus potentially skewing the data -- they represent an early

effort to delve into, and produce data on, librarians perceptions about social networking

sites and usage in their library. They conclude that "what role the library serves in these

environments might largely depend on whether librarians are proactive and experimental

with this type of technology or whether they simply dismiss it as pure reaction" (31).

The topic of Web 2.0 has received little attention from the archival community

(e.g., Yakel 2007; Krause and Yakel 2007; Evans 2007). Elizabeth Yakel's 2007 piece,

"Inviting the User Into the Virtual Archives", addresses Web 2.0 and its impact on archives. She contends that despite early interest in the Web, archives have become less experimental and slow to adopt some of the features of the more recent social networking applications. Although she does not supply empirical data for the reasons behind this perceived procrastination, she does offer a few possibilities such as wariness of moving away from the traditional relationship between archivist and researcher, and the archivist's desire to maintain authoritative metadata about the digital collections. She does provide several examples of archival repositories implementing Web 2.0 applications, which confirms that at least *a handful* of archival repositories are exploring the possibilities of this latest social networking trend.

Drawing on some of the conclusions from Hedstrom, Yakel recognizes that "re-conceptualizing the role of the archivist and the researcher is hard", however, "by and large the sites [Web 2.0 adopters] reviewed in this article have ceded some control over those core archival functions to their visitors and are reimagining the ways in which researchers can interact with the archival record and with fellow travelers in the virtual archives" (163).

Using a combination of Web analytics, surveys, interviews and content analysis, Magia Ghetu Krause and Elizabeth Yakel provide an initial evaluation of an experimental online finding aid which was created and implemented as an integral piece of the Polar Bear Expedition Digital Collection. Deployed in 2006, the next generation finding aid offered a variety of Web 2.0 technologies including bookmarking, user-generated comments, link paths intended to alert visitors to related pages viewed by other users, and user profiles, with the intent of enhancing social interaction as well as facilitating the

accessibility of archival materials.

While their initial findings suggest that using Web 2.0 features may possibly make archival materials more accessible and enrich traditional finding aids, Krause and Yakel concede that they were disappointed in the limited use of some of the interactive features. They also question whether these social navigation tools are the most appropriate for finding aids or whether other tools such as annotation, tagging or explicit ranking may be more appropriate (Krause and Yakel 312). Regardless of these varied results, Krause and Yakel are the first to study the use of social navigation tools in an online archival environment, thus revealing something about end users and their relationship with digital collections and the newest generation of finding aids that had never been previously published. This in itself is significant. Perhaps most importantly they remain optimistic about the future and the use of web technologies in enhancing the accessibility of and interaction with archival materials. Indeed, they assert "we are encouraged by this experiment and will continue to push the boundaries of current descriptive representations and reconceptualize how the interactions among archivists, researchers, and records can enhance the archival record" (Krause and Yakel 312).

In "Archives of the People, by the People, for the People", Max Evans introduces the concept of "commons-based peer-production" as a means for archival institutions to better manage their burgeoning collections. Evans argues that archivists are at a crossroads; the Information Age "means many more records to inventory, appraise, accession and process. But it suggests to the rest of the world that all information will be easily and quickly available. The Internet promises to increase the public's awareness and use of archives and historical records – a future I think we all want to encourage. But

reality intrudes" (Evans 388). Citing limited resources, budget cuts and changing formats, Evans asserts that this "conundrum" must be solved in order to make archival records more effectively searchable and retrievable.

Evans' model offers suggestions for changing archival activities to balance the realities of the information age with the realities of managing growing collections, and at the heart of this piece is his "commons" concept in which users determine the level of intellectual access to archival materials. He encourages user participation, asserting that "users can do what archivists cannot do alone" (Evans 397). Evans contends that archives do not necessarily have the resources to do item-level description and indexing and therefore should create an environment which invites contributions by volunteers to become suppliers of detailed data about archival holdings. He acknowledges the development of collaborative Web 2.0 tools and suggests that it is the archivist's job to "make sure that this tagging supports archival access systems" (Evans 398).

Since Evans is proposing a model in this article, he does not provide any examples of repositories experimenting with Web 2.0 applications nor provides any tangible answers of how to capture this technology to encourage participation. With that said, his article is noteworthy. He recognizes the impact of Web 2.0 applications for encouraging user interaction and collaboration and sees its potential for archives and their users. By creating a common environment shared mutually by archivists and archival users, he maintains that not only will we have holdings that are much easier to discover, access and use, but perhaps more importantly the "commons" will build a "community of highly intelligent men and women who will come to understand and appreciate archives" (Evans 400).

Are archival repositories at odds with the dynamic information needs and expectations of end users in a "Web 2.0" world, or are they perhaps just slow to adopt these social networking applications as Elizabeth Yakel suggests (Yakel)? Are archivists striving to remain integral parts of the information society by providing information to users in formats they expect with the access they demand or are they ignoring the potential information needs of their users? This exploratory study hopes to provide some preliminary answers to both questions.

Methodology

The methodology for this study combined content analysis with one-on-one interviews.

Content Analysis

The goal of the content analysis was to examine the extent to which archival repository websites are implementing Web 2.0 applications with respect to their digital collections. For the purposes of this study, "archival website" was broadly defined as the website of a repository that is responsible for the long-term preservation of materials, and "digital collection" was defined as digital resources organized into collections spanning a range of subjects that support the research needs of its community. For further clarification, I determined that a digital exhibition, which characteristically displays only a selected few digital resources with extensive description, would not be considered a digital collection. A website "hosting" a digital collection was broadly defined as one which was contributing digital content to its own website thus making its content accessible via the World Wide Web. Consortia of digital collections were excluded from

this study. It was decided that it would not only be challenging to clearly identify the owner/decision maker of the Web 2.0 application because of the multiple partners and contributors to the consortium digital collection, but it would also be difficult to decide if a shared collection counted as one digital collection or multiple collections.

A content analysis methodology was selected because it provided a systematic, reliable means of surveying the websites. It was decided to identify manifest rather than latent elements because of the interpretation and subjectivity involved in identifying latent content. Manifest content concerns the surface meaning or the presence of specific identifiable elements in a text. Latent content is also highly subjective and lacks the reliability in coding that manifest content allows (Yakel and Kim).

The content analysis was completed by first determining if a repository website was hosting a digital collection. I initially examined the home page of each website to determine if a digital collection was listed as either a feature or resource. In many instances the digital collection was easily identifiable (see Appendix A for an example) and thus was included on the recording sheet (Appendix B). If a link to a digital collection was not posted on the home page, I looked at subsequent web pages and as a final step, performed a search on the site map. If a digital collection did not exist (see Appendix C for an example), this was also noted on the recording sheet.

After the existence of a digital collection was confirmed, I proceeded to count the number of social media tools recommended by Fichter and Yakel were used on the archival website and documented this on the recording sheet. Appendices D through H illustrate the use of these applications by archival websites. If a social media tool did not exist this was also recorded.

Content Analysis Sampling

The Repositories of Primary Sources served as the principal sampling frame for this study. The website is "a listing of over 5,000 websites describing holdings of manuscripts, archives, rare books, historical photographs, and other primary sources for the research scholar. All links have been tested for correctness and appropriateness" (Abraham). This list considers a variety of sizes and types of repositories thus permitting a broad cross-section of archival repositories representing the larger archival community. Moreover, it is one of the most complete lists of archival repositories available. In addition to the sampling frame, archival repository websites which were known to have implemented Web 2.0 applications were a secondary source for inclusion in the content analysis as they were known entities[5]. These included repositories listed on professional listservs, other websites (i.e., an archivist's blog) or through "word of mouth" and discovery during the content analysis. This list is provided in Appendix I.

Since the 5,000 repositories included primary sources unrelated to archives, it was first necessary to create criteria for inclusion/exclusion in the sample to ensure that it was representative of archival repositories. The criteria were as follows:

- The repository was located in the United States;

- The words "archives" or "special collections" appeared in the name of the repository[6]; and

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[5] While it is possible that this preliminary listing of repositories could be included in the sampling frame, it was determined that since they are *known* repositories it was beneficial to treat them separately from the sampling frame as they may be missed in the random sampling.

[6] Whether a repository is called an archives or special collection depends on the institution. Both naming conventions were included as the primary focus is on research as their mission and as such collect primary materials that are unique (i.e., manuscripts, photographs, maps, etc) that require special handling, and are organized for the long-term preservation of materials.

- The repository was affiliated with either a university or college (a majority of universities/colleges have special collections or archives).

After the list was narrowed to approximately 1,000 archival websites, the study involved stratification of the population before executing the sampling. Stratification involves grouping of the units composing a population into homogeneous groups before sampling, thus improving the representativeness of the sample (Babbie). As the Repositories of Primary Sources list was already divided first by region (Eastern [A-M], Eastern [N-W], and Western) and then by state, this seemed to be the most appropriate stratification. The last step to the sampling was using the probability technique of systematic sampling. The list of approximately 1,000 archival websites were first compiled into an Excel spreadsheet in the order of the stratification (i.e., Eastern states A-M followed by Eastern States N-W, etc.). Then to ensure that the sample was random, I started at the 4th repository listed in the spreadsheet and selected every 5th unit for inclusion in the sample. This sample together with the repositories which were identified to have implemented Web 2.0 applications totaled 213 repositories selected for content analysis.

As the end product of the content analysis was numeric, the process involved counting the number of Web 2.0 applications appearing on the archival repository websites selected from the sampling and documenting this on the recording sheet.

One-on-One Interviews

The second phase of the study entailed conducting structured one-on-one interviews with the individual responsible for the implementation of the Web 2.0

application(s). The purpose of the interviews was to further investigate the topic of Web 2.0 applications with the expectation that the data would reveal what measures archival repositories are taking to remain vital to users in the digital era. A one-on-one interview method was selected over a general survey as the participants were more likely to provide detailed, in-depth answers, thus providing a level of validity to the data and greater "control" over the line of questioning by the researcher (Creswell). The interviews were structured, meaning the interviewer worked through a predetermined list of questions in a set order (see Appendix J), with the questions being primarily open-ended. Although the structured interviews typically do not allow the interviewer the freedom to depart from the questionnaire, the greatest advantage of this design was the assurance that the same questions were asked of all participants, thus allowing for increased consistency across interviews (Buckingham and Saunders). The choice of using open-ended questions not only allowed the participants the opportunity to freely express their opinions about the topic, but also acted as a means for exploring a topic not yet heavily discussed or addressed in the archival literature. The interviews were recorded on a cassette tape and the interviewer took detailed notes of the interviews to ensure that all answers were sufficiently captured.

The individuals to be interviewed were identified using the probability sampling technique of multistage cluster sampling. From the list of the 38 repository websites in which a Web 2.0 application was recognized as being used, I selected every 2nd repository thus compiling the final list of 20 repositories to be contacted for an interview.

One of the most challenging aspects of the one-on-one interviews was the identification of the participants to be interviewed, which entailed a degree of

investigative work. All of the repository websites either had a list of staff members or a "Contact Us" link located on their website. Of the 20 websites reviewed, 14 listed staff members and included key information such as title, telephone number and email address. I targeted the individual I thought responsible for the implementation of the Web 2.0 application by examining the titles listed, such as Archivist, Head of Special Collections, Director, and Special Collections Librarian. The remaining six websites simply listed a general reference email or telephone number. An email invitation was sent as the first point of contact with a potential respondent (see Appendix K for email introduction). It was requested that they respond by March 14, 2008. Approximately five days later, the individuals who had not responded to the initial email were contacted by telephone and if there was no answer, I left a voicemail. The interviews were closed to response by March 21, 2008.

The inducement for participation was based on self-perception which relies on individuals' desire to view themselves as kind, helpful, and generous (Sue and Ritter). By inviting individuals to participate in the interviews, I offered them the opportunity to manifest these qualities. Sue and Ritter explain that "the theory predicts that potential respondents who identify with the label [being kind, helpful, and generous] will choose to participate" (97). I attempted to capitalize on this by indicating I was a graduate student conducting a study that could potentially benefit the archival profession. The eight interviews were approximately 45 minutes to an hour in length, and depended on the availability of the participant. Overall, the shortest interview was approximately 15 minutes while the longest lasted 60 minutes. All interviews were conducted by telephone with the exception of one which was conducted in person.

Ethical Issues

      For this study, ethical issues were anticipated and addressed by the researcher with respect to the interview process and the interpretation of the data. Three of these major issues were: (a) informed consent, (b) ensuring respondent confidentiality and anonymity, and (c) ethical interpretation and reporting of the results (Sue and Ritter).

Informed Consent

      As the participants of the interviews were volunteers, they needed to make an informed decision about participating in the study. As such, they were briefed on the general purpose of the study, how the data was to be used, the identity of the sponsor of the research, the average length of time to complete the interview, and whether there were any risks involved in participating in the interviews, such as asking questions that would disclose uncomfortable or difficult information. As indicated above, this information was addressed in both the email invitation when initial contact was made. In addition, after the participant agreed to be interviewed, he or she was sent an Information Sheet (see Appendix L) via email, which further detailed the research study.

Confidentiality and Anonymity

      This was perhaps one of the most rigorous requirements, as the respondents expected that the information they provided was confidential and their identities kept anonymity – that is, their participation and information would not be disclosed in the results of the research except in general terms. It was the responsibility of the researcher to disassociate names from responses during the coding and analysis of the collected data. Every effort was made to generalize the information so that any identifiable information

was eliminated.

Data Interpretation and Reporting

   With respect to data interpretation, every effort was made to fully and accurately represent the results gathered during the study. As there is a potential for misinterpreting, suppressing, falsifying, or inventing findings to meet a researcher's or an audience's needs, the researcher took a proactive stance not to engage in these practices (Creswell).

Analyzing the Data

   Analysis of the interviews involved open coding, meaning that the codes were suggested by the examination and questioning of the data. Open coding is best used for exploratory studies which allows for an emergence of themes from the data. Creswell recommends six steps when carrying out a qualitative data analysis, which were employed for this study (191). These included:

1. Organizing and preparing the data for analysis (i.e., transcribing interviews, sorting and arranging data);

2. Reading through all the data, and obtaining a general sense of the information and reflecting on its overall meaning;

3. Beginning the detailed analysis with a coding process or organizing the materials into "chunks" or categories;

4. Using the coding process to generate a description of the categories or themes for analysis;

5. Advancing how the description and themes will be represented in the qualitative narrative; and finally

6. Making an interpretation or meaning of the data or "lessons learned".

Findings

Content Analysis

213 archival repositories were evaluated to determine the extent they are using the Web's next generation of applications with respect to their digital collections. The first step in this process was to ascertain if a website was hosting a digital collection. Of the 213 repositories evaluated, 85 (40%) of the repositories hosted a digital collection, with an additional six repositories in the process of developing or "hoping to" (according to the information on their homepage) develop digital collections in the future. Of the 85 archival repositories websites with digital collections, a surprising 38 (45%) repositories of the total employed a Web 2.0 application. To further refine the extent of the use of Web 2.0 applications, 28 repositories (74%) used at least one Web 2.0 application, eight (21%) employed two Web 2.0 applications, and two repositories (5%) of the total employed three Web 2.0 applications.

Figure 1 categorizes the type of Web 2.0 application most frequently used by archival repositories. This dissection of the Web 2.0 applications is rather interesting as one further evaluates the data. The data suggests that the type of Web 2.0 application being employed is related to the type of content management system a repository is using to manage and display the digital collection.
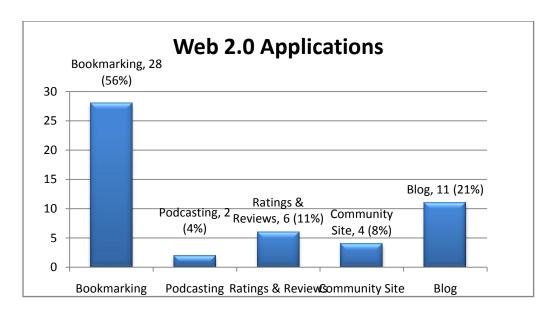
Web 2.0 Applications

Figure 1. Percentage of Web 2.0 Applications Most Frequently Used

As an example, of the 28 repositories offering a bookmarking feature, 21 (75%) of those were using CONTENTdm, a commercial digital management collection package which allows users to add images to their "favorites", reference the Uniform Resource Locators (URLs), and interact with images by zooming in and out on different parts of the images. Two additional repositories were using other commercial systems with features similar to CONTENTdm. The remaining five repositories with a bookmarking feature are using homegrown systems[7] to manage and host their digital collections. The distinction between the commercial and homegrown content management systems (CMS) appears to be noteworthy because the bookmarking features for the homegrown systems tend to go well beyond those offered by the commercial system. Several examples highlight this divergence. The Keweenaw Digital Archive at Michigan Technological University (http://digarch.lib.mtu.edu/default.aspx) features a "User Photo Album"

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[7] In general, the homegrown content management systems lacked the distinct branding of a commercial system. In some cases, the repository website indicated the system was unique to the institution.

component allowing users to build their own exhibit. Users can select images, add their own comments or narrative, insert bibliographic text, arrange the positions of the images, and combine the selected images into a web-based photographic exhibit available to the public. The bookmarking feature used by the University Archives at the University of Minnesota not only allows users the ability to add an image to their "basket" (thus building their own mini collection), but also gives them the opportunity to add and post notes about the image and export (save/open) the image to their own computer device. Lastly, the Frank & Marshall College Archives and Special Collections (http://library.fandm.edu/archives/new_archives.html) also includes a blog covering the latest exhibitions and web features sponsored by the repository and a profile in Facebook.

The data also reveals that the commercial management system/homegrown dichotomy continues when examining the remaining Web 2.0 applications being used by repositories. Specifically, the use of Web 2.0 applications being employed outside the standard features of the commercial CMS were examined, including blogs, community sites, ratings & reviews, and podcasting. The data suggests that these types of Web 2.0 applications are more frequently used by repositories using a homegrown rather than commercial content management system. Figure 2 illustrates this comparison. Although this dichotomy was not specifically addressed in the interview process, the data suggests that those repositories implementing an in-house content management system are more likely to experiment with Web 2.0 applications than those using a commercial system.
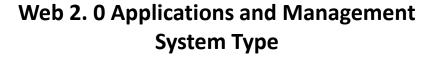
Web 2. 0 Applications and Management System Type

Figure 2. **Web 2.0 Applications and Management System Type**

As shown above, of the 11 repositories with a blog on their website, six (55%) have a homegrown system for their digital collections, compared to the five using CONTENTdm. The trend is more dramatic with the remaining Web 2.0 applications. Three (75%) of repositories employing a community site are using a homegrown system compared to the one that is not, and for both ratings & reviews and podcasting, all of the repositories (100%) use a homegrown content management system. As an example, the University Archives in the Rare Book, Manuscript, & Special Collections Library at Duke University, promotes both their digital and physical collections through the photo-sharing website Flickr (www.flickr.com/DukeYearlook). More than 350 digital images, including photographs, postcards, and catalogues are displayed in individual sets covering subjects such as student life, campus scenes and the Duke Blue Devil mascot.

Lastly, the data suggests that those repositories with an in-house content

management system are in general more likely to be novel with their use of the Web 2.0 applications than with their counterparts using the commercial system. A couple of examples illustrate this observation. The Naropa University Archives has currently digitized two thousand hours of audio recordings from activities at the Kerouac School (http://www.naropa.edu/archive/index.cfm). Access to more than five hundred hours of the collection are available online. What make the collection most interesting is the ratings and review system. The users of the collection can write a review of individual audio recordings including a rating of zero to five stars. These ratings are included in "Recently Reviewed Items" and in the "Most Downloaded Items Last Week". In addition to Naropa, the Plymouth State University Beyond Brown Paper project (http://beyondbrownpaper.plymouth.edu/about) allows for comments on the photographic images, and displays the comments with the image. Moreover, the repository provides an RSS feed and del.icio.us[8] option, affording users to bookmark the page and receive updates.

One-on-One Interviews

Of the 20 individuals initially contacted by email requesting participation in the research study, eight individuals (40%) responded. Out of the eight respondents, six agreed to be interviewed, while two indicated they were "fairly sure" their repository was not using a Web 2.0 application and accordingly declined participation. After contacting the remaining twelve potential participants by telephone, two additional individuals agreed to be interviewed, two others were not available until after the March 21, 2008 response closure date, and eight did not respond. Overall, there was a 60% response rate

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[8] del.icio.us is a social bookmarking website with its primary use of storing bookmarks online. This allows users to access the same bookmarks from any computer and add bookmarks from anywhere.

(12 out of 20 participants responded to the request), with eight out of the 20 individuals (40%), agreeing to participate in the one-on-one interviews. After the interviews were conducted, it was determined that one of the interviews was not valid due to a misinterpretation of which unit "owned" the Web 2.0 application and therefore the interview data was not included in the analysis[9].

On the whole, the interview participants were overwhelmingly positive about using a Web 2.0 application on their repository website. The participants' responses to the interview questions concerning their reasons for implementation, challenges associated with implementation, and the success or failure of these implementations are summarized and presented below[10].

Impetus for Including Application on Repository Website

Motivation for implementation varied among respondents as shown in Table 1, but promoting and sharing content with current and future users stood out as the most common reasons. Nearly half of the respondents employed these applications as a

Reasons	Number of Respondents	Percentage of Total Respondents
Promotion of collections	4	57%
Trying out new technology	3	43%
Participation from patrons	2	29%
Sharing our content with potential new users	2	29%
Direction from leadership	1	14%
Staying current with our users	1	14%

Table 1. Impetus for Application

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[9] The Web 2.0 application in question was a blog. The blog was prominently featured on the homepage of the archival repository website, but was not directly administered by the repository. In essence, the repository was providing a link to another unit responsible for blog's content. I contacted the other unit, but did not receive a response.

[10] Note that participants typically provided multiple answers to the questions, therefore, the percentages of total respondents for each question do not add up to 100%.

promotional tool for their collections in an effort to put their materials "out there" on the

World Wide Web and let current and new users know its availability for use.

Collectively, five out of the seven respondents implied that the driving force behind the

application was the patron or user. Whether the incentive was for sharing content with

current patrons because they requested it, eliciting participation from patrons with help in

describing collections, or wanting to use some of the emerging web tools that their

current patrons were engaged in and using, the data suggests that respondents are

thinking about their patrons/users when considering the use of a Web 2.0 application. As

one respondent commented:

> …we did hear a lot of feedback from people that when they work with images
> they wanted the ability to add comments, share information – and we certainly are
> very attentive to that – most of our photographic images come to us with little or
> no descriptive information, and although there are different types of descriptive
> information, we wanted an open system that gave and encouraged people to add
> comments to images and share information so that the next user would have more
> available information.

Planning and Timeframe for Application Implementation

On the whole, there was little planning when determining which Web 2.0

application(s) to implement. Forty-three percent (43%) of the respondents indicated that

little planning was done, and in fact, they essentially "just implemented it", while 29% of

the respondents stated that determining which application(s) to implement required some

planning and the remaining 28% stated that quite a bit planning was done. The data

suggests that the primary reason for the additional time for planning the implementation

of a Web 2.0 application was due to the application being part of a greater digitization

project or initiative, thus requiring the support of and direction from the library

administration. This directly correlates to the timeframe of the actual implementation of

the tool. Again, the respondents who indicated a medium (3 to 5 years) to long-term timeframe (more than 5 years) were those repositories involved in a larger digitization project or initiative, while the remaining 57% of the respondents not involved in a larger project implemented the application in less than a year. One respondent had not been employed long in his/her position and therefore was unable to answer the question.

Additional Web 2.0 Applications

Eighty-six percent (86%) of the respondents replied that they were considering the use of additional Web 2.0 applications on their repository website. Types of applications included a ratings and review system, blogs, Second Life®[11], wikis, and a profile on Facebook. Wikis were by far the most popular application, with 67% of the participants considering its use in the near future. Although I did not ask respondents the reason why they were considering additional Web 2.0 applications, several respondents inferred that these types of applications were something that users in general now expect on a website. One respondent affirmed this view by asserting:

> Now we've been given the technology to do that and I feel that we're kind of at a point of trying to take our services up a notch and so for example, we're having a lot of younger peer groups that have certain expectations that want something, when they want it, interact with what we do – why write a letter and why go through a bunch of red tape? Why not have a blog where they can comment? We're going to have to do more and more to stay relevant and speak to our stakeholders and less of a technology thing, although the technology is part of making the paradigm [shift] happen.

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[11] Second Life is an online, 3-dimensional virtual world which enable its users, called "Residents", to interact with each other through avatars, thus providing a level of a social network service combined with general aspects of a "metaverse".

The Pros and Cons of Implementing the Web 2.0 Application

Tables 2 and 3 reveal what the respondents felt were pros and cons of implementing the Web 2.0 application(s) on their repository website. For a majority of the respondents (57%), increased promotion for both their department and the resources held in the repository were unquestionably the most positive aspect. Several cited that they received recognition within their institution and from their peers not only for their efforts and success in implementing new technology, but also support and reinforcement from their peers that it "was the right thing to do". It was my sense that the encouragement from peers seemed very important to several of the respondents, particularly in giving them the motivation to continue their efforts in trying to be

Positive Reasons	Number of Respondents	Percentage of Total Respondents
Increased promotion for department and resources	4	57%
Meeting needs of patrons	2	29%
Potential increase in number/types of users	2	29%
It was easy to implement	2	29%

Table 2. Pros of Implementation

innovative and experimenting with different technologies.

The amount of time necessary to *maintain* the application (see Table 3 below), specifically as it relates to "taking away" time from traditional archival duties, was the dominant theme amongst the respondents when speaking to the drawbacks of implementation. A greater part of the respondents acknowledged that extra time was needed to keep the information in these applications current (for example, posting entries to a blog, posting new digital objects to a community website and adding ample metadata

for searching digital objects), and that striving to balance these responsibilities with everything else that required their attention was difficult. However, this obstacle did not appear to deter any of the respondents from continuing the use of their particular Web 2.0 application(s) or their plans to implement additional Web 2.0 applications in the future. In fact, one respondent seemed to concisely summarize what many of the respondents thought about this particular barrier:

> You have to decide whether you are really serious about doing this and then need to find the time to do it. At times technology is not the barrier; it's the people committing to it and saying this is what we want to do and identifying if it's part of your mission.

In addition to the concern of time, another interesting reason that two of respondents offered as a downside to implementation was the lack of consistency with descriptive standards. As patrons are adding comments to blogs and digital images or as repositories are uploading digital images to community sites or even to their own homegrown content management systems, respondents are not only struggling with determining how to capture and integrate patron-created descriptions into their own system, but also with determining which and how much structured metadata to include on an external Web 2.0 application, particularly if the application does not support professional metadata standards.

Negative Reasons	Number of Respondents	Percentage of Total Respondents
Time	5	71%
Lack of consistency with descriptive standards	2	29%
Lack of control over content	1	14%
Lack of technical expertise	1	14%
Creation of sophisticated metadata	1	14%

Table 3. Cons of Implementation

Implementation Challenges

A majority of the respondents felt that there were no major challenges in the actual implementation of the Web 2.0 application. In fact, 57% of the respondents felt that from both a technical and time standpoint, the applications were relatively "easy" to set up, although upon further examination, it appears that the level of technical expertise required depends on the type of application being implemented. For content management systems such as CONTENTdm, the intellectual work behind creating detailed metadata and organizing large amounts of materials was not only challenging, but also very time consuming. The respondents suggest that blogs are perhaps the least technically challenging application to implement primarily because the greater library system has previously implemented blogs and the programmatic aspects already exist.

The Greatest Benefit To Implementation

As shown below in Table 4, the two closely interrelated answers of promotion of repository collections and increased use of materials by patrons appeared to be the most significant benefits to the respondents. Several of the respondents were optimistic about the idea of taking content out into the Web environments and tools that people use, and as one respondent mentioned, "it helps cast, what I feel, is the correct tone that we're progressive and forward thinking even when we collect historic materials." In the same vein, a fair percentage of the respondents saw a noticeable increase in requests for the use of photographs and other digital images. It is interesting to note that some of these requests were not only online requests, but onsite visits to see the original materials. One respondent noted that "now when we have classes, not only do we bring out the traditional archival resources, but we show them the digital. And we've seen increased

used because of that – not only use in digital assets, but it brings them in to see the

original."

Greatest Benefits	Number of Respondents	Percentage of Total Respondents
Promotion of our collections	4	57%
Increased use of materials by patrons	3	43%
Increased management of digital objects	2	29%
Improved skill set of our staff	2	29%
Increased donations from patrons	1	14%

Table 4. Benefits to Implementation

Another interesting aspect of using these different applications has been the

benefit to the archival or special collections staff, not only by helping to increase the skill

set of the staff (these include not only technical skills, but also in two cases, the

professional skills to take on a new digital project and manage it well), but also in how

the unit manages its digital objects. Several respondents indicated that they have seen

better control and organization of their digital objects on the web by implementing some

of these newer technologies.

Feedback From Patrons

While a majority of the respondents (71%) answered that feedback from their

patrons has been positive, this result is somewhat suspect. First, none of the respondents

have a formal feedback mechanism in place for tracking use, thus the feedback is

primarily anecdotal. Consequently, there really is no "hard evidence" that the patrons

like/dislike or find the Web 2.0 application useful or not useful. Several cited receiving

some positive comments on blogs and photographic images, but this data is not being

formally tracked. Additionally, 71% of the respondents indicated that while feedback was

positive, it was really still too early to tell if patrons regularly used the Web 2.0

application. The speculation for this insufficient feedback varied among respondents

ranging from patrons not being familiar with the technology (i.e. not accustomed to

adding comments a blog or photograph) to not having the application up long enough to

warrant responses (as one respondent remarked, the comments are just starting to "trickle

in"). While I sensed that there was some small degree of disappointment amongst some

of the respondents that they had not received the level of response as hoped, all appeared

confident that this would change. One respondent reported considering "tweaks to the

system" to increase patron interaction, others were intensifying their efforts to promote

the application(s) on their repository website, while four respondents were merely taking

a "way and see" approach.

Support for the Application

     Nearly all the respondents (86%) indicated that they had the support and

encouragement to pursue these types of implementations. Although some of the

respondents had the freedom to experiment with different applications without having to

get the nod from library administration (the unit was fairly autonomous), others had had

to undergo a more formal process of gaining support from the library administration.

Regardless of the process, overall support for these types of implementations were

noticeably enthusiastic.

Respondents Experience

     All of the respondents (100%) stated that the implementation of the Web 2.0

application has been a positive experience. Table 5 illustrates the myriad of reasons for

why this has been a positive experience. In many cases, the implementation and use of

the Web 2.0 application has not only transformed the types of services being offered to

their patrons, but has benefited the repository unit as well in the form of additional staff

and externally funded projects to gaining new technical and professional skills. However,

the data again suggests that the most significant experience for the respondents has been

the promotion of their respective collections.

Respondent Experience	Number of Respondents	Percentage of Total Respondents
Great way of promoting our collections	3	43%
Has transformed how we do certain things	2	29%
Low impact in establishing/maintaining	2	29%
Have developed additional externally funded projects	1	14%
Hired additional staff	1	14%
Significant for our profession	1	14%
Have learned new things	1	14%

Table 5. Respondents Experience

Encouraging Others to Adopt Web 2.0 Applications

Respondents were enthusiastic about encouraging others in their profession to

adopt the newest generation of web applications as 100% answered "yes" to the question.

Their reasons for encouragement are summarized in Table 6. It is interesting to note

that although there was a high level of enthusiasm for the Web 2.0 applications, many of

the respondents cautioned that with the adoption of any new technology one has

to understand not only the limitations of the application(s), but also their own limitations

and comfort level with implementing something new. As one respondent advised, "you

Reasons for Encouragement	Number of Respondents	Percentage of Total Respondents
Helps us be ready to take on new directions	3	43%
Can help us meet the needs of our patrons	3	43%
Take advantage of new technology	3	43%
Can reach non-traditional users	2	29%
Another means to tell people why archives/collections are relevant	2	29%

Table 6. Reasons for Encouragement

kind of have to know your limitations – whether its financial or technical – there are so many areas where I could bite off too much and you don't want to do that. I feel that you want to have a couple of things that you can do and do well." In addition, understanding the repository mission and how this new technology supports this mission is also appears to be critical. As another respondent observed, it was their mission to be more of a "storehouse of knowledge" and therefore were more open to taking on new directions "to be out front on certain things" than perhaps other institutions with different missions.

Regardless of these caveats, five respondents shared the sentiment of one of the respondents who concluded, "if you can manage the changes, then people should 'make that jump', step out of your comfort zone, and use it to your advantage."

Discussion

The results of this exploratory study suggest that many archival professionals *are* embracing Web 2.0 to promote their digital content and redefine their relationship with their patrons. The promotion of their digital materials was a consistent theme arising from the interviews. Although a formal feedback mechanism for measuring this did not necessarily exist, many respondents wanted to reach a wider audience because they felt

they had materials of value that were not necessarily exposed on the Web. They suggested that employing these tools could give them the ability to do just that.

While there was not much conclusive evidence on whether the end users of these applications see them as being positive or negative, based on anecdotal feedback, the respondents felt that patrons found them to be useful. The anecdotal data suggests that, although there is not yet clear evidence that these blogs, community sites and rating and review systems are experiencing a high level of traffic, the unexpected side benefit seems to be an increase in use of the materials in the collections. Respondents spoke of spikes in patron requests for scans of digital objects, patrons donating materials to their collections, and an increase of patrons wanting to see the original materials. As archival repositories continue to navigate their way through and sort out issues associated with digital collections and Web 2.0 technologies, perhaps these added benefits are something that will spur the archival profession forward to further adopt Web 2.0 tools.

Time is of a concern to these respondents, who acknowledge that they grapple with balancing the more traditional archival duties such as managing and processing newly acquired and existing collections with maintaining and staying current with these web applications. Indeed it is a struggle that is to continue; as the quantity of records archivists' need to appraise, accession and process grows, so will the public's expectations of being able to access and interact with content on the World Wide Web. However, it was my impression that none of the interview respondents were deterred by this future and seemed ready to address it head on. Most recognized that their users will have different expectations when it comes to interacting with the archives (these users not going to write a letter requesting materials anymore as two respondents pointed out), and

they are proactively taking steps to meet those expectations. As one respondent concluded:

> … you really have to stay current and project an image of currency in terms of technology. I think that's vital just for general public relations; but probably more importantly, the future researchers that are going to use our collections – they're millennials on [meaning the generations after the millenials] and they expect us to be on the web, easily accessible, interactive, multi-media – they're just not simply going to use our collections if they're not easy. Millennials make it clear that convenience is really important to them, so they're going to want to see things digitized with key word searches in multiple formats of the same record – I think that now you have to make this a main thing that you do – there is so much competition for information out there.

Limitations

Content Analysis

As previously conveyed, a manifest content analysis methodology was selected because it provides a systematic, reliable means of surveying the websites. However, several limitations to this selected method may have brought the validity of this methodology into question. The greatest limitation to the content analysis was the identification of the repositories for inclusion in the sample as I may have missed an archival or special collections repository if the name of the repository did not match the second criterion (words "archives" or "special collections" in the name of the repository). For example, a historical society may identify itself as either archives or special collections, but not have those words in its name. Consequently, I could have possibly overlooked an archival repository that was using an innovative Web 2.0 application. In addition, I grappled with several of my definitions, including "digital collection" and the "hosting" of a digital collection. It is reasonable to assume that some repositories may consider digital exhibitions equivalent to digital collections and such should have been counted as having a digital collection. The definition of hosting was perhaps the most

tenuous as I excluded those repositories participating in a consortium as I felt it would be difficult to identify the owner/decision maker – and thus potential participants for the interview process – were the digital collection employing a Web 2.0 application. Any ambiguity with these definitions could have impacted the validity of my sample.

One-on-One Interviews

      Interviews also have both advantages and disadvantages in terms of validity and reliability. Although this type of methodology offered a greater depth of understanding than surveys, thus making them a valuable tool as far as validity, there were several limitations to conducting the interviews. This included:

- *Fairly low participation rate*. Although every attempt was made to contact individuals for the interview, there were non-respondents. This could skew the data results as it was challenging to draw conclusions on a limited sample.

- *Sample may not adequately represent the population*. This applies both to the sampling technique and the response rate. There is the possibility that the sample size was too small and therefore, it was often challenging to draw conclusions about the results of the study. Perhaps more importantly, there is a chance of a self-selection bias. Individuals who are more positive about use of Web 2.0 are much more likely to volunteer to participate in the study and therefore may affirm that the use of these web applications is more positive than it actually is.

- *Identification of participants*. I felt that while I was partially successful in identifying the individual responsible for the implementation of the Web 2.0, it is possible that several of them were incorrectly identified therefore negatively

impacting the participation rate.

- *Contacting the Participant*. Three of the initial emails were sent to a general reference email and then followed up with a phone call to the general reference number. As these generic inboxes receive large amounts of email, the invitation email may have been ignored or overlooked. In addition, I simply ran out of time. Two of the respondents contacted me on the last day I was conducting interviews and therefore, I did not have the luxury of scheduling interviews into subsequent weeks.

- *Telephone interview versus face-to-face*. The primary disadvantage of not being able to interview face-to-face was the lack of visual cues (or interactive component) that may have provided an additional source of data.

Conclusion and Future Research

The scarcity of information in the professional literature on the extent to which archival professionals employ Web 2.0 applications with respect to their digital collections is regrettable as it is evident that the Web is moving towards a shared environment. The literature reveals the need for archivists to embrace technology in order to remain vital and essential to current and future users in the digital era, and this exploratory study suggests that a number of archival professionals are moving in this direction. It is crucial for archival professionals to give the *greatest possible access* to their materials, thus conveying a greater sense of worth and vitality to the community it serves. As such, it is critical to continue to explore if the archival profession is making an effort to meet the changing needs of its users through implementation of the latest web technology. There appears to be some interest in the archival community about Web 2.0

applications and how these applications could potentially benefit both the archival community and its users as evidenced by the handful of blogs and wikis addressing the topic. As such, the results from this study could continue to fuel this interest and create greater discussion in the archival community. Continuing research is crucial as the profession continues to explore its relationship with technology and its users. Future studies could include:

- Exploring the definition of Web 2.0. It appears that there are many different interpretations to this definition and what it really means to the profession.

- Examining archival or special collection repositories with digital collections that *have not* implemented a Web 2.0 application to gain an understanding of the barriers to implementation.

- Examining attitudes towards web technologies and whether these applications have a place in the archival profession.

- Exploring whether the size/budget/staffing of the repository impacts the implementation of new technologies.

- Collecting user data (and not just relying on the perception of archivists) to determine whether these types web applications are useful to patrons.

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Appendix A

Example of Repository Website with Digital Collections

The homepage of the Iowa Women's Archives (http://www.lib.uiowa.edu/iwa) clearly shows the presence of digital collections (see the outlined "Digital Collections" under Resources). Selecting the link brings the user to the digital collections web page (see below) thus confirming its content.

The digital collections of the Iowa Women's Archives.

Appendix B

Sample Recording Sheet

Repository Name	Web Address	Digital Collection?		Web 2.0 Applications					Comments
		Yes	No	Blog	Community Sites	Ratings & Reviews	Podcasting	Bookmarking	
XYZ Rep	www.xyz.org	Y		x		x			
ABC	www.abc.org		N						
Spec. Coll	www.spe.org	Y			x		x		

Appendix C

Example of Repository Website with No Digital Collections

After examining several web pages and conducting a site search, it was concluded that the repository website of the Stonehill College Archives & Special Collections (**www.stonehill.edu/archives/index.htm**) does not host a digital collection.

Appendix D

Example of Repository Website Employing a Blog

The blog of the Lawrence University Archives (http://blogs.lawrence.edu/library.archives). Note that the blog allows for comments from users thus enabling person-to-person communication.

Appendix E

Example of Repository Website Employing a Community Site

The Duke University Archives (http://library.duke.edu/archives) promotes both their digital and physical collections through the community photo-sharing website Flickr (www.flickr.com/DukeYearlook)

Appendix F

Example of Repository Website Employing Ratings & Reviews

Beyond Brown Paper (http://beyondbrownpaper.plymouth.edu/about/) is a multi-phased project that involves three collaborative departments at Plymouth State University. The site invites user participation and contribution by allowing users to input written content related to the photographs, or communicate orally directly over a phone via a toll-free number.
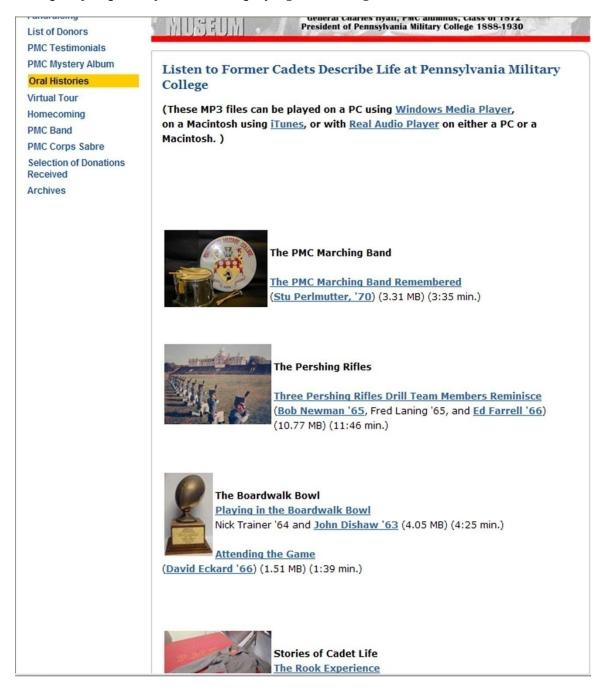
Appendix G

Example of Repository Website Employing Podcasting

The Widener University Archives
(http://liberty.widener.edu/Student_Affairs/Arts_Media/Art_Gallery_and_Collection_/PMC_Museum/Oral_Histories/1150/) allows individuals to download audio clips.

Appendix H

Example of Repository Website Employing Bookmarking

The Keweenaw Digital Archives (http://digarch.lib.mtu.edu/default.aspx) provides a searchable database of digitized historical photographs documenting Michigan's historic copper mining district. The site also encourages visitors to add their own comments and information to photographs in the archives, and to create their own personal "web album" of images on particular subjects or places.

Appendix I

Known Archival Repositories Implementing Web 2.0 Applications

1. Polar Bear Expedition: http://polarbears.si.umich.edu/
2. Plymouth State University: http://beyondbrownpaper.plymouth.edu/
3. Duke University Archives: http://www.flickr.com/photos/19219926@N04/
4. Michigan Technological University. Keweenaw Digital Archive: http://digarch.lib.mtu.edu/
5. M.E. Grenander Department of Special Collections and Archives: http://liblogs.albany.edu/grenander/
6. The Special Collections Research Center (SCRC) of the Earl Gregg Swem Library of the College of William and Mary: http://www.flickr.com/photos/scrc/
7. Northwestern University Archives: http://staffweb.library.northwestern.edu/news/archives/001658.html
8. Yale University Beineke Library: http://brblroom26.wordpress.com/
9. Ball State University Archives and Special Collections: http://bsuarchives.blogspot.com/
10. Hugh Morton Processing Blog (UNC): http://www.lib.unc.edu/blogs/morton/

Appendix J

Interview Questions

1. What was the impetus for including this/these application(s) on your repository website?
2. What planning was done for determining which applications to implement and then implementation? (i.e., timeframe)
3. Are you considering any additional applications? Which ones?
4. Pros/cons of implementing the Web 2.0 application on your repository website.
5. What were some of the challenges in implementing this/these application(s)?
6. What has been the greatest benefit of this implementation?
7. What has been the feedback from your patrons? How are receiving this feedback?
8. Was it effortless or difficult gaining support for this implementation? (i.e., was it supported right away or did you have to convince anyone?)
9. Overall, do you think that this has been a positive experience? Why or why not?
10. Would you encourage others in our profession to adopt these applications? Why or why not?
11. Is there any additional information that you would like to include?

Appendix K

Email Request

Dear [Name of Potential Participant]:

I am Mary Samouelian, a graduate student in the School of Information and Library Science at the University of North Carolina at Chapel Hill. I am conducting research in support of a master's paper, "Embracing Web 2.0: Archives and the Newest Generation of Web Applications."

The purpose of this study is to examine the extent archival repositories are using the Web's next generation of applications with respect to their digital collections. By conducting interviews with archivists or special collections staff who are primarily responsible for the implementation, the study will allow for examination of the reasons for implementation, challenges associated with implementation, and the success or failure of these implementations. It is anticipated that the results will add value to the emerging discussion of Web 2.0 and its implications for the archival community.

The interview will be conducted by telephone and will take less than an hour. I will ask you questions about the selection and implementation of the Web 2.0 application in your archival repository. Participation in this study is completely voluntary and you may choose not to answer any particular question or questions. Any information that you do provide will be kept anonymous.

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

If you have any concerns, questions, or comments about this survey and the research study it supports, please feel free to contact me (by telephone (919) 929-9686 or email amcclen@email.unc.edu) or my academic advisor, Professor Christopher A. Lee at (919) 962-7024 or at callee@ils.unc.edu).

I sincerely hope that you will choose to participate in this study by contacting me either by telephone or by email by March 14, 2008. Your contributions will be very valuable to the study. Thank you for your consideration.

Appendix L

Fact Sheet

University of North Carolina-Chapel Hill
Information about a Research Study

_____

IRB Study # GEOG 05-xxx   **Consent Form Version Date:** 02-03-05

Title of Study: Archival Repositories and Use of Web 2.0 Applications

Principal Investigator: Mary Samouelian
UNC-Chapel Hill Department: School of Information and Library Science
Faculty Advisor: Dr. Christopher A. Lee

Study Contact telephone number: 919-388-7228
Study Contact email: samoueli@email.unc.edu

_____

What are some general things you should know about research studies?
You are being asked to take part in a research study. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?
The purpose of this study is to examine the extent archival repositories are using the Web's next generation of applications with respect to their digital collections. By conducting interviews with archivists or special collections staff who are primarily responsible for the implementation, the study will allow for examination of the reasons for implementation, challenges associated with implementation, and the success or failure of these implementations. It is anticipated that the results will add value to the emerging discussion of Web 2.0 and its implications for the archival community.

How many people will take part in this study?
If you decide to be in this study, you will be one of approximately 20 people in this research study.

How long will your part in this study last?
The interview will take less than one hour. You can choose to stop the interview at any time.

What will happen if you take part in the study
I will ask you questions about the selection and implementation of the Web 2.0 application in your archival repository. I will take notes about what you say. You do not have to answer any questions that you do not wish to answer, for any reason.

What are the possible benefits from being in this study?
Research is designed to benefit the archival community by gaining new knowledge. Your participation is important to help us conduct primary research in the archival community, but you may not benefit personally from being in this research study.

What are the possible risks or discomforts involved from being in this study?
We do not think you will experience any discomfort or risk from the interview.

How will your privacy be protected?
Your name will not be used in the presentation of this research to others, so no one here in your community, or elsewhere, will know what you said.

Will you receive anything for being in this study?
I am not going to pay you for your information, but your information is very important to us.

Will it cost you anything to be in this study?
There are no costs for being in the study.

What if you have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you have questions, or concerns, you should contact me contact me or my advisor in the United States at the phone numbers and email addresses listed at the beginning of this form.

What if you have questions about your rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

Thank you for helping me with this study.