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This paper examines the functionality of 25 online web exhibits in their use of audio media, against a backdrop of the changing character of the archive in the age of virtual access to primary materials. A discussion of the evolution of the archival role, from simple custodian of materials to historian/educator/interface designer, is followed by an analysis of online audio exhibits using a matrix measuring specific aspects of audio performance. Each web exhibit is scored against the matrix, itself examined as a tool of measurement. The scores are compiled, ranked, and analyzed. Based on these scores, the state of audio technology, and the insights provided by digital archival preservation, a set of standards are proposed as a starting point for archives to use in increasing audio exhibit performance.

Headings:

Archival materials -- Digitization

Archival materials -- Exhibition

Audio-visual Archives -- United States

Audio-visual materials -- Evaluation

Audio-visual materials -- Handbooks, manuals, etc.

Library exhibits -- Design

SOUND PRACTICES:
ONLINE AUDIO EXHIBITS AND THE CULTURAL HERITAGE ARCHIVE

by
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Table of Contents

Tables and Figures

Introduction

> *By its nature, archives consist of information bound to its origin; consequently, the foremost imperative in service must be to deliver this information with key contextual attributes preserved and knowledge of its origins adequate, understandable, and accessible. Uniting data to context may be easy to say, but it is difficult to achieve quickly, compactly, and seemlessly* [sic] *so that information is actually delivered to the user whole and intact.* – Barbara Craig[1]

I.

Digital platforms enable cultural heritage archives to reach broader audiences with greater flexibility. As information-seekers rely more and more on digital resources, institutions providing virtual representation of holdings may benefit from this presence tremendously. The online archive can point to increased collections usage to justify funding of further projects, while safeguarding source materials through use of digital surrogates. It is little wonder, therefore, that digital access in archival literature continues to focus primarily on digital preservation and encoded description, and that standards for these have kept step with available technologies. Less clearly defined for the archive in the digital age is the role of the online exhibit. Identified at turns as marketing channel, outreach effort, or education tool, the online archival exhibit appears to have neither the gravity of the digital preservation project nor the immediate practicality of the EAD finding aid. Because of this, perhaps, standards for online exhibition of archival materials lack significant supporting literature beyond project-based efforts. The reasons may also run deeper, into the very DNA of archiving itself, traceable to the sanctity of original order and the archivist's view of education and presentation as activities

secondary to securing and accessioning holdings. But as the increasing number of online exhibits may, in the eyes of users, function as the "face" of the archive, the institution's storefront, a consideration of standards is critical. First impressions are lasting impressions, the worn phrase says, and as cultural heritage repositories enter the 21st century with the potential to open their doors to audiences worldwide, they should do so cognizant of the fact that when it comes to virtual users, even archives must compete for eyes.

Rather than consider online archival exhibits as a whole, this paper endeavors to examine only audio-based exhibits mounted by archival or repository-minded institutions. Limiting the scope to audio achieves two goals, the first to speak meaningfully to a particular type of exhibit, while drawing conclusions applicable, it is believed, to all online exhibits. The second goal is to address specifically the medium of audio and its behavior online; while practices for visual imaging for the internet have developed to standardization, the same cannot be said for audio. Audio collections continue to expand as sound recording enters its second century, yet standards for delivery of online audio are not fixed and remain problematic, for a variety of reasons. It is with this in mind that audio's role in the archival exhibit is considered.

II.

The first section of this paper considers the archive as a tool of educators, and demonstrates a conceptual shift over the last century in traditional archival responsibilities, the priorities of which have grown to include active engagement with

materials. The rise of social history in the latter half of the twentieth century, and the emergence of public history as a discipline, have opened up new paths of use for cultural heritage archives. Coupled with the development of online environments, doors of access to archival materials have never had the potential to be so easily opened. The tools archivists have needed to demonstrate the knowledge bases their archives represent have finally been made available to them.

What have these new tools yielded? The second section of the paper analyzes one subcategory of digitization, web exhibition, specifically detailing 25 websites produced by major cultural heritage archives to exhibit selections of audio collections. While in digital form it is a file that, like any other, can be linked to a web page, because of the massive files it can produce audio presents unique challenges to archivists. Server and user bandwidth, file sizes and formats, and "customer service" in the form of online help are critical. The matrix developed to assess the sites may in itself be regarded as an experiment, an attempt to create a tool for exhibition evaluation. The resulting analysis provides a glimpse into the exhibition of, not merely the simple mounting of, archival materials on the web..

From the matrix a set of suggestions is selected, constituting the third section of the paper. The suggestions incorporate archival theory regarding digitization for preservation. While distinct from digitization for exhibition, the thinking and methods advocated in digital preservation can inform exhibition construction.The resulting set of practices represent a starting point for creating audio exhibits online.

[1] Barbara L. Craig, "Old Myths in New Clothes: Expectations of Archival Users," *Archivaria* 45 (Spring 1998): 122-23.

I. The Archive As Educator

> *It is with reference to organization of knowledge that we are likely to find Either-Or philosophies most acutely active. In practice, if not in so many words, it is often held that since traditional education rested upon a conception of organization of knowledge that was almost completely contemptuous of living present experience, therefore education based upon living experience should be contemptuous of the organization of facts and ideas.* – John Dewey[1]

> *Unlike the school, where the learner must typically submit to the values and interpretations of an instructor, the situation for experience in the cultural institutions is largely under the control of the user. Moreover, the institution succeeds only when it has responded to the needs of the individual user. The responsive institution makes direct, authentic, and unrestricted experiences possible for the user, then it helps the user illuminate those experiences and see them in further, deeper, richer, more extensive contexts.* – David Carr, *The Promise of Cultural Institutions*, 44.[2]

Archives educate users. A defining characteristic of humanity, the impulse to discover and to organize unique information, in a spectrum of assemblages keyed to a diversity of perspectives, gives the cultural heritage archive purpose. Society entrusts the archive with protecting the raw resource, evidence unfettered by any but its creator's hand. In equal measure society entrusts the archive with performing the task of accessioning and presenting the raw resource to the user. The potential for conflict between these roles has driven archival theory for over a century, with the emergence of electronic environments furthering debate on archival practice. Are "either-or" perspectives obscuring what is really at issue for organizers of knowledge, as John Dewey suggests and David Carr implicitly seconds in the quotes above? In protecting and creating access to knowledge, should archivists be both thoughtful interpreters as well as effective caretakers? This chapter will broadly examine the progress of archival thought in light of the tensions

between the archive as keeper of evidence and the archive as user-focused facilitator or teacher, setting the stage for the discussion, exploration, and analysis of digitization and online archival exhibits.

> *The Archivist must not turn Student, or may at most do so only as an occasional treat, and with the strictest precaution against his own possible malfeasance; for every Student has an axe to grind, a theory to establish, a statement to prove: and that form of interest is incompatible with dispassionate conduct in sorting, in arrangement, in presentation – in all those processes in which the tiniest modification may have the most far-reaching results.* – Hilary Jenkinson[3], "Reflections of an Archivist," 20.

The traditional debate over the nature and value of information held by archives pits Hilary Jenkinson against T.R. Schellenberg, in an environment of government and legal records. This environment extends to the cultural heritage archive or manuscript collection -- concepts of evidence, reliability, authenticity, and trust remain essentially unchanged across information types. Thus the debate between the ideas of these two figureheads of the archiving profession remains relevant across time and disciplines. Taking cues from the work of the French Central Archives as well as Muller, Feith, and Fruin's "Dutch Manual" (*Manual for the Arrangement and Description of Archives*), Jenkinson expounded on the significance of original order as a necessary element of a record's value: without the administrative information reflecting the way the document was handled by its creator, the record would retain little evidential worth. In Jenkinson's archive the archivist could play little more than custodian, significant a role as this is, to the records. In short, the mere existence and order of the records told a story as critical as the content of the records themselves. While sorting and interpreting were to be left to the historian, success to the archivist could be measured by "*the extent to which he keeps*

all his Records in an unimpaired condition – all; not merely those which are momentarily the popular ones – against the day when they may become vital for somebody's work."[4] For Jenkinson, it came down to a defense of truth in history, and that the documents, the primary concern of the archivist, should be allowed to speak within their own context first. Adhering to this point of view lends archives an important safety valve: if it is not theirs to interpret the record, it is therefore not theirs as impartial custodians to risk *misinterpreting* the record. The common use of the archival record for purposes other than for its creator's intention demanded the archivist provide the clearest possible picture of that intention, by preservation of the original order and structure of the documents. It is this that Jenkinson believed the archivist's difficult duty, "to hand on the documents as nearly as possible in the state in which he received them, without adding or taking away, physically or morally, anything: to preserve unviolated, without the possibility of a suspicion of violation, every element in them, every quality they possessed when they came to him, while at the same time permitting and facilitating handling and use."[5]

The last part of this statement rings down the years as capable of turning Jenkinson's very noble and compelling argument at least somewhat on its ear. For there is a certain critical mass, with regard to the sheer weight of archival holdings, where the facilitation of handling and use is made impossible without some intervention by the archivist, with regard to the appraisal and selection of records that should be kept. Writing on appraisal, T.R. Schellenberg began his introduction with the dry observation, "Modern public records are very voluminous."[6] Although for Schellenberg, too, retaining the original

order of a group of records intact and separate from other related groups was key, the increased volume of public (and private) records in the 20th century demanded that Jenkinson's emphasis on the custody of the record be tempered by very real and practical considerations such as an archive's space and scholarly interest. In contrast to Jenkinson, Schellenberg emphasized the secondary value of records, not only the primary value attached to them by their creators and administrators. Schellenberg gave voice to concerns of modern archives, and suggested that archivists had a much more proactive, and risky, role to play than Jenkinson may have earlier envisioned. Schellenberg's advice, that "the archivist should assume the role of moderator" between scholars and records in selecting documents for retention, continues to challenge archivists concerned, on the one hand, with the original order and purpose of records and, on the other, with managing the ever-increasing weight of documents of historical value.[7]

While Schellenberg's advocacy for the secondary value of documents found wide acceptance, the core belief shared by Schellenberg and Jenkinson, that retaining the provenance of a document and the group to which it belongs, continued to be both a theoretical and practical tenet of archiving. Reordering remained a mostly intellectual pursuit, a clever support role to the "natural place," as Oliver W. Holmes put it, of an archive's holdings.[8] In 1964 Holmes reminded archivists that physically rearranging collections received from their respective agencies was folly, and emphasized that "the archivist is free to [rearrange on paper] to his heart's content if he can find time and money for it. Paper rearrangements by the archivist may usefully supplement the physical arrangement established by the agency of origin; they cannot supplant it."[9]

Imagining connections not already made by creators between documents within groups, not to mention between disparate collections, was, still, simply beyond the scope of an archivist's duties, and even if attainable it could only be an afterthought.

Yet as social history has matured the ideas of original order and the primary user, while still valid and as critical to evidential value as ever, have also had to share room with important questions regarding the practical value of original order, the user who the heritage archive ultimately serves, and the nature of the source of a record. In 1982 Frank Boles advocated for the "disrespecting" of original order when necessary, because "(r)ecords in an archival institution should be maintained in a state of usability, their exact arrangement being the simplest possible which assures access to the documentation."[10] Access as a measuring stick for effective ordering of collections in archives may, in the virtual world, be compatible with original order. Peter Horsman has argued that electronic environments can facilitate both enhanced access and preserve a sense of the original *context* of the record through a sort of virtual reality.[11]

The guardianship of context has become a prime mover in archives in the last generation, as the tools to do so effectively have merged with archival thought. In "What is Past is Prologue," Terry Cook re-invents Jenkinson through the lens of original context, stating that "archivists will continue to shift their emphasis from the analysis of the properties and characteristics of individual documents to an analysis of the functions, processes, and transactions which cause documents to be created."[12] Who created the document and why, as a focus of archival appraisal, not only re-defines the "sense of provenance," but

also speaks to the need for archivists to act as historians, to dig deeper than individual documents might allow:

> *By embracing this postcustodial and conceptual redefinition of provenance as the dynamic relationship between all connected functions, creators, and "records," archivists can develop an intellectual framework to address, with confidence, the challenges…of describing in rich context archival records in all media, and of enhancing the contextualized use and understanding of archives by their many publics.*[13]

Finding the larger context of a document empowers archivists to ensure the total societal story is told, which is a tremendous responsibility. Kenneth Foote reminds archivists that "the idea of archives as memory is more than metaphor," and that this creates very concrete and immediate challenges.[14] Questions about how far archivists are willing to take their responsibility to history have begun to emerge, and in one area very relevant to this paper, oral history, archivists have taken an active role as contributors.

Whether to "fill in the gaps" in a collection or to document, in the style of the social historian, traditionally underrepresented groups, oral histories have become significant elements of many cultural heritage archives. Ellen Swain advocates for the enhancement and standardization of oral history methods in archives, arguing also that collaborations between archivists, librarians, and historians are critical to oral history collection development as clientele become increasingly diversified.[15] Swain observes that many oral history archivists (such as Robert Perks, curator of the Oral History British Library National Sound Archive), have great expectations for the world wide web and its ability

to transmit history to audiences "more comfortable with oral and visual, rather than written, forms of memory and narrative."[16]

The recent emergence and promise of the internet has extended the increasingly conjoined ideas of primary contexts and secondary users deep into virtual space. Yet despite the promise of online transmission of archival documents, such as oral histories, whether archives are prepared to take advantage of the tools offered by virtual connectivity is still open to question. The skills involved in effectively mounting representations of historical documents on the web, or for that matter in presenting and displaying them in the archive, require both technical expertise and some understanding of pedagogy, or how to *teach* the archive. Archival education is present, to some degree, in every answer archival staff give to reference questions, and is based, ultimately, on the needs of the user.

"With the revolution in [encoded] description well underway, it is time to seek a transformation in access…. Optimized 'accessible access' can only come with a thorough understanding of user needs and information-seeking behaviors," writes Helen Tibbo, in a study of how academic historians use the web in searching for materials.[17] These needs are undergoing radical change, as evidenced in Elizabeth Yakel's article "Archival Reference Services at the Turn of the Century." As virtual audiences open up, so do gaps in the services archivists have traditionally provided. For Yakel, archivists must view their "representations of primary sources (that is, finding aids)" as containers, and these containers must be "flexible enough to facilitate these transformations [for

individual use in virtual space], yet sturdy enough to maintain the appropriate context, authenticity, and evidential value of the records or representations."[18] Shaping the container for individual uses, with an eye towards standardization facilitating use across repositories, is paramount. Maintaining this regard for flexibility ultimately protects the authentic storytelling capacity of documents.

Most educators would agree that this sounds a lot like the job of a teacher, and as archives are increasingly called on to incorporate outreach efforts, educational skills become very important.[19] It is not a tremendous leap; those who appreciate and keep the documents may be the best teachers of them, and to echo Peter Hirtle, because the "real assets in archives are not the holdings, but the skills, talents, knowledge, and abilities of its trained archival staff," teaching the archive can only add value to its contents.

Yet in teaching specific populations, it is important to use well-measured pedagogic tools, and to take into account groups of potential users who are not typically associated with the primary documents held in archives. One such group is K-12, who Ann Gilliland-Swetland viewed in 1998 as an "unparalleled opportunity for archivists" to take advantage of: working with K-12 students starts primary document awareness early, heightens the profile of the archivist as an active participant in cultural heritage preservation, and with funding trends tending to favor K-12 applications, presents the archive with a potential financial resource.[20] Transforming documents for web-based education has the added benefit in a K-12 environment of teaching students about how to use technology, and the power of information within technological infrastructures.

However, development of archival education programs, particularly online, is not without risk. It is here that the potential value of online archival exhibits, as pedagogically driven and user-oriented, and also attended by pitfalls, really surfaces in the long road of archival thought.

In the seven years since she wrote the article, several of Gilliland-Swetland's observations, as will be shown in Chapter II, still ring true. Where online exhibit of materials geared towards education needs to be designed for its users rather than for the archive or the object, with materials being available in both narrative-heavy and less mediated forms, "archival applications show little evidence that their developers have considered the needs of the diverse new audiences that might now access their materials."[21] While the objects an archive chooses to mount on the web in exhibit format will always be the stars of the show, relatively few objects, with simple descriptions, can provide a wealth of curricular material for teachers, so that a "bigger issue than selection of digital content for archivists…may be how they can make these teacher activities more effective through the ways in which that content is described and a digital access system is structured overall."[22] Just as important as the object, Gilliland-Swetland suggests, is the user.

K-12 teachers have echoed Gilliland-Swetland's comments regarding online presentation of unique materials. Outlining a list of favorite museum and exhibit websites, high school teacher Phyllis DiBianco succinctly summed up their potential:

> *First, they provide a multitude of opportunities to teach content and skills in ways that were not possible a decade ago....*
> *Second, they don't intimidate….*
> *Third, they are purposeful….*
> *Fourth, they're easily accessible in your school library, classroom, and home….*
> *The fifth and most powerful reason is the versatility and impact these sites have on students (and our colleagues as well).*[23]

At the end of her fourth point, DiBianco adds: "[A cautionary note: Many of these sites require up to date hardware, a fast Internet connection, a current browser, plus free and downloadable Flash and Shockwave plug-ins.]."[24] Accessibility, technological as well as contextual, remains a very important aspect in web representation of archival materials, perhaps even a make-or-break element.[25]

By the end of the 1990s archives were recognizing how web representations of their materials could positively impact K-12 students, as well as researchers and non-academic users. By allowing access to unique materials many audiences would not otherwise be able to experience, and by storing and presenting media in a variety of formats and structures, the internet has empowered archives to offer unique cultural information in ways that simply could not have been imagined a generation ago.

Yet very few archives have addressed in their project literature how to make web exhibits effective in their natural pedagogic role, how to counter the risks involved, or, indeed, what those risks even are, concentrating instead on the digital preservation piece that typically sits behind the exhibit project or the collaborative workflow necessary for any large-scale digitization effort. Evaluative instruments to assess usability of exhibits by target populations are also notable by their absence. The Voices of the Colorado Plateau

Project, The African American Oral History Project at Washington State University, and The Hoagy Carmichael Digital Collection at Indiana University have gone to some lengths to remedy this in their project literature, but by and large standards for exhibiting archival materials, particularly audio, are still in their early developmental stages. [26] In the following chapter, audio exhibit websites will be analyzed in terms of usability and accessibility, to lay a foundation for the further development of audio exhibit standards.

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[1] John Dewey, Education and Experience (New York: Minton, Balch, and Company, 1934), 82.
[2] David Carr, *The Promise of Cultural Institutions* (Walnut Creek, CA: Altamira Press, 2003), 44.
[3] Hilary Jenkinson, "Reflections of an Archivist," in Maygene Daniels and Timothy Walch, eds., *A Modern Archives Reader* (Washington, D.C.: National Archives and Records Service, 1984), 20.
[4] Ibid., 18.
[5] Ibid., 20.
[6] T.R. Schellenberg, "The Appraisal of Modern Public Records," *Bulletin of the National Archives* Number 8 (October 1956), 15 February 2005, http://archives.gov/research_room/alic/reference_desk/archives_resources/appraisal_intro.html.
[7] Ibid.
[8] Oliver W Holmes, *Archival Arrangement -- Five Different Operations at Five Different Levels* (Washington, D.C.: U.S. National Archives & Records Administration, 1964). 15 February 2005, http://www.archives.gov/research_room/alic/reference_desk/archives_resources/archival_arrangement.html.
[9] Ibid.
[10] Frank Boles, "Disrespecting Original Order," *American Archivist* 45 (Winter 1982): 31.
[11] Peter Horsman, "Dirty Hands: A New Perspective on the Original Order," *Archives and Manuscripts* 26 (May 1999): 51-52.
[12] Terry Cook, "What is Past is Prologue: A History of Archival Ideas Since 1898, and the Future Paradigm Shift" *Archivaria* 43 (Spring 1997): 47.
[13] Ibid., 48-49.
[14] Kenneth E. Foote. "To Remember and Forget: Archives, Memory, and Culture," *American Archivist* 53 (Summer 1990): 392.
[15] Ellen D. Swain, "Oral History in the Archives: Its Documentary Role in the Twenty-first Century," *American Archivist* 66 (Spring/Summer, 2003): 156.
[16] Robert Perks, "Bringing New Life to Archives: Oral History, Sound Archives and Accessibility," *International Association of Sound Archives Journal* 12 (July 1999), 24, quoted in Swain, "Oral History," 156.
[17] Helen R. Tibbo, "Primarily History in America: How U.S. Historians Search for Primary Materials," *American Archivist* 66 (No. 1, 2003): 11.
[18] Elizabeth Yakel, "Thinking Inside and Outside the Boxes: Archival Reference Services at the Turn of the Century," *Archivaria* 49 (Spring 2000): 148.
[19] Some of the challenges and rewards of outreach programs in general are recounted in Tamar G. Chute, "Selling the College and University Archives: Current Outreach Perspectives," *Archival Issues* 25 (Nos. 1 and 2, 2000): 33-48. Web-based outreach is also addressed in Lorraine Normore, "Studying Special Collections and the Web: An Analysis of Practice," *First Monday* 8 (No. 10, October 2003), 15 Oct. 2004, http://www.firstmonday.org/issues/issue8_10/normore/index.html.

[20] Anne J. Gilliland-Swetland, "An Exploration of K-12 User Needs for Digital Primary Source Materials," *American Archivist* 61 (Spring 1998): 137.
[21] Ibid., 142.
[22] Ibid., 154.
[23] Phyllis Dibianco, "Interactive Museums and Exhibits," *Information Searcher* 14 (No. 3, 2004): 4.
[24] Ibid.
[25] A good discussion on context as it applies to access in museum websites is in V. Kravchyna and S.K. Hastings, "Informational Value of Museum Web Sites," *First Monday* 7 (No. 2, February 2002), 15 October 2004, http://firstmonday.org/issues/issue7_2/kravchyna/index.html.
[26] See particularly Kristine R. Brancolini, et al, "Digital Star Dust: The Hoagy Carmichael Collection at Indiana University," *First Monday* 5 (No. 6, June 2002), 28 September 2003 http://www.firstmonday.org/issues/issue5_6/brancolini/index.html; Trevor James Bond, "Streaming Audio from African-American Oral History Collections." *OCLC Systems and Services* 20 (No. 1, 2004): 15-23; Matthew Nickerson. "Voices: Bringing Multimedia Museum Exhibits to the World Wide Web." *First Monday* 7 (No. 5, May 2002). 15 October 2004 http://firstmonday.org/issues/issue7_5/nickerson.index.html.

II. Digital Domains: Exhibition of Audio Online

> *The web is an interesting blend of the passive and the interactive…. Unlike the gallery visitor,…the visitor to the online exhibition must move from passive absorption of the exhibition to active participation through clicking or scrolling. Though a gallery exhibition may lose visitors if they turn and walk out, the online exhibition can lose visitors through the simple click of a mouse.*
> – Martin R. Kalfatovic[1]

> *At the Library of Congress, American Memory collections are selected to serve the broad educational community, from grade school through higher education and life-long learning.* – Carl Fleischhauer[2]

If education and outreach define the purpose of online exhibit of archival materials within the broader scope of user access, how do archives and similar cultural heritage institutions fulfill this particularly pedagogic role or purpose? To address this question, this chapter examines online exhibits that employ audio as a major component of presentation. By viewing audio as representative of online exhibition challenges, it is believed conclusions can be drawn applicable to a variety of exhibit types. Online audio acts as a crucible for several reasons:

- There are substantial and growing archives of recorded sound. The century-plus backlog of audio materials are at a preservation crossroads[3], and as digital surrogates are increasingly easy for even "off the shelf" computers and software to make, the web has become a tempting place for their representation.
- Digitization methods for web presentation are varied. Unlike for images, which typically utilize 72dpi JPEG or GIF files for online presentation, there is no gold

standard for presenting online audio and therefore lots of questions about which format might be most appropriate. Choosing formats for online audio representation remains a challenge, as potential users of exhibits cannot be expected to have ready access to playback softwares.

- Perhaps of greatest importance, the nature of audio makes it unwieldy online. Keyed to real time rather than to onscreen pixels, delivering digital audio is tricky business because, for it to be effective, sound files must be translated back to analog soundwaves that require high levels of hardware and software performance. "Performance" in this context is important in its other meaning as well: sounds have discrete, time-based beginnings and ends. In this sense, they mirror physical exhibition of materials in those museum galleries that focus on narrative. Where a digital representation of an image can be beautifully wrought onscreen even when that image's file size is quite small, the quality of a representation of an audio file is in almost all cases proportionate to its size. In short, increased compression of audio for effective online exhibition impacts sound quality negatively.

Online audio exhibits face the same challenges encountered by all exhibits, but these challenges become amplified due to file sizes, compression schemes, rights issues, and the technological infrastructure of users. To better understand the issues attending digital audio and its access online, it is important to account for the background of digital audio in general and the development of user tools in recent years.

A Short History of Digital Audio

Many of the same principles that apply to digital imaging also apply to digital sound. For both, a measure of resolution is accompanied by bit-depth, also known as word length. Where in imaging pixels per *inch* define resolution, in digital "sampling" of sound the measure of resolution is Kilohertz (or sound wave frequency) per *second*. Where greater bit depth in imaging allows for a larger color palette and therefore greater color precision in the digital scan, so in sampling greater bit depth allows for a larger spectrum of tones and therefore greater tonal precision in the digital sample.

The advent of the compact disc in the early 1980s set the first widely held standard in digital audio, with a sampling rate of 44.1Khz and a bit depth of 16 bits (or two bytes). Twice the spectrum size of common human hearing, 44.1Khz, it was believed, provided reliable representation of audio nuances. The CD offered extended playtime, greater clarity than LPs or tapes when played on most consumer equipment, and a seemingly unlimited number of plays. CDs changed the way music was both recorded and listened to, and according to some not for the better. Audiophiles accustomed to high-end analogue setups in fact called foul early on, as the digital spectrum allowable by CDs clipped out what they considered hear-able chunks of sound, harmonics and nuances not picked up at 44.1/16. Sound archivists, already hard-edged audiophiles with a sense of historical mission, continued to preserve to tape.

A generation later, digital technology capable of rendering analogue sound into digital had grown considerably stronger and become tremendously cheaper. A basic consumer

computer with a bundled soundcard could generate better-than-CD quality copies of analogue sources (typically 48Khz/16-bit), while with some modest investment in a home computer could make a .WAV file at 96Khz/24-bit (even if this file couldn't be rendered onto a playable CD without dumbing it down to the 44.1/16 cd-playable file). The .WAV file, the audio equivalent of the .BMP or .TIFF raster image, had become the common currency of digital audio recording.[4]

The drawback of the .WAV file was its size; with a CD-quality 3-minute file taking up around 30,000 megabytes, the format did not lend itself to easy desktop processing or web transfer, and thus creators of .WAVs could not easily share them using the internet. MPEG technology, particularly .mp3 technology, mitigated this problem. At work on compression standards for audiovisual materials since 1988, by 1992 the Motion Picture Experts Group developed a means of dramatically reducing sound file size. Based on the psychoacoustic principle that humans best hear tones of 2Khz-4Khz (within an overall hearing spectrum of 20Hz to 20Khz), an .mp3 file rendered from an uncompressed source at 128 kilobytes per second (Kbps) reduced an uncompressed audio file by a factor of ten, getting rid of the tonal ranges humans don't hear so well. This "lossy" compression scheme sliced out audio information from the extreme portions of the audio spectrum, much as the JPEG image rendering system did with pictures, leaving behind what to the human senses might constitute a fair mirror of the original.[5]

The passable audio quality provided by .mp3, especially when compared to other portable sound packages with inherent limitations (e.g., cassette tape), sparked a revolution in the

way people listened to recorded music; or, put another way, changed the face of delivering cultural material to audiences. In retrospect the success of .mp3 appears to be serendipity: By the time .mp3 emerged, consumer technology had developed at a pace where it could capably handle the format, and users recognized that digital music could finally be effectively processed on a desktop and online. Audio quality in this context was secondary; and convenience was king, in the .mp3, much as it had been in the format's cassette tape predecessors.

Although interests of the recording industry and issues of copyright will not be addressed here, the influence of these factors on audio file formats and their usage will be. As a primarily non-proprietary technology (although its creators do hold some patents), .mp3 became the first audio medium that was neither created nor controlled by the recording or broadcasting industry.[6] It is difficult to overstate the significance of the cultural shift that has occurred because of this. Mp3's wide adoption, by the listening public first and the computer industry second (i.e. iTunes), has redefined the traditional recording industry, challenged popular perceptions of copyright, and given rise to a whole new business model keyed to the convenience of music as "download."

Controlling the rights to audio in an .mp3 environment has become enormously important because of the format's compression ratio and the power of digital file copying. The ability to download an .mp3 audio file with relative ease, enjoy it at leisure, then place it on a website, enabling its download by millions of others, threatens intellectual rights holders and recording industry giants alike. As a result, in the wake of .mp3's

emergence, other online listening schemes have appeared to offer an alternative to the download. The "streaming" methods devised by companies like Real (RealAudio and RealMedia), Apple (Quicktime), and Microsoft (Windows Media Player), while often employing compression detrimental to audio quality, have given to rights-sensitive materials the ability to be played online without being downloaded. Streaming servers send "packets" of audio information that are then played back by proprietary software players, and discarded. No artifact is left with the user, and any recording of the audio the user might do via computer soundcard would not be a digital copy but rather an analog derivative with reduced quality. Non-proprietary streaming softwares, such as Ogg Vorbis, are also becoming more commonplace among institutions concerned about longevity, openness, and improved streaming quality. Many streaming programs can also deliver their content at variable rates depending on a user's technological configuration and bandwidth, offering some flexibility across a variety of connections.

Whether downloadable or streaming, however, the unknown factor in preparing audio for online delivery remains the audience. Archives and cultural heritage organizations planning to exhibit audio online must consider the variations in technological infrastructure their users work within. In an educational or outreach program geared toward the general public, this means accounting for everyone.

Broadband and Dial-up

> Bandwidth *is the number of binary bits of information that can be transmitted per second through a given channel, whether that is copper wire, radio spectrum, coaxial cable, or optical fiber.* – Horrigan and Rainie[7]

Current statistics show that 65% of American internet users (about 65 million people) connect to the internet with high-speed or "broadband" connections, with 39% subscribing to broadband at home.[8] *Broadband* is defined by the FCC as 200 Kbps, four times the speed of a standard 56.6 Kbps dial-up modem, and because access speed has been shown to determine online activity, and may be the single most influential factor in intensity of internet use, the blooming of broadband in the last five years (its user base growing about 1600%) cannot be underestimated, by providers of content in particular.[9] This is especially true considering the average time internet users spend on individual web pages, clocked by Nielsen in February 2005 at just 52 seconds per web page.[10] Broadband users may be spending more time online, but they are spending a very small amount of time on individual web pages.

Given the constraints in presenting audio online, expanding broadband usage appears at first a windfall to exhibit creators eager to connect with more people and expand their audience base. The faster the connection, and the faster audio files can download or stream, the less likely a user will be to leave the site. And yet broadband is simply not a fact of life for many internet users, 45% of whom still use dial-up connections, connecting less often and for shorter periods[11], for reasons including:

- Expense – at $20-$30 more per month than dial-up, broadband access constitutes an annual expense running in the hundreds of dollars, not an option for many lower- and middle-income households.[12]
- Geographic location – in the U.S., many rural areas simply do not have a broadband infrastructure. Only 10% of rural Americans have high-speed access at home.[13]

In addition, as products of public cultural heritage institutions, many online audio exhibits must make allowances for all its potential users, in order to fulfill mission. For instance, the University of North Carolina at Chapel Hill's mission statement includes the goal, "to serve all the people of the State," by extending "knowledge-based services and other resources of the University to the citizens of North Carolina…."[14] In states like North Carolina, with large rural populations, mounting online exhibits while maintaining the University's mission means extending the idea of community beyond the wealthier urban and suburban areas of the state, where broadband users tend to cluster.[15]

While audio exhibits mounted by cultural heritage archives may be challenged by low-speed connections, the reward in making such exhibits accessible to all internet users is considerable, especially if raising awareness of resources as historical documents and educational tools is a motivator. In John Horrigan's and Lee Rainie's 2004 study of broadband internet usage, they discovered that, more than anything, users liken the

internet to their library, while 9 out of 10 broadband users say that as a tool it helps them learn new things.[16]

The Exhibits

This study was undertaken with two purposes. The first was to develop a tool that might be used to evaluate online audio exhibitions. The second was to analyze and score twenty-five web exhibits, thereby evaluating not only the websites but also the evaluation tool. Exhibits were assessed on their ability to provide access to audio information and contextual information, in light of considerations of bandwidth and in what is assumed to be an educational or outreach environment online. Although it could be argued that several of the websites analyzed do not conform to some definitions of "exhibit," in that they do not contain a narrative story, all of them have been mounted online to display selections of materials from collections within cultural heritage institutions.[17] Therefore, where no textual narrative appears, the objects make up a kind of narrative-by-selection. Every site showed clear intention, and in no case were random selections of objects displayed.

The sample was taken, with the exception of one site, from the Smithsonian's list, "Library and Archival Exhibitions on the Web."[18] Searching on "multimedia" as a keyword returned the approximately 225 sites, of the several thousand on the list that would possibly include audio. Sites on the list were sifted manually to exclude video as well as exhibits using secondary representations of non-audio materials (for example, an actor reading a letter of Thomas Jefferson's). Then a fair representation of primary

materials and resources was sought from a variety of archives, historical societies, and repository-minded museums. This process met with some challenges: oral history has a much greater presence in the web-empowered archive than music, so of the 25 sites chosen for analysis, only slightly more than one-third (nine) oriented towards music, and two of those came from the same institution, the Library of Congress. In addition, along with the LOC, two other "parent" organizations were chosen more than once (University of North Carolina at Chapel Hill, and University of North Carolina at Charlotte), although differences among the individual exhibits were substantial.

Table 1. The Exhibit Sites

Exhibition	Institution
Battle of Britain Recollections	Imperial War Museum (UK)
Bridgeport Working	Bridgeport Public Library
Brush Creek Follies	University of Missouri at Kansas City
Charlotte Voices: Earle Sumner Draper	University of North Carolina at Charlotte
Gold Band Records	University of North Carolina at Chapel Hill
Helen Creighton	Nova Scotia Archives
Hoagy Carmichael Collection	University of Indiana
In their own words	National Institute of Health
John and Ruby Lomax	Library of Congress
Kent State at Baruch	Baruch College
Lift Every Voice	University of Virginia
Like a Family	University of North Carolina at Chapel Hill
Max Hunter Folksong Collection	Southern Missouri State University
McGuinn's Folkden	Private, high-profile folk music archive
New South Voices for K-12 Teachers	University of North Carolina at Charlotte
Oscar Peterson: A Jazz Sensation	Library and Archives of Canada
Project Jukebox	University of Alaska at Fairbanks
Studs Terkel: Conversation with America	Chicago Historical Society
Tejano Voices	University of Texas at Arlington
The Cuban Missile Crisis, 1962	George Washington University
Virginia Roots Music	Library of Virginia
Voices from the Days of Slavery	Library of Congress
Voices of the Colorado Plateau	Southern Utah University
Witness and Response	Library of Congress
Women Who Dared	Jewish Women's Archive

For each site 32 assessment fields were completed.* Of these fields, 23 contained criteria against which the sites could be measured with objectivity. The remaining fields were informational, with one, "Navigational style," certainly worthy of further user study, but here not scored because of the subjectivity of navigational values. Points were assigned

* See Appendix for complete matrix for each site.

to criteria using two methods, both of which could weight the qualitative value of a particular criterion, with weighting based on assessment of the sites as educational or outreach documents generated by an archive with trained staff.

- A “yes/no” method, where an element was either present or not. Depending on the assigned qualitative value of the criteria assessed, the presence of an element would add 1, 3, 5, or 10 points to a site’s overall score.
- A ranking method, where an element was present to varying degrees. For the fields in which a ranking method was used for assessment, depending on the assigned qualitative value the scoring possibilities were (0,1,2), (1,3,5), (0,1,3,5), or (0,5,10). A “0” score here can be reflective of the understood baseline presence of an element, e.g., that a site exhibiting audio materials uses at least one audio file format.

Table 2. Assessment Fields and Point Values

Assessment Fields	Options	Possible Points
Exhibit Title		
URL		
Institution		
Number of Collections Drawn From		
Extent (exhibit)		
Extent (number of primary source recordings)	<5,0; <50, 1; >50, 2	2
Audio Formats	1, 0; 2, 5; 3, 10	10
Audio Time or File Size Listed With Link?	No, 0; +1, 3; +2, 5	5
Metadata Embedded in Audio File (beyond title)	0, 10	10
Extent (Primary source Images)	>50, 5; >25, 3; >1, 1	5
Extent (Primary source textual documents)	>50, 5; >25, 3; >1, 1	5
Secondary Scholarship	>50, 5; >25, 3; >1, 1	5
Metadata	0, 5 (Mtag), 10 (DC)	10
Simple Index for Audio	0, 5	5
Search feature	0, 5	5
Navigation Style		
Download Time Broadband	<5 sec,10; >5, 5; >10,0	10
Download Time Dial-Up (56.6K)	<15sec, 10; >15,5 >90,0	10
Links to relevant finding aids/collections	0, 5	5
Educational tools or lesson plans	0, 10	10
Further resources outside archive	0, 1	1
Help or FAQ on Playback	0, 5	5
Digitization methods explained	0, 1	1
About the Institution (Contact, Hours)	0, 1	1
User Feedback Capability	0, 5	5
Date Visited		
Date created/Last update	0, 1	1
Google Homepage Ranking (Title Search)	Top 10,5; 20,3; 30,1; >30,0	5
Yahoo Homepage Ranking (Title Search)	Top 10,5; 20,3; 30,1; >30,0	5
MSN Homepage Ranking (Title Search)	Top 10,5; 20,3; 30,1; >30,0	5
Notes	**Total**	**126**

A site could be awarded a maximum of 126 points. Although the highest scoring site achieved significantly less than this, the ability to produce an exhibit capable of achieving the total, or close to it, could not be considered beyond the scope of any of the parent organizations. The scored criteria were selected and weighted with the following in mind.

- *Extent (number of primary source recordings)*: With a possible maximum score of two points, the extent of the audio collection, i.e., the number of audio files offered in the exhibit, was not considered of tremendous value, insofar as an excellent, thoughtful exhibit could be made from a handful of recordings, while a

poorly organized exhibit might contain hundreds of recordings. Therefore, while greater extent of recordings is rewarded to a small degree, the extent criterion in this case is less important than it is in the case of other primary and secondary documents within the site that provide context.

- *Audio Formats*: Providing more than one format of audio file adds tremendously to the value of a site that wishes to speak to many audiences, among whom hardware, software, and bandwidth configurations vary. Offering downloading and streaming formats, as well as both higher and lower quality versions of an audio file, speaks to concern for the user's technological infrastructure as well as a concern for representing a sound source accurately. Offering one file format therefore gained a site no points, offering two formats added five points, while 10 points were awarded to sites offering three or more formats.
- *Audio time or file size listed with link?*: Letting visitors know the length of a selection, or the size of the file they have to download or stream, gives them the ability to decide if a) they wish to invest the time in listening to the file and b) if they wish to invest the time and resources in downloading or streaming the file. Because time of an audio selection is not consistently reflected in file's size, it is important to list both in an exhibition of audio materials online. For this criterion, listing neither gained a site no points, listing one gained them three, and if a site listed both it was awarded five points.
- *Metadata embedded in audio file (beyond title)*: Most audio file formats that are web adaptable, particularly .mp3 and streaming formats, are capable of carrying metadata beyond the simple file title. As files produced by cultural heritage

institutions with archival missions, it is very important that alterable digital files sent across the internet be described appropriately. Additionally, sending users details of the file within the file itself is roughly equivalent to museums providing "tombstone"-style labels to convey basic information about the work for easy reference. Therefore, a score of zero or 10 points was possible for this category.

- *Extent (Primary source images, Textual Documents, and Secondary Scholarship)*: Each of the "extent" categories for other primary and secondary sources were worth a maximum of 5 points each, ranked in terms of quantity , where greater than 50 supporting documents added five points, 25-49 added three points, and 1-25 added one point. In exhibits, these sources function as context, and include introductory and exhibit narratives. While contextual sources can become overwhelming in online environments, this has been mitigated somewhat in this measurement exercise by distinguishing sources displayed from sources referred to (such as bibliographies and links, which are assessed separately).
- *Metadata*: While all the documents in all the exhibits were described to some degree, metadata as a criteria here means, specifically, information carried in the source code of the web page itself describing the nature of the site. Including metadata in the heading of web page's source can make the page more accessible to search engines, and, much like the metadata embedded in the audio files, helps track the web page as an object produced by the archive in question. If a site carried no metadata in its coding, it received no points, if it included "meta" tags for description, keyword, etc., it received five points, and if it utilized the

standardized Dublin Core metadata schema for archival web pages it received 10 points.

- *Simple index for audio* and *Search feature*: Providing a simple checklist of objects in an exhibit is a time-honored museum practice and one which adds great value to online exhibits, especially those that contain a great number of audio files, textual documents, and images. A search engine can also enhance access, whether it is site specific or covers the larger organization of collections housed in the institution. In both cases, the presence of the finding feature added 5 points to an exhibit's total.
- *Download time (broadband)*: "Download time" here means time elapsed to the beginning of a streaming audio file's playback. Using broadband greatly facilitates access to audio files, and in this study an ethernet connection with a 100mbps (through the University of North Carolina at Chapel Hill server) typically began streaming large files in under five seconds.[*] While it could be assumed that any delays would thus be originating on the exhibit provider side, it is important to recognize that bandwidth shifts as demand on connections increases and decreases. Therefore the scores assigned here are very specific to the session, and changeable. This makes them no less important to the heart of exhibiting audio online, which is the actual delivery of sound. With this in mind, delivery under five seconds scores 10 points, delivery between five and 10 seconds scores 5 points, while delivery over 10 seconds scores no points.

[*] In examining the sites via broadband and dial-up connections, the same system was used: A Hewlett-Packard laptop using a Pentium 4 processor @ 2.2 GHz, with 640MB RAM and all current software playback packages loaded.

- *Download time (dial-up)*: Dial-up performance is more perceptibly variable than broadband, with connections using a 56.6kbps modem and a major ISP rarely reaching the 56.6k maximum and more generally falling in the 28-48k range. Unscheduled service dropouts are also more common, so that downloading often goes unfinished before service disconnects. Accessing audio using a dial-up connection is therefore difficult, an exercise in patience that, as noted earlier, could just as easily end up in a user leaving a site altogether. Most streaming softwares can detect modem performance and adjust the size of the stream accordingly, to accommodate slower connections. Even so, streaming speed cannot always keep up with playback once it begins, and interruptions in playback on a dial-up connection are not uncommon. In this study, if a site streamed its audio in under 15 seconds, it was awarded 10 points, if it did so between 15 and 90 seconds, it was awarded 5 points, and if time-to-playback exceeded 90 seconds it was awarded no points.
- *Resources (Links to relevant finding aids/collections; Educational tools or lesson plans; Further resources outside archive)*: If exhibits function as doorways to collections, contexts, and further exploration, accommodating the desire to learn goes a long way towards achieving the common goals of outreach and education. Constructing solid resources challenges institutions whose web designers may believe all they are doing is mounting a sampling of material online, but providing a lesson plan to teachers, finding aid access to researchers at all levels who are starting their journey at the exhibit, or simply links to other relevant resources, can add great pedagogic value to an online exhibit. The presence of a finding aid

(or a link to a more detailed description of the collection from which the exhibit gets its materials) was worth 5 points in scoring, a lesson plan was worth 10 points, while links to outside sources was worth 1 point.

- *About the site (Help on playback; Digitization methods explained; About the institution; User feedback capability; Date created/updated)*: Information about the site becomes most important in terms of help regarding audio playback and feedback. The first is critical to user satisfaction, while the ability for a user to interact with the exhibit's creators demonstrates that the institution is interested in dialogue and can function as a reference desk. These two aspects were worth five points each, while the others were worth one point each. Of particular note, knowing when the site was created or updated can give the user an idea of the technologies available to the exhibit's creators, and the creator's ongoing involvement.
- *Homepage search ranking (Google, Yahoo!, MSN)*: Searches for exhibits across popular search engines give an idea of how an exhibit name, used as a search term, correlates with "hits" on the exhibit homepage. The actual worth of a hit is debatable, dependent not only on search engine algorithms, but variable also by date searched and the commonness of the search terms. Searches were conducted on the exhibits' main titles only (i.e., no subtitles or secondary titles were included), and without use of enclosing quotation marks. A top ten hit scored five points, a top 20 hit scored 3 points, a top 30 hit scored one point, while anything over 30 scored no points.

With these criteria defined and valued, an analysis of the 25 websites revealed the following overall scores as percentages.

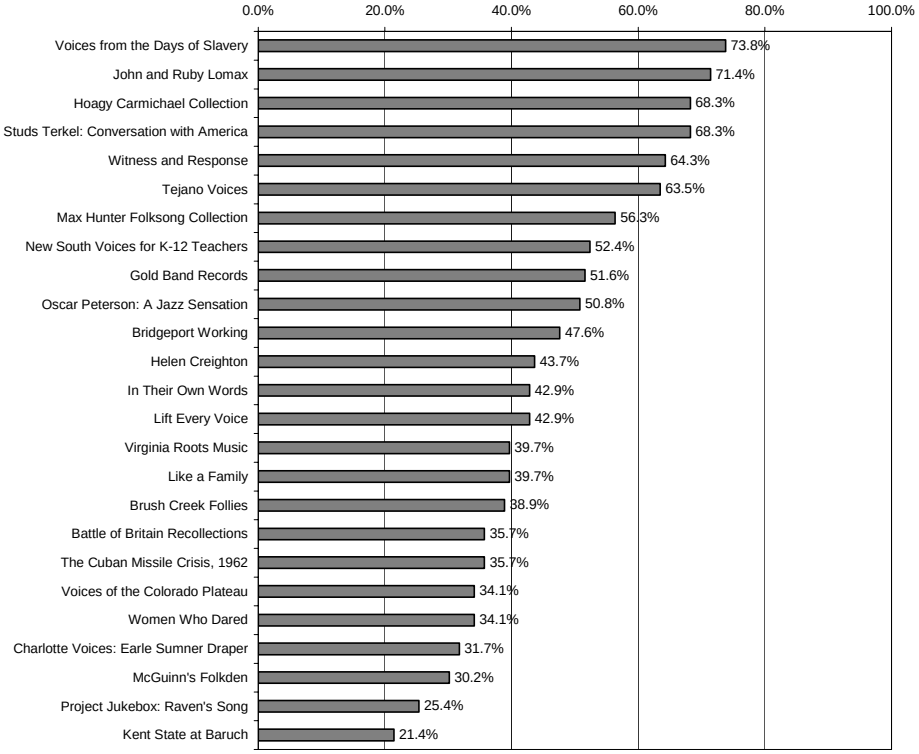


Figure 1. Ranking of Exhibits by Percentage of Possible Points

With three of the top five positions occupied by Library of Congress exhibits, it is clear that the work on standards that the LOC has done with regard to archival audio has translated well to the representation of its collections online, whether those collections are virtual ("Voices from the Days of Slavery" collects oral interviews with former slaves from a number of collections, while "Witness and Response" is a cooperative effort, with a physical counterpart, to bring together materials from across collections regarding the events of 9/11/2001) or standalone (the John and Ruby Lomax Collection). The other two exhibits in the top five likewise come from archives that have taken great care in following and creating digitization standards. Indiana University's Hoagy Carmichael

Collection exhibition is the result of a high-profile project undertaken to digitize the thousands of items within that collection (only a portion of the audio is available online). Likewise, the Chicago Historical Society's Studs Terkel Collection was a large project undertaken to digitize and make available online Terkel's considerable spoken word/radio archive. From the initial results of the total scores, it appears that large, comprehensive projects fared better overall, which may be the result of greater funding and the responsibilities inherent therein (such as adherence to public or institutional mission, the creation of evaluation instruments, etc.), as well as greater focus on project management due to the sheer weight of the materials.

In reaching the total scores, several categories stood out as being particularly important, the first being the number of audio formats used in the web exhibits.

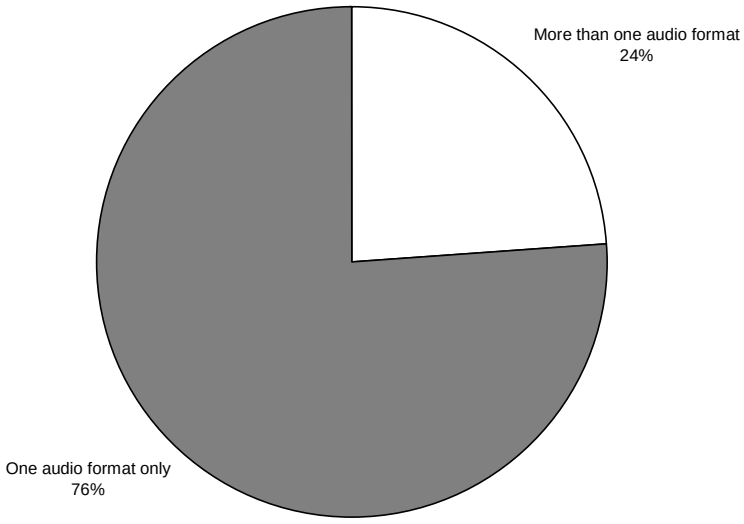


Figure 2. Percentage of Exhibits Using Multiple Audio Formats

As discussed above, increasing the number of audio formats available to audiences significantly increases the likelihood of a successful connection to the sounds, for two reasons. Hardware and software configurations vary widely, even among users who have state-of-the-art equipment, and bandwidth of internet connections range from 14.4kbps to 100mbps. But, while even a slow internet connection can eventually deliver even weighty audio files, the ability of a user's machine to play those files is variable.

As an example, while exploring the John and Ruby Lomax site through the Library of Congress, it was discovered that the RealAudio streaming files would not play back on the testing machine, despite the latest version of the RealMedia player being loaded. Additionally, there can be compatibility issues between web browsers and media players if configurations are not set correctly and updates are not maintained. This appears particularly problematic with the RealMedia player, which updates often but also may have trouble playing back earlier versions of RealAudio (such as that used on the Lomax site). Browsers vary significantly in their ability to playback audio, with Microsoft's Internet Explorer performing particularly poorly with RealAudio in this study. To access RealAudio files Mozilla's Firefox browser often had to be used. An additional usability problem demonstrated with the RealMedia player was the prompt to change settings to accommodate different bandwidth environments. If a user takes a portable machine from a broadband to a dial-up environment (as done in this study), he or she is urged to change playback settings so the audio will stream more efficiently. While Real considers this a positive feature of its software, for a user visiting an online exhibit it is an obstruction that may discourage further use of the collection.

At the John and Ruby Lomax site, exhibitors provided other file formats (both spoken-word quality .mp3 and the higher performance but heavier weight .WAV), and therefore met head-on potential user difficulties with software. This was less the rule than the exception across the sites considered. Of the 25 sites, only 24% provided more than one audio file format for playback, while 72% of these sites offered RealAudio in combination with other file types. Fifty-two percent of the sites overall offered RealAudio exclusively.

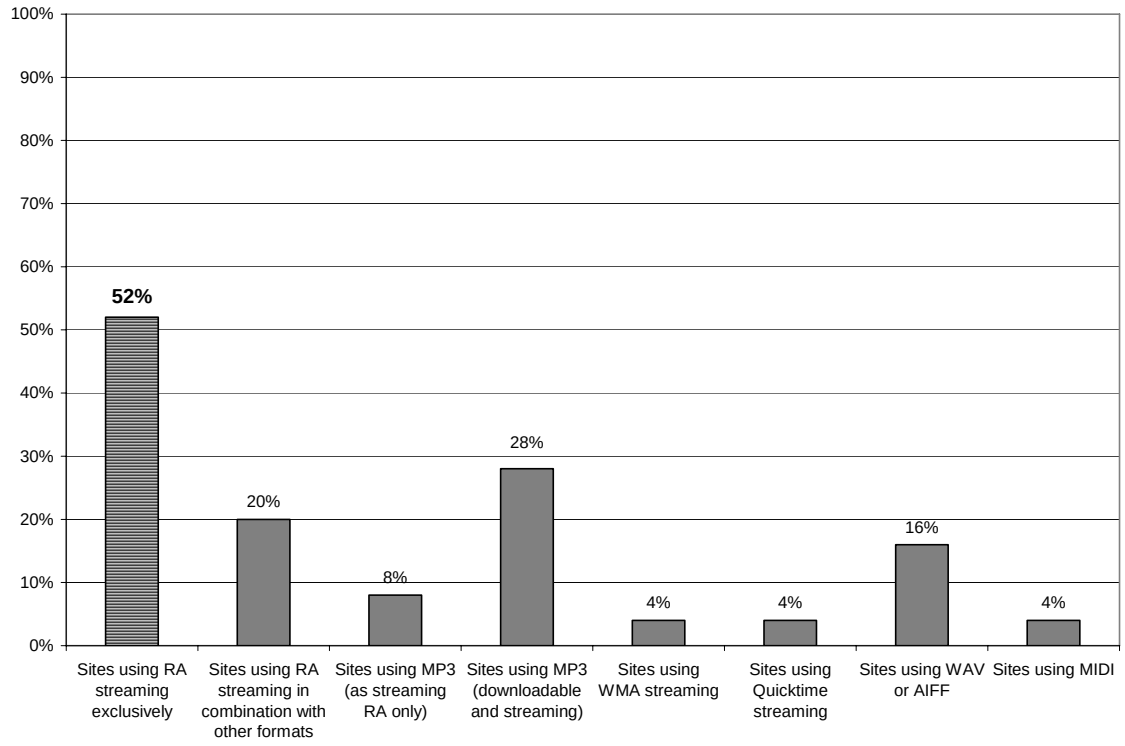


Figure 3. Presence of Audio Formats Across Sites

WMA or Windows Media files, used on one site only, also demonstrate slightly more usability across bandwidth environments than RealAudio, but like RealAudio WMA

suffers from frequent prompts to update, prompts to change user settings, and an advertising-based support system that, while allowing the companies to distribute their players and encoding systems for free, may lend an uncomfortable commerciality to archive-based exhibits.

Other playback systems, such as Apple's Quicktime, proved far more durable, but just one of the sites used Quicktime (.av) files. However, Quicktime playback was also used on the local machine to stream those .mp3 files not configured to stream as RealAudio files (which was the case on two sites). An emerging benefit of the Quicktime format is its ability to be embedded in HTML pages by exhibitors, so that compatibility with user systems becomes, if not assured, more likely. The chief drawback to Quicktime streaming, as in the case of AIFF (.WAV files formatted for CD) and .WAV files, was an apparent inability to readily show metadata (including a simple time read-out or file title) associated with the audio file.

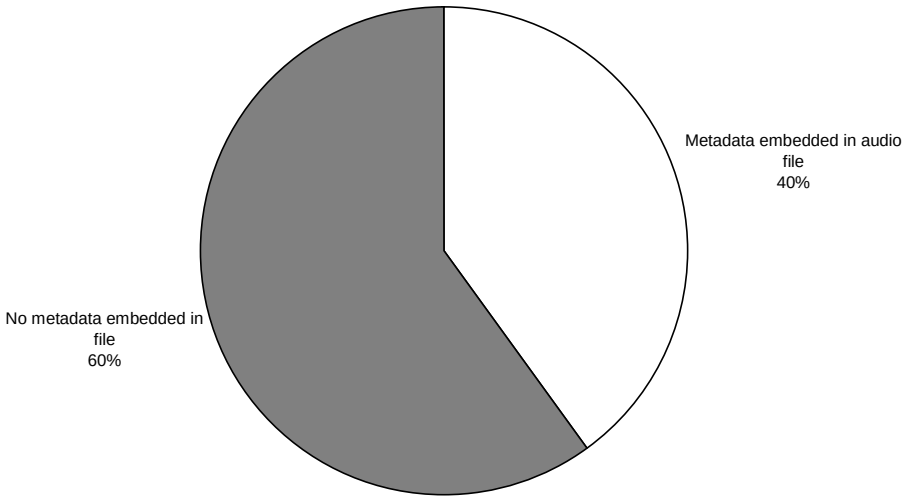


Figure 4. Percentage of Exhibits Embedding Metadata in Audio Files

Embedding metadata (beyond the simple file title) in an audio file is supported in .mp3 and streaming file formats. Typically a limited number of fields are available, usually including title, author, copyright, and description (see Figure 5. below). It was therefore something of a surprise to learn that over half of the audio exhibits surveyed did not embed metadata in their files, in consideration of the acknowledged importance of the practice within the archival and museum communities, and the availability of information about the audio in question, which one might assume the archive possesses. However, failing to embed metadata in audio files may be attributable to reasons beyond carelessness. Embedded metadata doesn't always survive the streaming process, particularly if playback software is out-of-synch with the encoding software. A file may play back, but the software may not be capable of showing the metadata embedded therein. Additionally, technologies for ripping .mp3's vary widely in their advertisement of embedd-able informational fields, and there may be a disconnect between the exhibitor-archivist's knowledge of the software and the software's capabilities.

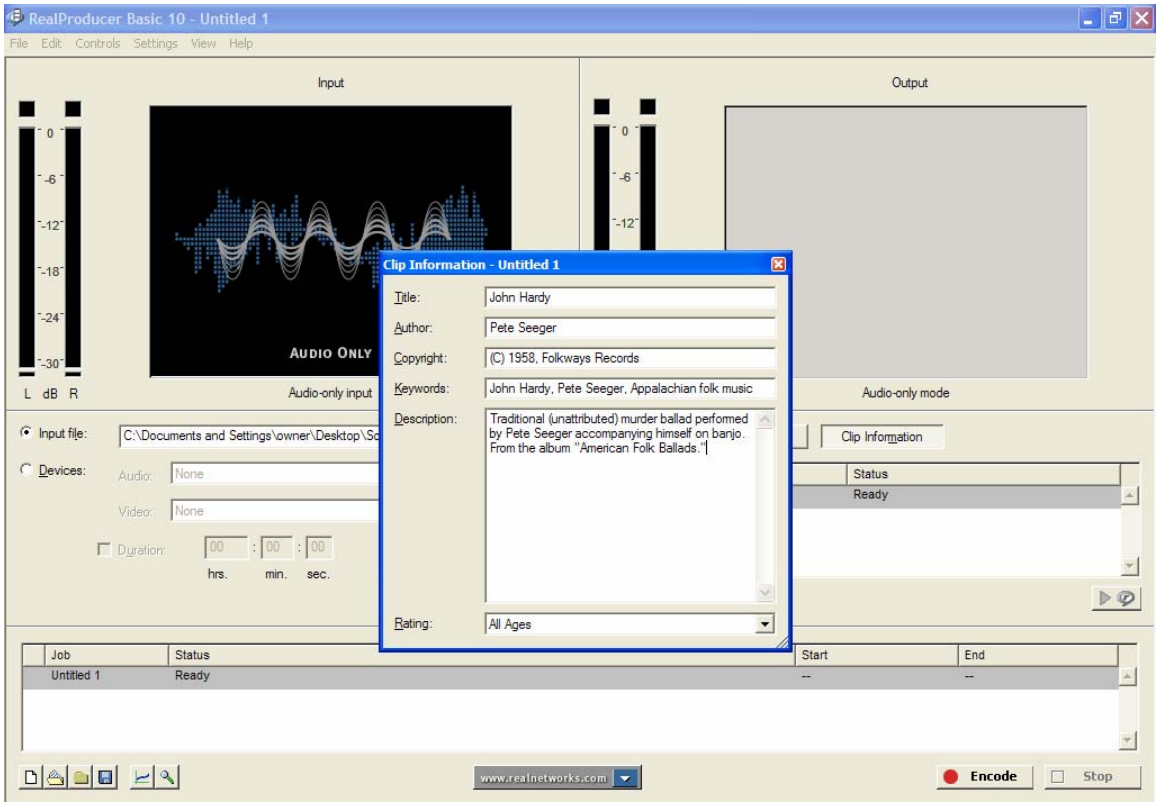


Figure 5. Screenshot of RealAudio Producer showing Clip Information fields to be embedded in RA file.

While the ratio of sites that included metadata in their HTML source code to those that did not is identical to the ratio embedding metadata in their audio files to those that did not (60/40), there does not appear to be a significant correlation between these two measurements. Only half the sites embedding metadata in their audio files also embedded metadata in their HTML.

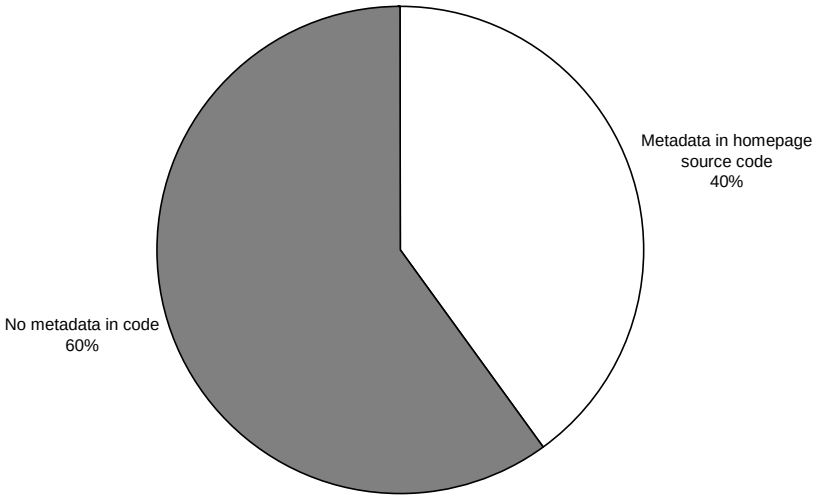


Figure 6. Percentage of Exhibits Embedding Metadata in HTML Source Code.

Including metadata in HTML coding is a fairly simple process facilitated by either plain META NAME tags, or by the Dublin Core schema developed using those tags. Such metadata embedded in the header of an HTML page can assure interoperability among organizations, facilitate searching, and may or may not, depending on a search engine's algorithm, increase "hits" on the site when potential users look for related information. Using metadata in the header of an HTML page also reflects the institution's attitude towards the exhibit as a document generated by the archive, with a need for its own distinct metadata.

With regard to other kinds of information structures, particularly user interfaces that facilitate searching for materials, the two primary tools adopted by the online audio exhibits could be broken down into search engines and indexes, the latter of which would be comparable to a museum exhibit's object checklist.

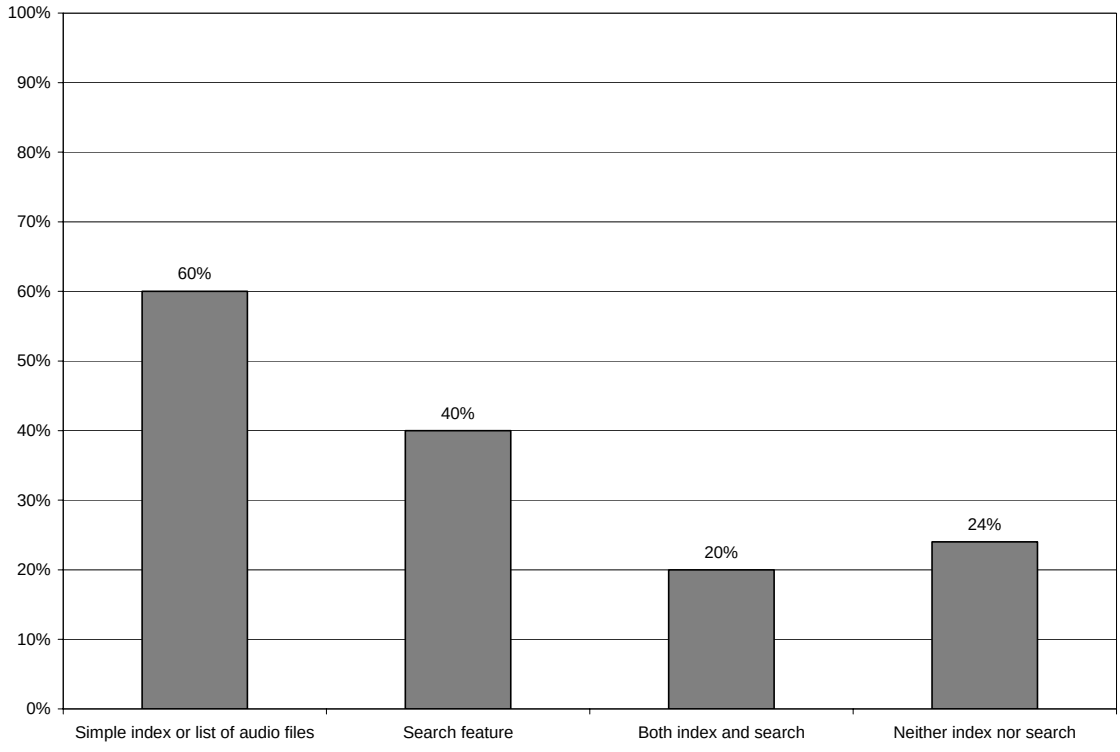


Figure 7. Percentage of Sites Using Audio Indexes or Search Engines in Exhibits.

A majority (76%) of the sites used one of these methods, with several using both. Lists often were not used when sites, such as the Brush Creek Follies or In Their Own Words, relied heavily on a narrative in which the audio had been carefully placed. Often, too, if audio files constituted a relatively small, if important, portion of the exhibit, as in Witness and Response, separating the audio out into a distinct list may not have appeared useful to the creators.

Several sites went further than a simple list of all audio, and broke down the files into thematic categories mirroring the exhibit's organization or, as often occurred with sites exhibiting music, allowed users to access lists arranged by artist or song title. When

search engines were made available on the exhibit pages, in almost all cases they interfaced with the parent organization's database or OPAC.

Once an audio piece has been selected by the user, the time elapsed to the beginning of an audio stream is of critical importance.

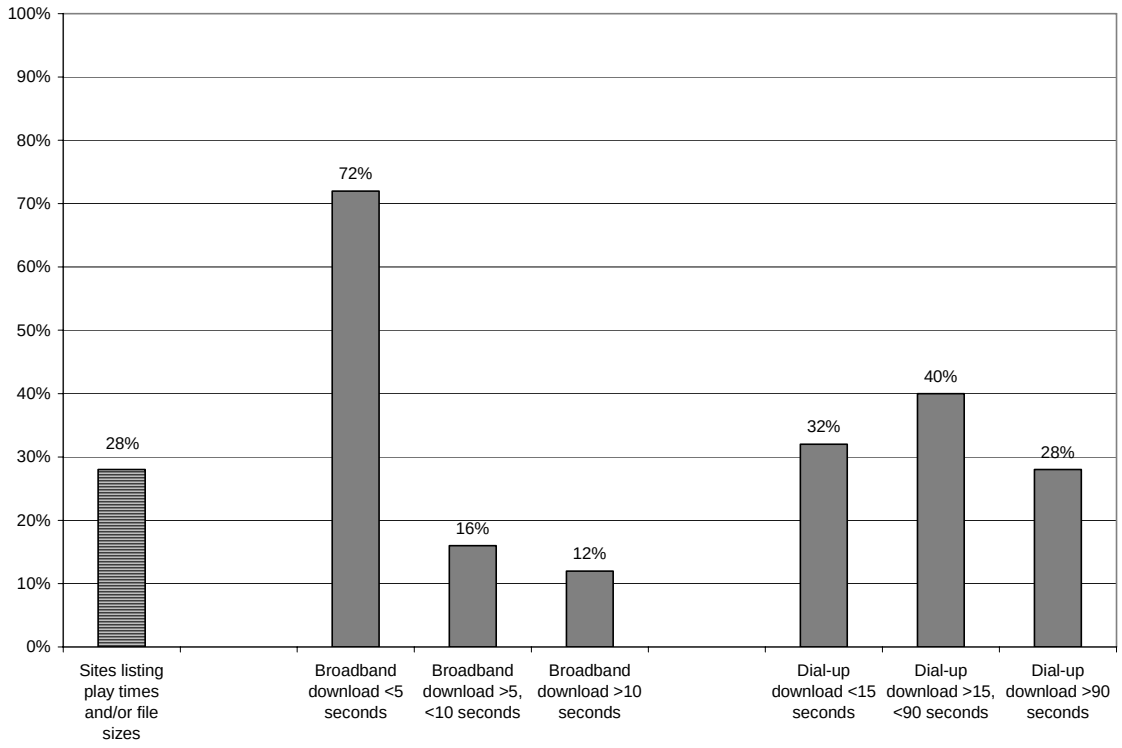


Figure 8. Percentage of Sites Listing Times or Sizes, and Achieving Specified Download Performance.

The first column in Figure 8 is the percentage of sites listing play times or file sizes, which can give users an idea of time commitment regarding play back of the files. This low percentage is surprising given the often elaborate description and contextualization of the audio pieces in their respective exhibits. It is also surprising given the challenges of usability of audio online. These challenges may seem less apparent in the

measurements for accessing the audio files using a broadband connection. A significant percentage (72%) of audio exhibits streamed the selections tested in under five seconds, while only 12% took longer than 10 seconds. With dial-up connections, however, the numbers tell a very different story. While streaming audio performs surprisingly well in dial-up situations if the files have been encoded to playback at low streaming speeds (16-32 kbps), those encoded at higher bitrates, as well as MP3 files (which were streamed, not downloaded to the hard drive, in this study), often took over 90 seconds to begin streaming. This again demonstrates the thin line that audio exhibits online must traverse: as higher streaming rates equal higher quality, they also equal slower download to the user's machine, and increase the potential for interruption during playback.

Providing contextualization for audio and other exhibited objects was achieved to varying degrees in all cases. Exhibitors' abilities to provide materials that could add further value to the site for educators or those wishing to learn more about the topic also varied widely but were not present in all cases.

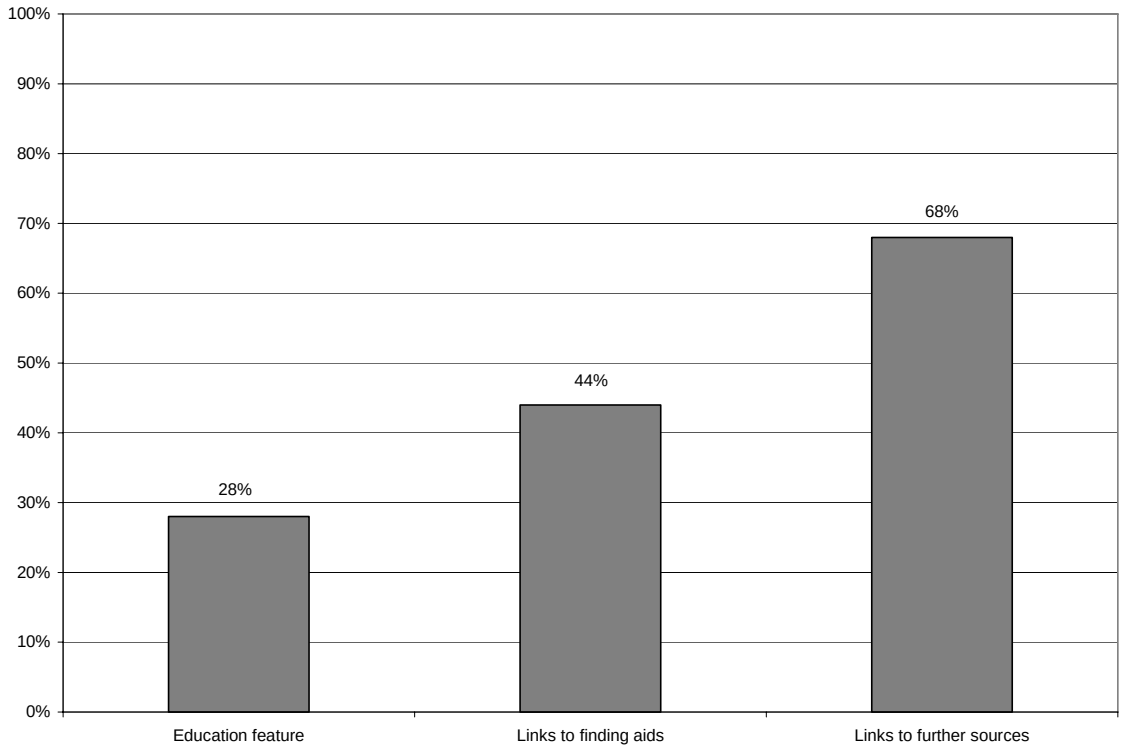
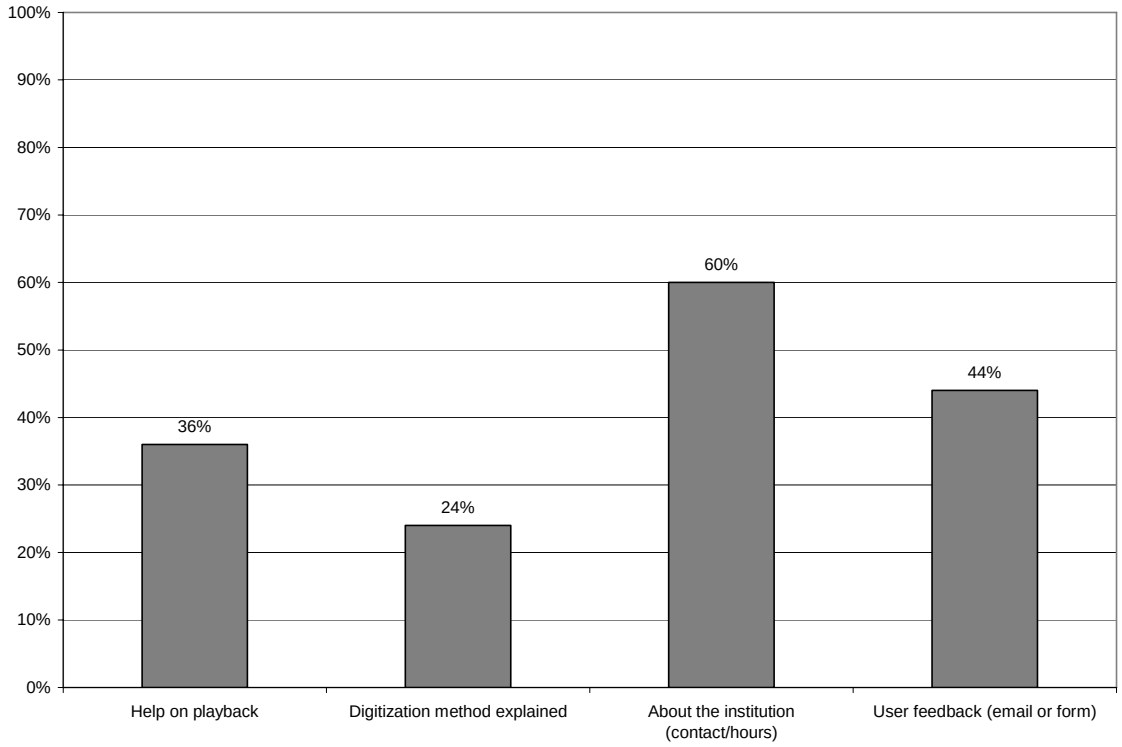


Figure 9. Percentage of Sites Providing Education Features and Links.

Exhibits were most successful in listing links to further resources, including bibliographies and websites. Less than half linked to finding aids or similar documents explaining the nature or extent of objects' source collection. Seven sites (28%) added tremendous value to their exhibits by including lessons plans or similar educational tools that teachers might reference in using the sites in the classroom.

As discussed at length above, processing audio online is neither simple nor easy, for the organization delivering the audio, but especially for the user, whose technological infrastructure and experience with audio downloading and programs cannot be known. For novice users, many websites employing complex technologies provide "help" files of different types to aid user accessibility. Well written help pages serve the purpose of

answering user questions quickly and can limit customer service calls or emails asking for specific technological help (which many archives, it could be argued, would be pressed to provide).



In this study, 36% of exhibits provided some form of help geared to playing back of audio, although the number includes those that simply provided links to sites providing the playback technology, such as www.real.com (RealAudio). Often some degree of help could be found in pages explaining the actual digitization process, although only 24% of sites offered to explain the methods they used, which is interesting given the effort of digitization of audio for web readiness. Additionally, users of digital audio may be baffled by unusual bitrates or .mp3 files sizes, especially in spoken word (oral history)

audio where files can be effectively rendered at lower settings than those demanded by music. Transparency with regard to institutional contact information fared somewhat better, with 60% of sites providing clear contact information, although in some cases it was necessary to link to the parent organization's site to find it. Surprisingly, less than half the sites made a feedback form or email contact readily available. As funds for projects such as online exhibits may come increasingly from outside granting sources, this figure will likely change as evaluative tools will be required more and more.

The last measured category enumerated the success with which the exhibit website homepages could be searched, by main title and without quotation marks, using three of the top search engines: Google, Yahoo!, and MSN. Most sites faired well in this assessment, with the majority being returned in the top 10 hits for each search engine. It should be noted that this assessment may be as much a measurement of search engine effectiveness as it is of any efforts made by the exhibiting websites to get ranked higher through use of metadata, unique naming, or simple popularity. It should also be noted that of the measured categories, this one is least relevant to the site as an exhibit, of audio or of any other kind of object.

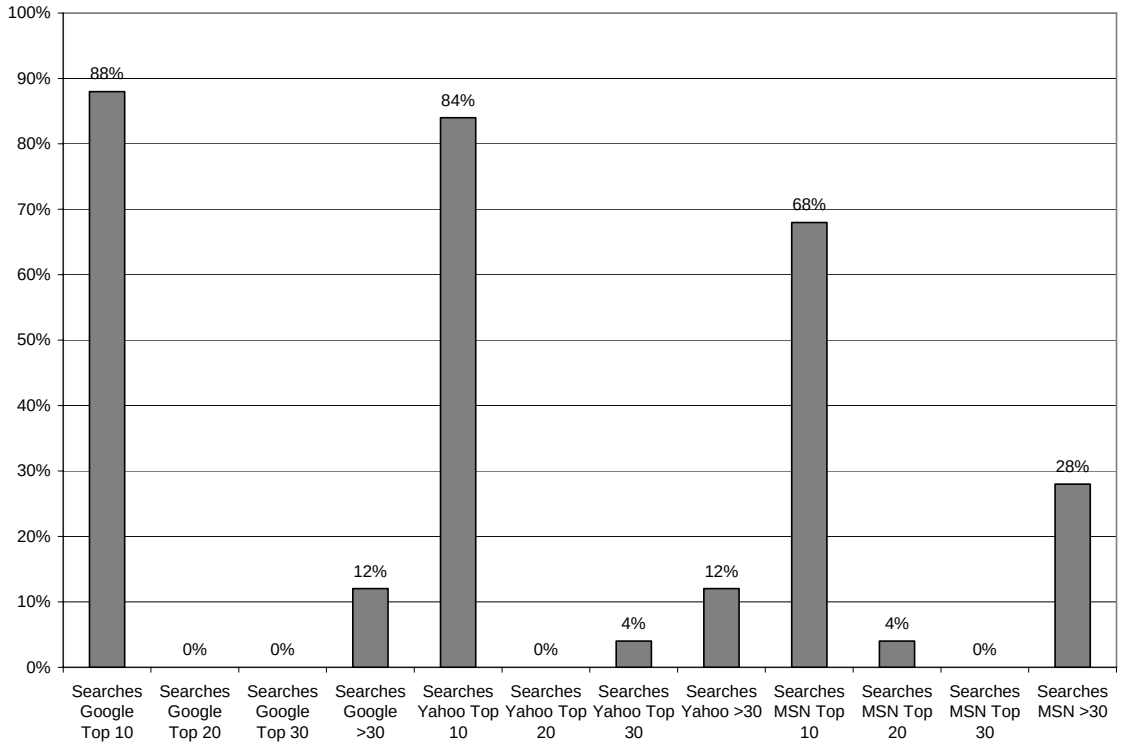


Figure 11. Percentage of Sites In Search Engine Rankings.

Next Steps

The goal in undertaking the assessment of these 25 websites was to develop: a) a tool for audio exhibition assessment; and b) baseline knowledge, using the evaluation tool, on the state of web exhibits produced by cultural heritage institutions in which audio plays a primary or important role. The results of the assessment appear to show that repositories adhere to few standards in the construction of audio exhibits. While this could result from limited institutional resources, more likely it is the result of poorly articulated standards or the lack of standards altogether. The categories that were formulated to measure the web exhibits studied here might be used as a starting point for the development of standards. It is necessary to note, however, that the categories cannot be considered exhaustive, although they were not developed in a vacuum, further

consideration of the evaluation tool by sound archivists in a variety of cultural heritage institutions would certaintly advance its development. In Chapter III, some the categories will be discussed again, with broad recommendations made for standards to be employed in the construction of audio exhibits.

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[1] Martin R. Kalfatovic. *Creating a Winning Online Exhibition: A Guide for Libraries, Archives, and Museums* (Chicago: American Library Association, 2002), 73.
[2] Carl Fleischhauer, "Selecting Collections and Selecting Technology: American Memory at the Library of Congress," in *Moving Theory into Practice: Digital Imaging for Libraries and Archives*, eds. Anne R. Kenney and Oya Y. Rieger (Mountain View, CA: Research Libraries Group, 2000), 20.
[3] For the crisis in audio preservation due to sheer weight of holdings, see particularly Abby Smith, et al. *Survey of the State of the Audio Collections in Academic Libraries*. Washington, D.C.: Council on Library and Information Resources, 2004.
[4] 96.1KHz/24-bit sampling is the Library of Congress standard for master copies. Most original sources don't exceed 15 KHz, and the theoretical rule of thumb in digitization of sound is to sample at twice that. Since industry standard is 44.1Khz/16-bit for CDs, even low-end consumer software can effectively digitize analogue originals, at least in theory. However, audio engineers in archives prefer to preserve at 96.1Khz/24-bit (and some even advocate going to 192Khz/24-bit) as a stop-gap, to cover operator mistakes, to ensure harmonic capture, and in case future technology allows for more efficient rendering. Carl Fleischhauer, "Audio and Video Preservation Reformatting: A Library of Congress Perspective." Preservation Conference: Digital Technology vs Analog Technology, 27 Mar. 2003. 5 Nov. 2003 <http://www.archives.gov/preservation/conferences/papers_2003/fleischhauer.html>.
[5] Geoff Nicholson, "MP3 Explained: A Beginner's Guide," *Shareware Music Machine News*, March 1999 (http://www.hitsquad.com/smm/news/9903_109/). See the Moving Pictures Expert Group homepage for greater detail on MPEG technology. http://www.chiariglione.org/mpeg/index.htm.
[6] Amy Harmon, "What Price Music?" *New York Times* 12 October 2003.
[7] John B. Horrigan and Lee Rainie, *The Broadband Difference* (Washington, D.C.: Pew Internet & American Life Project, 2004), 7.
[8] Matt Richtel, "Dangling Broadband from the Phone Stick," *New York Times* 19 March 2005; Don Fernandez, "Little Luxuries, Big Bills," *Atlanta Journal Constitution* 26 Dec. 2004.
[9] Horrigan and Rainie, *The Broadband Difference*, 7, 14; Fernandez, "Little Luxuries."
[10] "United States Average Web Usage, Month of February 2005, Home Panel," Nielsen//Net Ratings, 23 March 2005 (http://direct.www.nielsen-netratings.com).
[11] Rob McGann, "High Speed, High Spend," clickz.com 24 January 2005, 22 March 2005 (http://www.clickz.com/stats/sectors/broadband).
[12] Fernandez, "Little Luxuries."
[13] John B. Horrigan, "Pew Internet Project Data Memo" *Pew Internet & American Life Project* April 2004, 22 March 2005 (http://www.pewinternet.org).
[14] "University Mission," University of North Carolina, 25 March 2005 (http://www.unc.edu/about/mission.html).
[15] Horrigan and Rainie, *The Broadband Difference*, 10.
[16] Ibid., 4, 17.
[17] In his tremendously helpful volume on online exhibitions, Martin R. Kalfatovic argues that "Though a collection may have an idea behind it,…what separates an exhibition from a collection is that an exhibition has a tight connection between its idea, objects, and script that ties them all together." While accepting

Kalfatovic's argument on principle, I would disagree on the degree of its application, especially in light of non-scripted museum exhibits. Kalfatovic, *Creating a Winning Online Exhibition*, 3.

[18] 15 February 2005 (http://www.SIL.si.edu/SILPublications/Online-Exhibitions).

Chapter III: Conclusion: Sound Practices

Your archives has many publics. – Finch and Conway[1]

Archive-based audio web exhibits are representations of selections from archival holdings. They are, literally in the case of recorded oral histories, "talking" artifacts (as David Levy might call them) that include secondary context as well as primary content.[2] Some are more designed than others, more narrative-heavy, or more intent on simply providing an enhanced list of audio objects. As expressions of archives, concerned with the long-term welfare of collections, exhibits may be passing artifacts, temporary placeholders. Yet web exhibits, often appearing little more than second thoughts, should perhaps be taken at more than face value, especially by their builders. They are, after all, virtual doors to archives, even if they are not the fully realized content interfaces for which many archives currently strive. And yet it appears that the care with which archivists approach notions of permanency, authenticity, trust, and accessibility are not always manifest in the web documents they build to demonstrate the value of their holdings. The irony here, of course, is that of all populations archivists are perhaps most tuned to the power of documents as both artifact and living force. Additionally, the transformative role of digital environments in the information professions may be affecting archives most profoundly. The archive therefore seems like the natural progenitor of the digital exhibition of "content."

If archives do not appear to represent their materials online as well as they could, legitimate excuses could be made. Resources in archives are universally hard to come by, and exhibits are typically not first on the list when prioritizing projects. This is certainly the case in the audio archive. Beset by a surfeit of formats, harnessed with a muddled set of copyright laws, and charged with puzzling-out the stability of the latest digital media, archives may see their collection management challenges obscuring outreach efforts like exhibits. Yet standardization in audio archives regarding digital audio and accessibility is becoming increasingly defined, in terms of preservation rather than presentation. Samuel Brylawski of the Library of Congress identifies several areas where efforts must be concentrated, including:

- Audio format migration based on a program that "presumes media obsolescence."
- Meaningful descriptive, structural, and administrative metadata.
- Digitization standards.
- The importance of collaboration in managing access and rights issues.[3]

Brylawski's concerns and recommendations briefly encapsulate general archival thinking regarding digitization and its focus on issues of preservation, capturing digitally the authentic and reliable object, making it accessible, keeping it sound, and in so doing retaining the public trust. [4] No matter the specific direction of the literature, what at core archival theorists return to is the importance of public access to materials. Perhaps, then, the world of digital preservation and web exhibition are not so different in their goals.

In the nine years since Paul Conway wrote "Preservation in the Digital World," much has changed with regard to virtual access, but his advocacy for the user and society has endured. "Organizations that accept preservation as central to their mission also serve a larger societal need….Part of the service that libraries and archives provide to society is (or will be) their investment in converting, storing, and making available research resources in digital form."[5] In performing these tasks Conway acknowledges that modern archivists transform the access/preservation relationship, so that the focus shifts from the original artifact to the digital container holding the bits capable of virtually rendering the artifact. This sea change has had a dramatic impact on the "social value" archives provide through digitization.

> *The particular value to society of preservation in the digital world has less to do with historical consciousness and group memory – as advocates for traditional preservation have claimed – and much more to do with service to academic, scholarly, and public communities. Active use is the lifeline of the loosely connected clusters of unique (in digital form), highly valuable, and intensely consulted digital collections that form a digital library worth preserving.*[6]

The shift in emphasis to "active use" of collections has tremendous ramifications for the quality of user services that archives provide. With regard to digital documents, especially as they appear online, usefulness, as David Levy points out, may come down to the individual user and the "fluidity" of the digitized document, i.e., its ability to meet the same needs, unique to each user, of the original document.[7] In this type of environment, where behaviors of digital objects so easily demand center stage, Levy warns that it is easy for archivists to lose sight of their audiences.

> *In both the library world and the world of archives, people at times have become so focused on the artifacts themselves that they have risked losing sight of their users or their users' needs. A similar tendency exists in the world of computers – the tendency to turn inward and become preoccupied with the computational artifacts, with their elegance, simplicity, internal consistency and so on….The problem comes when one's gaze is narrowly restricted to the digital object.*[8]

Even, as Levy hopes, archives can succeed in taking a "more deeply human-centered perspective,"[9] access may still not be easily realized online. As they are not the focus of this paper, rights issues have not been addressed, but they can have a significant impact not only on whether, but how, users are *allowed* to access digital documents.

Brewster Kahle, Rick Prelinger, and Mary E. Jackson open their paper, "Public Access to Digital Material," with the bold statement, "The goal of universal access to our cultural heritage is within our grasp."[10] For the authors access is contingent upon rights being granted by intellectual property owners to allow legal access to materials. Their "digital divide" is a line separating those who have legal access to information and those who do not. Certainly legal issues regarding the right of individuals to their intellectual legacies often take precedence when archives decide what to digitize.[11] Yet another divide exists even after copyrights are determined and cleared, a divide obscured by the push for open content, much as David Levy's "computational artifacts" take attention away from the users of those artifacts. The socio-economic and geographic divide, suggested in the discussion of broadband versus dial-up in Chapter II, very concretely makes access to digital materials, especially weighty multimedia files, difficult if not impossible for many would-be users of archival materials.

In an example of well-intentioned public advocacy also potentially trumping access, Kahle and his co-authors emphasize that the Internet Archive (founded by Kahle) supports downloading over streaming of video, "for technical considerations as well as out of a belief that users should have the right to view material repeatedly and do with it what they please." The Internet Archive's video files, weighing in at 250MB per 10 minutes of video, may be outside the limits of many users' technological infrastructures. It is no wonder that "the preponderance of downloads are from education institutions and DSL/cable modem users, as might be expected given the large size of the movie files."[12] Although the Archive expected, as of 2001, to shift to a more efficient compression scheme, the choice to offer one kind of online access only (downloading), for reasons of principle rather than technology, may ultimately limit the potential for use given differences in the technological infrastructure of users. While limiting rights to use may prevent access altogether, simply making everything available does not solve problems of access or further the understanding of user behaviors.[13]

Avoiding the pitfalls of the digital world and the online exhibition of materials is therefore a tricky, and risky, business. Barbara Craig counsels archivists to "disconnect the hype that surrounds the business of 'getting connected' from the legitimate expectations that the net encourages."[14] Craig brings enthusiasm for the online archive back to earth, framing it within the "information economy," where quality of presentation is at least as important as getting the entirety of a collection online. "It is well to remember that the problem of delivering information in context is not new. What is new now are the demands to provide access to archives equitably to all users on site and

remotely," she writes, adding that the archival web presence must be an environment not only of the "seasoned habitue," but of the casual visitor as well.[15]

With the considerations of archival theory, practice, and both the student/researcher and casual virtual visitor in mind, what approaches appear reasonable for the exhibition of media online, particularly audio? Clearly, in the case of online access to exhibits, archives will benefit from a "lowest common denominator" approach to the display of their materials. This is not to suggest exhibits and related online productions (home pages, news and events, etc.) cannot be smart, or even groundbreaking, in their representations of the intelligent archive, but rather that the simplest technological infrastructure is assumed on the part of the virtual visitor. Simplicity, on the one hand, must characterize the structure of the information; allowing informed choices, on the other hand, must characterize sites concerned with universal access.

Suggested Guidelines

If the assessment tool used in this study is assumed to be an effective one, the following emerge as suggested guidelines for improved exhibit access and performance.

1. *Audio Delivery Type Options* – Both downloading and streaming options should be offered. While downloading gives the user the ability to play back audio files from his or her hard drive (thus allowing offline, anytime-access to the audio file), streaming can allow more timely access and less hard-drive commitment. As streaming technologies improve, with both proprietary and open formats now available, they become more reasonable as options for acceptable-quality,

uninterrupted playback. They may also allow for greater use of rights-restricted materials. They do, however, have their drawbacks (see #3).

2. *Audio File Size/Quality Options*: At least two options should be offered users, high and low quality, with, ideally, a middle-range option as well (see recommended settings for these in #4 below.).

3. *Multiple Format Options*: To borrow and modify the LOCKSS acronym (lots of copies keeps stuff safe) from the field of preservation, this category can be thought of as Lots-of-Versions-Keeps-Stuff-Accessible. At least two audio file formats should be available to users, even if the decision has been made to download or to stream only. While RealMedia and WindowsMedia now dominate the streaming market, along with Apple's Quicktime, Ogg Vorbis, an open streaming software, is gaining ground, rated higher in quality, and is playable on popular playback softwares such as WinAmp. Commercial streaming softwares like RealMedia and WindowsMedia are notorious for requiring users to update their players. If a user does not already have a player, downloading one means enduring a registration process and waiting as much as a half hour for the player to download, *before* setup and configuration. Additionally, these companies tend to let old versions go unsupported, so refreshing and migration are factors for archives exhibiting these formats.[16] For downloading, .mp3 will probably remain the primary choice for some time to come, although .WAV and the non-lossy compression system .FLAC can provide a more pure audio

experience to audiophiles with broadband connections. It should be noted that streaming media players can be configured to stream downloadable .mp3, but the (typically) heavier .mp3 files will take much longer to begin playback, tying up both user and server resources. Regardless of the format chosen, the capability of the medium to support metadata, so that (the potentially numerous) derived files describe their relationship to original sources, is an important consideration with regard to the authenticity of the derived audio.

4. *Balanced Audio Quality*: This is where an experienced ear is necessary, as well as a dose of good judgment and common sense. The idea is to create a quality listening experience without overwhelming the visitor's technological infrastructure. Since quality will be relative not only to a listener's taste but also his or her technology, optimizing audio file settings for different environments is a good idea. It should be noted that in the case of exhibits the archivist's impulse to provide the unmodified representation of historical audio (that is, without normalization, equalization, or compression) might in some cases reasonably be sacrificed to the necessities of user technology, without compromising the integrity of the story being told. This is ultimately a question of transparency, and should be echoed in the metadata as well as in an explicit message to the user (e.g., "This audio file has been optimized for online listening").

   Part A. Streaming Audio – Exhibitions using streaming audio need to assess their host server capabilities: often parent institutions will have streaming servers already employed, so this may determine the type of software that can be used.

That said, streaming audio encoders typically allow a variety of settings, starting with a 16kbps bitrate for low-bandwidth dial-up connections (28.8kbps – it can be fairly assumed that most 14.4kbps modems are now obsolete or parts of systems whose processors could not handle streaming audio anyway). Although most dial-up systems in 2005 are in all probability using 56.6kbps dial-up modems, actual connections to internet service providers typically range in the 28.8-48.8kbps range – rarely is anything over 50kbps actually achieved. Therefore, a 16kbps setting may still be a best bet for a low-bandwidth user option, with a maximum of 32kbps if the original file has already been compressed. This is a key consideration, as quality in streaming files is dependent on the source audio file from which the streaming file has been derived. If starting with a clean, CD-quality, 44.1 kHz 16-bit .WAV file, compressing to a 16kbps streaming file will make for passable online audio, especially if the audio content is spoken word. However, re-compressing an already compressed .mp3 or low-quality .WAV file to 16kbps will typically yield substandard results, which will be even more noticeable if the original recording was made under the constraints of poor equipment or conditions. Deciding on the higher quality streaming file is much easier. While technically able to derive files from originals at a very high-quality, encoding at 64kbps for online delivery will yield fast performance and good quality over a broadband connection.[17]

Part B. Downloadable Audio – At the broadband end of the spectrum, downloadable audio may be restricted only by rights owners. However, with CD-quality .WAV audio weighing about 10Mb/minute, and standard .mp3 (128kbps)

coming in at about a tenth of that, the decision to provide the spectrum of quality made possible by these formats may also come down to server space and management. If the point of the exhibit is to represent audio faithfully for online audiences with reasonable expectations (i.e., non-audiophiles), stereo .mp3 at 128kbps will in most cases be sufficient as a higher-end option, although if space and resources allow CD-quality .WAV or the slightly smaller (and open) .FLAC formats may be seen as adding value to sites heavy in music audio, which requires greater fidelity. It is possible also to create .WAV files of lesser resolution that still offer acceptable quality (for instance, the Library of Congress offers 22.1kHz mono .WAV recordings on their John and Ruby Lomax site). Downloadable audio options for dial-up users could include mono .mp3 at 96kbps, or even mono .mp3 at 64kbps (for spoken word). As they are doing in streaming audio, Ogg Vorbis has developed .mp3 technology based on a quality scale rather than a bitrate, that is reported to deliver higher quality at lower bitrates. This may also make a good option for low bandwidth users.

Part C. The Future – Keeping in mind Samuel Brylawski's observations on media obsolescence, and the idea of digital preservation as an ongoing process, it would be wise for designers of web audio to keep abreast of developments in audio compression, streaming, and downloading, as they continue to rapidly change.

5. *Lengthy audio pieces should be divided where possible*: Often spoken word pieces, the substance of oral history programs and websites, can be 30 minutes or

more. Breaking these into technologically digestible chunks benefits the listening visitor to the audio exhibit. While dividing long spoken word files may be more critical for downloading files and less so in streaming efficiency, in either case another potential benefit in breaking up longer files is the opportunity it gives exhibit designers for descriptions of discrete passages of audio.

6. *File times and/or sizes should be listed with audio selections*: Describing an audio piece in terms of length and file size allows the listener to make an informed choice in selecting the work for playback, from the perspective of both the commitment of technology and time investment.

7. *An index or search tool for audio should be made available*: Often online exhibits, particularly those who use narrative extensively and integrate audio into that narrative, neglect to collect their "exhibit checklist" of objects and make it accessible to users, who might then be given the opportunity to link to pieces directly from the list. The web facilitates these types of indexes; an object need be present on a server only once to be linked to many times. Collecting the audio on one page and sorting it in a logical order (by title, artist, date, region, collection or call number, etc.) is a simple way to greatly enhance access. Employing a search tool is also helpful, depending on what the tool has been configured to search – allowing users the ability to search by format (e.g., .mp3) or type of media (e.g., audio), as well as keyword, tunes the searching mechanism to be more sympathetic to users of the site.

8. *An audio help or FAQ page can greatly benefit new users*. As made abundantly clear in the foregoing pages, playing back online audio can be a complex, frustrating process for users unaccustomed to using multimedia on the web. Simple instructions on downloading software players, hints on browser settings, and an explanation of digitization methods and why they were used (which should also have its own page, although for site usability this is less critical) can make using audio exhibits much easier.

9. *Simplicity of page design*. While perhaps not having as much of an influence on web audio functionality, the web page, as the container holding the content, should be designed with an eye to a simplicity that facilitates fast page loads. While presentation plug-ins such as Flash or Shockwave can provide an eye-popping wow! factor, they can also require that users download software, and they can consume precious processing power. To paraphrase a common rule of composition, if an element in the construction of a work doesn't advance the story being told, leave it out. It will be at best a distraction and at worst will drive audiences away. Additionally, while not addressed directly in this paper, it is also important, and in many cases mandated, to consider the Americans with Disabilities Act in constructing web exhibits – institutional guidelines for these distinct issues of access will have to be consulted.

10. *Adequate contextualization should be provided for each object* – As in #4 above, this one is ultimately a judgment call. Contextualization can mean other primary media, such as photographs, text, and video; it can refer to secondary works regarding the piece in question; it can be the exhibit "label" itself; and it can be the metadata provided in the page and audio file coding. Deciding how much is enough in the description of an audio work should perhaps start with questions such as: Is there a transcript (if spoken word)? Are there supporting primary sources? Are there easily integrated secondary sources? Would a newcomer to the subject understand, given what's provided, what this work is about?

The table below is a succinct representation of the recommendations above, transformed into a quick evaluation tool. It is designed to assist in building web audio exhibits, allowing designers to score their sites on a 100-point scale, and may help in planning for digitization for web presentation.

Table 3. Accessibility Top 10 - Quick Checklist for Online Audio Exhibits.

Factors Enhancing Audio Access			**Factors Limiting Audio Access**
Option to download and stream files	☐+10	☐-10	Streaming only or download only
Multiple file sizes or quality options	☐+10	☐-10	One size or quality option only
Multiple audio file formats available	☐+10	☐-10	One file format only
Audio file quality neither exceeding intended bandwidth capabilities nor falling below acceptable exhibit quality	☐+10	☐-10	Audio quality too high (exceeding bandwidth capabilities) or too low (audio distorted) for online exhibit
Lengthy spoken word pieces divided at appropriate intervals	☐+10	☐-10	Lengthy pieces not divided, must be downloaded or streamed as one file
Descriptions of file play time or size	☐+10	☐-10	Pieces lack time or size descriptions
Index or search tool for audio	☐+10	☐-10	Narrative organization only
Audio help page	☐+10	☐-10	No help page for listening back to audio
Simple design yielding fast page loads	☐+10	☐-10	Plug-ins (e.g., Flash, Shockwave, etc.)
Adequate contextualization provided with regard to the origin and interpretation(s) of the piece	☐+10	☐-10	Contextualization inadequate for a newcomer to the subject
Totals			
Audio Accessibility Score Total:			

Rigorous archival thought regarding digital preservation can inform web presentation. Both require standardized practices recognizing the complexities of electronic media. Thankfully, the more highly-evolved canon of preservation literature can shed light on many of the issues web exhibitors will face. Archival theorists have begun to strongly argue for preservation practices that increasingly focus on user needs as well as the requirements of the artifact. Such urging needs to be doubled with regard to web exhibition of archival materials.

Online exhibits must also be considered on their own, as important new forms of archival practice and expression. While they may be affected by preservation standards, their

digitization needs are distinct from those required for preservation. While they may aid in helping users find materials, they are distinct from finding aids. As outreach or educational documents they must consider the user, not just the object, especially in variable online environments. Yet as John Dewey noted at the beginning of this paper, this does not have to be an either/or proposition. Emphasizing the needs of the user does not imply that the integrity of the original archival object should not or cannot be upheld in its online proxy. Exhibit descriptions may in fact allow for extended contextual interpretations and metadata opportunities, backing up the authenticity of the archival resources upon which the virtual ones are based. In the online audio exhibit, where quality is often intentionally sacrificed to access, transparency in description can maintain the delivery of authenticity, even in derivative copies made for web consumption.

That an exhibit's digital surrogate is a worthy representation of authentic material will ultimately depend on trust in the institution and the quality of the coded and narrative metadata. That an exhibit will be successful with its audiences, however, will ultimately depend on user satisfaction as well as sound documents. A trustworthy archive holding authentic resources can still be responsible for a badly designed and delivered exhibit. Effective archival web exhibitions may be credited to the design, technological, and pedagogic skills of archival staff, as well as the delivery of authenticating material. This is the online exhibit's challenge, as web technology promises to be in a state of flux for some time to come. Providing access to wide audiences, in as equal a measure as possible, demands that exhibitors evaluate their presentations with the care of archivists, the minds of educators, and the eyes of users.

[1] Elsie Freeman Finch and Paul Conway, “Talking to the Angel: Beginning Your Public Relations Program,” in *Advocating Archives* (Chicago: Society of American Archivists, 1994), 5.
[2] Levy writes: “Documents work to hold talk fixed, to ensure its repeatability…. It is something that documents do well and and people by and large don’t.” David M. Levy, "Heroic Measures: Reflections on the Possibility and Purpose of Digital Preservation," in Witten et al., eds. *Digital Libraries 98* (New York: ACM, 1998): 153.
[3] Brylawski, Samuel. “Preservation of Digitally Recorded Sound.” In *Building a National Strategy for Digital Preservation: Issues in Digital Media Archiving* (Washington, D.C.: Council on Library and Information Resources, 2002), 61-64.
[4] While not explored in detail in this paper, these issues are exhaustively considered in Peter B. Hirtle, "Archival Authenticity in a Digital Age," in Abbey Smith, ed., *Authenticity in a Digital Environment* (Washington, D.C.: Council on Library and Information Resources, 2000); David M. Levy, “Where’s Waldo? Reflections on Copies and Authenticity in a Digital Environment,” in Abbey Smith, ed., *Authenticity in a Digital Environment* (Washington, D.C.: Council on Library and Information Resources, 2000); Waters, Donald and John Garrett. *Preserving Digital Information: Report of the Task Force on Archiving of Digital Information* (Mountain View, CA: Research Libraries Group, 1996); Kenneth Thibodeau, "Overview of Technological Approaches to Digital Preservation and Challenges in Coming Years," in *The State of Digital Preservation: An International Perspective* (Washington, D.C.: Council on Library and Information Resources, 2002); Peter Lyman and Brewster Kahle, "Archiving Digital Cultural Artifacts." *D-Lib Magazine* Jul./Aug. 1998. 17 September 2003 <http://www.dlib.org/dlib/july98/07lyman.html>; Howard Besser, "Digital Longevity," in *Handbook for Digital Projects: A Management Tool for Preservation and Access,* 10 September 2003 <http://www.nedcc.org/digital/ix.htm>; and *Trusted Digital Repositories: Attributes and Responsibilities* (Mountain View, CA: Research Libraries Group, 2002).
[5] Paul Conway, "Preservation in the Digital World," (Washington, D.C.: Council on Library and Information Resources, 1996). 10 Sep. 2003 <http://www.clir.org/pubs/reports/conway2/index.html>.
[6] Ibid.
[7] Levy, "Heroic Measures,” 156.
[8] Ibid., 159.
[9] Ibid., 160.
[10] Brewster Kahle, Rick Prelinger, and Mary E. Jackson, "Public Access to Digital Material," *D-Lib Magazine* Nov. 2001. 17 September 2003 <http://www.dlib.org/dlib/october01/kahle/10kahle.html>.
[11] For many, rights issues are the key factor in making digitization decisions. See especially Dan Hazen, Jeffrey Horrell and Jan Merrill-Oldham, *Selecting Research Collections for Digitization* (Washington, D.C.: Council on Library and Information Services, 1998).
[12] Kahle, Prelinger, and Jackson, “Public Access.”
[13] These issues are pointedly addressed in Tibbo, “Primarily History,” and Barbara Craig, “Perimeters with Fences? Or Thresholds with Doors? Two Views of a Border,” *American Archivist* 66 (No. 1, 2003).
[14] Craig, “Old Myths,” 120.
[15] Ibid., 123.
[16] See http://www.real.com – Real, while not supporting older versions of their software, does have the good sense to list for users what versions they do and do not support.
[17] For discussions of practical applications of streaming in project environments, highly recommended articles include Trevor James Bond, "Streaming Audio from African-American Oral History Collections," *OCLC Systems and Services* 20 (No. 1, 2004): 15-23; and Kristine R. Brancolini, "Digital Star Dust: The Hoagy Carmichael Collection at Indiana University," *First Monday* June 2002. 28 Sep. 2003 <http://www.firstmonday.org/issues/issue5_6/brancolini/index.html>.

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Appendix: Site Evaluation Matrices

Total Points= 90	Music	**Score**
Exhibit Title	Southern Mosaic: The John and Ruby Lomax 1939 Southern States Recording Trip	
URL	http://memory.loc.gov/ammem/lohtml/lohome.html	
Institution	Library of Congress	
Number of Collections Drawn From	1	
Extent (exhibit)	One page timeline.	
Extent (number of primary source recordings)	686	2
Audio Formats	RealAudio streaming (inoperative), MP3@24kbps mono, WAV (mono 16-bit 22.05kHz) downloadable.	7
Audio Time or File Size Listed With Link?	Time: No File Size: No	0
Metadata Embedded in Audio File (beyond title)		0
Extent (Primary source Images)	381	5
Extent (Primary source textual documents)	22 (307 pp.)	1
Secondary Scholarship	Biographical sketches of John and Ruby Lomax	1
Metadata	In source page, "meta" tags: "description" and "keywords." Information given also with each object accessed.	5
Simple Index for Audio	Yes: Subject, Title, Text, Performer	5
Search feature	Yes: Search keywords in bibliographic records and full text	5
Navigation Style	Single page scrolling.	
Download Time Broadband	MP3 stream "Alabama Bound" (1:43): 5 seconds, no interruption	10
Download Time Dial-Up (56.6K)	MP3 stream "Alabama Bound" (1:43): 70 seconds, no interruption	5
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	Yes ("Collection Connections")	10
Further resources outside archive	Yes, to other LOC American Memory sites	1
Help or FAQ on Playback	Yes	5
Digitization methods explained	Yes	1
About the Institution (Contact, Hours)	Yes	1
User Feedback Capability	Yes, online form	5
Date Visited	3/15/2005	
Date created/Last update	9/7/1999	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	RealAudio inoperative (-3 points). Audio file times not listed.	

Total Points= 43	Oral history	**Score**
Exhibit Title	Voices of the Colorado Plateau	
URL	http://archive.li.suu.edu/voices/voices.html	
Institution	Hosted by Southern Utah University	
Number of Collections Drawn From	Not stated.	
Extent (exhibit)	24 people profiled with regard to 13 places and 21 topics. No linear guidance provided.	
Extent (number of primary source recordings)	686	2
Audio Formats	RealAudio streaming @ 64kbps.	
Audio Time or File Size Listed With Link	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	Not stated.	1
Extent (Primary source textual documents)	Transcripts.	3
Secondary Scholarship	Labels and limited exhibit narrative.	1
Metadata	None in source page. Limited to object (recording and image) "tombstone" style description, with call numbers and locations for images.	
Simple Index for Audio	None.	
Search feature	None.	
Navigation Style	Flash homepage. Macromedia Flash and Shockwave driven, external browser navigation buttons disabled. No playback controls.	
Download Time Broadband	Unknown stream "Tex Worley: Your Official Duty" (2:00): 5 seconds, no interruption	10
Download Time Dial-Up (56.6K)	Unknown stream "Tex Worley: Your Official Duty" (2:00): 25 seconds	5
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	No	
Digitization methods explained	Limited to site's purpose.	
About the Institution (Contact, Hours)	Yes	
User Feedback Capability	Yes, online form	5
Date Visited	3/15/2005	
Date created/Last update	2002	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Cooperative effort: N. AZ U., UNLV, S. Utah U., Edge of the Cedars Museum, Iron Mission State Park Museum, John Wesley Powell Memorial Museum, Museum of Northern Arizona, Utah State Historical Society. Navigation not transparent: non-flash site not easily accessible.	

Total Points= 71	Oral history	**Score**
Exhibit Title	Max Hunter Folk Song Collection	
URL	http://www.smsu.edu/folksong/maxhunter/	
Institution	Southwest Missouri State University and Springfield-Greene County Library	
Number of Collections Drawn From	1 - Max Hunter Folksong Archive	
Extent (exhibit)	No narrative organization.	
Extent (number of primary source recordings)	1,594	2
Audio Formats	RealAudio streaming @ 15kbps, MIDI, and AIFF cd-quality streaming	10
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	None.	
Extent (Primary source textual documents)	None.	
Secondary Scholarship	Editor's note.	1
Metadata	None in page source. Catalogue information given with each selection.	
Simple Index for Audio	By title, singer, or catalogue number.	5
Search feature	Yes, linked to SMSU search page.	5
Navigation Style	Single page scrolling.	
Download Time Broadband	RA stream: "Afraid of the Dark" (1:04): 10 seconds, no interruption	5
Download Time Dial-Up (56.6K)	RA stream: "Afraid of the Dark" (1:04): 10 seconds	10
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	Yes, "Information about variants and other collections cited," points to published folksong collections.	1
Help or FAQ on Playback	No	
Digitization methods explained	Yes.	1
About the Institution (Contact, Hours)	No.	
User Feedback Capability	Yes, email link.	5
Date Visited	3/15/2005	
Date created/Last update	9/01/2001	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	3	5
Notes	Simply layed out. Little evidence of maintenance. File formats may be getting aged at this point.	

Total Points= 49	Music	**Score**
Exhibit Title	Brush Creek Follies	
URL	http://www.umkc.edu/lib/spec-col/Follies/main.htm	
Institution	Marr Sound Archives, Special Collections, Miller Nichols Library, University of Missouri - Kansas City	
Number of Collections Drawn From	1 - Arthur B. Church KMBC Radio Collection	
Extent (exhibit)	Four main pages: History, Favorits, Stars, and Characters	
Extent (number of primary source recordings)	20	1
Audio Formats	RealAudio streaming @ 64kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	50	5
Extent (Primary source textual documents)	None.	
Secondary Scholarship	Exhibit narrative.	1
Metadata	None in page source. Catalogue information given with each selection.	
Simple Index for Audio	None	0
Search feature	Yes	5
Navigation Style	Flash homepage.	
Download Time Broadband	RA stream: "Kenny and Scrappy" (1:09): 5 seconds, no interruption	10
Download Time Dial-Up (56.6K)	RA stream: "Kenny and Scrappy" (1:09): >90 seconds	
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	Yes	5
Digitization methods explained	No.	
About the Institution (Contact, Hours)	Yes.	1
User Feedback Capability	Yes, email link.	5
Date Visited	3/15/2005	
Date created/Last update	6/11/2004	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	>30	
Notes	Energetic, friendly, not too complicated. Nice connection to Marr Collection and finding aids.	

Total Points= 65	Music	**Score**
Exhibit Title	Goldband Records	
URL	http://docsouth.unc.edu/sfc/goldband/	
Institution	Southern Folklife Collection and DocSouth, University of North Carolina at Chapel Hill	
Number of Collections Drawn From	1 - Goldband Records	
Extent (exhibit)	History page, Genres page	
Extent (number of primary source recordings)	23 full	1
Audio Formats	MP3 streaming @ 16kbps and RealAudio streaming @ 32kbps	5
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	70	5
Extent (Primary source textual documents)	None.	
Secondary Scholarship	Exhibit narrative (History and Genres pages)	1
Metadata	In source page, "meta" tags: "description" and "keywords." Archive catalogue Information given also with each object accessed.	5
Simple Index for Audio	By artists and recordings.	5
Search feature	No	
Navigation Style	Single Page scrolling.	
Download Time Broadband	MP3/RA stream: "Talon Waltz" (3:11): 5 seconds, no interruption	10
Download Time Dial-Up (56.6K)	MP3/RA stream: "Talon Waltz" (3:11): 10 seconds	10
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	No	
Further resources outside archive	Yes	1
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes.	1
User Feedback Capability	Yes, link to manuscripts inquiry form.	5
Date Visited	3/16/2005	
Date created/Last update	1/29/2001	1
Google Homepage Ranking (Title Search)	3	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	>30	
Notes	MP3 streams were made with RA.	

Total Points= 45	Oral history	**Score**
Exhibit Title	Battle of Britain Recollections	
URL	http://www.iwm.org.uk/upload/package/28/batbritsound/intro.htm	
Institution	Imperial War Museum (UK)	
Number of Collections Drawn From	1 - Imperial War Museum Sound Archive	
Extent (exhibit)	One page	
Extent (number of primary source recordings)	10	1
Audio Formats	RealAudio streaming @ 16kbps	
Audio Time or File Size Listed With Link?	Time: Yes File Size: Yes	5
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	6	1
Extent (Primary source textual documents)	Transcriptions for each recording.	1
Secondary Scholarship	Introduction and blurbs for each recording.	1
Metadata	None in page source.	
Simple Index for Audio	No	
Search feature	No	
Navigation Style	Single Page scrolling.	
Download Time Broadband	RA stream: "Roland Beaumont" (2:58): 5 seconds, no interruption	10
Download Time Dial-Up (56.6K)	RA stream: "Roland Beaumont" (2:58): 80 seconds	5
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes	1
User Feedback Capability	No	
Date Visited	3/16/2005	
Date created/Last update	Not stated on page.	0
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	3	5
MSN Homepage Ranking (Title Search)	>30	
Notes	One page exhibition serves as introduction to collection of Battle of Britain oral histories. Simple in concept, good example of what can be done with very little	

Total Points= 60	Oral history	**Score**
Exhibit Title	Bridgeport Working: Voices from the 20th Century	
URL	http://www.bridgeporthistory.org/	
Institution	Bridgeport Public Library	
Number of Collections Drawn From	1 - Bridgeport Public Library Historical Collection	
Extent (exhibit)	Timeline, based on decades from 1900-1990. Each decade as several separate pages of narrative focusing on individual years, with scrollable timeline on right.	
Extent (number of primary source recordings)	62	2
Audio Formats	RealAudio streaming @ 16kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)		
Extent (Primary source Images)	153	5
Extent (Primary source textual documents)	Transcriptions for each recording.	5
Secondary Scholarship	Exhibit narrative, glossary, company descriptions, and "Introduction to Organized Labor in Bridgeport"	1
Metadata	In source page, "meta" tags: "description" and "keywords." Information given also with each object accessed.	5
Simple Index for Audio	No	
Search feature	No	
Navigation Style	Frames (top and bottom).	
Download Time Broadband	RA stream: "Reverend Wells 1" (4:33): 5 seconds, no interruption	10
Download Time Dial-Up (56.6K)	RA stream: "Reverend Wells 1" (4:33): 12 seconds	5
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	Yes (89 page Word document)	10
Further resources outside archive	Yes: bibliography and website	1
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes	1
User Feedback Capability	No	
Date Visited	3/16/2005	
Date created/Last update	Not stated on page.	0
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Well-conceived and executed, with lots of information intelligently organized. Good use of frames.	

Total Points= 40	Oral history	**Score**
Exhibit Title	Charlotte Voices: Earle Sumner Draper	
URL	http://libweb.uncc.edu/archives/draper/default.htm	
Institution	Special Collections, University of North Carolina at Charlotte	
Number of Collections Drawn From	4 - The Draper taped interview, The Myers Park Homeowners Foundation Collection, The Mary Norton Kratt Papers, Esten B. Mason Collection	
Extent (exhibit)	Timeline, based on decades from 1900-1990. Each decade as several separate pages of narrative focusing on individual years, with scrollable timeline on right.	
Extent (number of primary source recordings)	7 excerpts from 1 recording	1
Audio Formats	RealAudio streaming @ 64kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: Yes	3
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	14	1
Extent (Primary source textual documents)	None	
Secondary Scholarship	Introduction	1
Metadata	None except for titles of pictures and their sizes.	
Simple Index for Audio	No	
Search feature	No	
Navigation Style	Frames (left and right)	
Download Time Broadband	RA stream: "Planting Trees" (1:31): 5 seconds, no interruption	10
Download Time Dial-Up (56.6K)	RA stream: "Planting Trees" (1:31): 13 seconds	5
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	No	
Further resources outside archive	Yes.	1
Help or FAQ on Playback	No	
Digitization methods explained	Yes, limited to nature of materials.	1
About the Institution (Contact, Hours)	Yes, via link to Special Collections homepage.	1
User Feedback Capability	No	
Date Visited	3/16/2005	
Date created/Last update	11/05/99	1
Google Homepage Ranking (Title Search)	>30	
Yahoo Homepage Ranking (Title Search)	>30	
MSN Homepage Ranking (Title Search)	>30	
Notes	Simple frame navigable site that provides a nice portrait of Sumner's work in Charlotte.	

Total Points= 66	Oral history	**Score**
Exhibit Title	New South Voices for K-12 Teachers	
URL	http://newsouthvoices.uncc.edu/schools.php	
Institution	Special Collections, University of North Carolina at Charlotte	
Number of Collections Drawn From	1 - Charlotte Narrative and Conversation Collection	
Extent (exhibit)	1 introductory page	
Extent (number of primary source recordings)	Unknown but growing, goal is 800. Not all interviews are mounted.	2
Audio Formats	16-bit 44.1 kHz WAV and 56kbps/22.05 kHz MP3, downloadable and streaming	5
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	None	
Extent (Primary source textual documents)	Transcripts for all interviews (html and .pdf)	5
Secondary Scholarship	Introduction	
Metadata	None in source page, but descriptive for each entry.	
Simple Index for Audio	No	
Search feature	Yes, through main site	5
Navigation Style	Single scrolling.	
Download Time Broadband	MP3 Quicktime stream: "Interview with Sallie Gaddy,1998-11-12" (10:18): 5 seconds, some initial interruption	10
Download Time Dial-Up (56.6K)	MP3 Quicktime stream: "Interview with Sallie Gaddy,1998-11-12" (10:18): >90 seconds, some initial interruption	
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	Yes	10
Further resources outside archive	Yes, bibliography	1
Help or FAQ on Playback	No	
Digitization methods explained	Yes, a very broad explanation of eachformat is available in a "key."	1
About the Institution (Contact, Hours)	Yes, via link to Special Collections homepage.	1
User Feedback Capability	Yes, via email	5
Date Visited	3/17/2005	
Date created/Last update	3/17/2005	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1 (overall projec)	5
MSN Homepage Ranking (Title Search)	2	5
Notes	A good example of a collection/exhibit hybrid, where the K-12 educators portion of the site is browsable by subject keyed to curriculum.	

Total Points= 86	Music	**Score**
Exhibit Title	The Hoagy Carmichael Collection	
URL	http://www.dlib.indiana.edu/collections/hoagy/	
Institution	Digital Library, Indiana University	
Number of Collections Drawn From	1 - Hoagy Carmichael Collection	
Extent (exhibit)	Introductory pages facilitate access to collection.	
Extent (number of primary source recordings)	14 mounted of 548	1
Audio Formats	RealAudio streaming @ 32kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	1,039	5
Extent (Primary source textual documents)	1,432	5
Secondary Scholarship	Introduction, biography, timeline	1
Metadata	None in source page, but descriptive for each entry.	
Simple Index for Audio	Yes	5
Search feature	Yes, collection and format specific	5
Navigation Style	Single scrolling, gallery style, for intro, browse, search, research pages	
Download Time Broadband	RealAudio stream: "Lazy Bones" (3:02): 5 seconds	10
Download Time Dial-Up (56.6K)	RealAudio stream: "Lazy Bones" (3:02): 13 seconds, interruptions	10
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	No	
Further resources outside archive	Yes, bibliography	1
Help or FAQ on Playback	Yes, "What you need to view this site"	5
Digitization methods explained	Yes, elaborate descriptions including equipment used.	1
About the Institution (Contact, Hours)	Yes, via link to Special Collections homepage.	1
User Feedback Capability	Yes, via email	5
Date Visited	3/17/2005	
Date created/Last update	6/4/2004	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	A good example of a collection focused site with some good ancillary materials.	

Total Points= 54	Oral history	**Score**
Exhibit Title	In Their Own Words	
URL	http://aidshistory.nih.gov/	
Institution	National Institute of Health	
Number of Collections Drawn From	1	
Extent (exhibit)	Annotated timeline and five major thematic categories.	
Extent (number of primary source recordings)	24	1
Audio Formats	RealAudio streaming @ 16kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	75	5
Extent (Primary source textual documents)	20 transcripts, 40 other unpublished documents	5
Secondary Scholarship	9 articles, 93 press releases	5
Metadata	None in source page, but descriptive for each entry and embedded in RA files (along with rights information).	
Simple Index for Audio	No	
Search feature	No	
Navigation Style	Single scrolling, gallery style, for major themes and for documents and images.	
Download Time Broadband	RealAudio stream: "First Encounters/Dr. Christine Grady" (1:10): 5 seconds	10
Download Time Dial-Up (56.6K)	RealAudio stream: "First Encounters/Dr. Christine Grady" (1:10): 13 seconds	10
Links to relevant finding aids/collections	No.	
Educational tools or lesson plans	No.	
Further resources outside archive	Yes, links.	1
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	No	
User Feedback Capability	No	
Date Visited	3/21/2005	
Date created/Last update	6/4/2001	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	24	1
MSN Homepage Ranking (Title Search)	>30	
Notes	Really nice look at the development of AIDS the disease, the culture, the medicine. It's very simple gallery style is contained, makes it easily absorbable.	

Total Points= 55	Oral history	**Score**
Exhibit Title	Helen Creighton	
URL	http://www.gov.ns.ca/nsarm/virtual/creighton/	
Institution	Nova Scotia Archives and Records Management	
Number of Collections Drawn From	1 - The Helen Creighton Collection	
Extent (exhibit)	Introduction page,	
Extent (number of primary source recordings)	4	
Audio Formats	MP3 @ 44.1, 128kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	54	5
Extent (Primary source textual documents)	4	1
Secondary Scholarship	Introduction page	1
Metadata	Dublin Core in source page, full archival description for each item.	10
Simple Index for Audio	No	
Search feature	Yes.	5
Navigation Style	Linear, one image per page with navigation arrows.	
Download Time Broadband	Quicktime stream: "Ghost Story" (:37): 5 seconds, one interruption.	10
Download Time Dial-Up (56.6K)	Quicktime stream: "Ghost Story" (:37): >90 seconds.	
Links to relevant finding aids/collections	Yes.	5
Educational tools or lesson plans	No	
Further resources outside archive	Yes, links.	1
Help or FAQ on Playback	No, except for optional intro animation.	
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes, linked directly to archive homepage with relevant information.	1
User Feedback Capability	No	
Date Visited	3/21/2005	
Date created/Last update	8/18/2003	1
Google Homepage Ranking (Title Search)	2	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Really nice look at the development of AIDS the disease, the culture, the medicine. It's very simple gallery style is contained, makes it easily absorbable.	

Total Points= 32	Oral history	**Score**
Exhibit Title	Raven's Story (Project Jukebox)	
URL	http://uaf-db.uaf.edu/Jukebox/PJWeb/progusers.htm	
Institution	University of Alaska, Fairbanks	
Number of Collections Drawn From	1 - Alaska and Polar Regions Collection	
Extent (exhibit)	Introduction page, personal story page for each person profiled.	
Extent (number of primary source recordings)	21 (with chapters dividing each)	1
Audio Formats	WMA @ 48kbps	
Audio Time or File Size Listed With Link?	Time: Yes File Size: No	3
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	21	1
Extent (Primary source textual documents)	0	
Secondary Scholarship	Introduction page, personal stories	1
Metadata	None in source page, but descriptive for each entry on an "Additional Information" page.	
Simple Index for Audio	No	
Search feature	No	
Navigation Style	Link from image gallery to recordings.	
Download Time Broadband	WMA stream: "Hazel Strassburg" (4:19): 5 seconds.	10
Download Time Dial-Up (56.6K)	WMA stream: "Hazel Strassburg" (4:19): 20 seconds.	5
Links to relevant finding aids/collections	Yes, through Jukebox Homepage	5
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes, on Raven's Story and Project Jukebox homepage	1
User Feedback Capability	No	
Date Visited	3/21/2005	
Date created/Last update	No explicit mention, but since 2003.	0
Google Homepage Ranking (Title Search)	>30	
Yahoo Homepage Ranking (Title Search)	>30	
MSN Homepage Ranking (Title Search)	4	5
Notes	Rich oral history collection with simple, if outdated interface. More digitizaton information and/or options are always good, but streaming quality was high.	

Total Points= 27	Oral history	**Score**
Exhibit Title	Kent State at Baruch College	
URL	http://newman.baruch.cuny.edu/digital/2002/kentstate/	
Institution	Baruch College, CUNY	
Number of Collections Drawn From	1 - Baruch College Archives	
Extent (exhibit)	Introduction page	
Extent (number of primary source recordings)	15	1
Audio Formats	RealAudio links broken	
Audio Time or File Size Listed With Link?	Time: Yes File Size: No	3
Metadata Embedded in Audio File (beyond title)	Cannot be ascertained, so no.	
Extent (Primary source Images)	10	1
Extent (Primary source textual documents)	2	1
Secondary Scholarship	Introduction page	1
Metadata	None in source page, descriptive elsewhere but only to the level of author/title.	
Simple Index for Audio	Yes	5
Search feature	No	
Navigation Style	Single page scrolling, one page for each media type.	
Download Time Broadband	NA - links broken.	
Download Time Dial-Up (56.6K)	NA - links broken.	
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	No	
User Feedback Capability	No	
Date Visited	3/21/2005	
Date created/Last update	Not stated.	0
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Good example of RISK realized. Poor description and broken links do not put a good face on this project, despite its heart being in the right place and having a good	

Total Points= 54	Music	**Score**
Exhibit Title	Lift Every Voice	
URL	http://www.lib.virginia.edu/small/exhibits/music/index.html	
Institution	University of Virginia	
Number of Collections Drawn From	From within and outside archive.	
Extent (exhibit)	Introduction page and narrative for each category	
Extent (number of primary source recordings)	18	1
Audio Formats	MP3 @ 80kbps mono	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	43	3
Extent (Primary source textual documents)	Interspersed with images.	3
Secondary Scholarship	Narrative	1
Metadata	None in source page, descriptive elsewhere.	
Simple Index for Audio	Yes	5
Search feature	No	
Navigation Style	Single page scrolling by category.	
Download Time Broadband	MP3 Quicktime "Lift Every Voice" (:59), 5 seconds.	10
Download Time Dial-Up (56.6K)	MP3 Quicktime "Lift Every Voice" (:59), 7 seconds.	10
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	Through link to UVA site.	
User Feedback Capability	Yes, form.	5
Date Visited	3/21/2005	
Date created/Last update	11/29/2004	1
Google Homepage Ranking (Title Search)	2	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	6	5
Notes	Sound quality poor, distorting.	

Total Points= 38	Music	**Score**
Exhibit Title	McGuinn's Folkden	
URL	http://www.ibiblio.org/jimmy/folkden/php/search/	
Institution	Privately held by Roger McGuinn	
Number of Collections Drawn From	1	
Extent (exhibit)	Introduction and thorough background for each folksong.	
Extent (number of primary source recordings)	113, with a new song added each month.	2
Audio Formats	MP3 @ 128kbps stereo	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	None	
Extent (Primary source textual documents)	None	
Secondary Scholarship	Narrative on folksongs	5
Metadata	None.	
Simple Index for Audio	Yes, by Date, Title, and Category	5
Search feature	Yes	5
Navigation Style	Single page scrolling by category and song.	
Download Time Broadband	MP3 Quicktime "Follow the Drinking Gourd" (2:46), 30 seconds, initial interruption.	
Download Time Dial-Up (56.6K)	MP3 Quicktime "Follow the Drinking Gourd" (2:46), >90 seconds.	
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	No	
Digitization methods explained	No.	
About the Institution (Contact, Hours)	No.	
User Feedback Capability	Yes, form.	5
Date Visited	3/22/2005	
Date created/Last update	3/1/2005	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Traditional folk music performed by a walking encylopedia of folk music.	

Total Points= 81	Oral history, virtual version of walk-in exhibit	**Score**
Exhibit Title	Witness and Response	
URL	http://www.loc.gov/exhibits/911/911-home.html	
Institution	Library of Congress	
Number of Collections Drawn From	Virtual collection from sections of LOC.	
Extent (exhibit)	Introduction for each LOC section from which materials are drawn.	
Extent (number of primary source recordings)	7	1
Audio Formats	RealAudio @ 16kbps	
Audio Time or File Size Listed With Link?	Time: Yes File Size: No	3
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	300+, not (but majority, probably) all accessible.	5
Extent (Primary source textual documents)	None	
Secondary Scholarship	Introductory narratives.	5
Metadata	In source page, "meta" tags: "description" and "keywords." Information given also with each object accessed.	5
Simple Index for Audio	No	
Search feature	Yes, through LOC search.	5
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Interview with Reanna Stout" (3:24), 5 seconds	10
Download Time Dial-Up (56.6K)	RealAudio streaming "Interview with Reanna Stout" (3:24), 10 seconds	10
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	No	
Further resources outside archive	Yes	1
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	No	
User Feedback Capability	Yes, form for feedback and to share stories.	5
Date Visited	3/22/2005	
Date created/Last update	5/14/2004	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Simple, thorough, demonstrates the many facets of the LOC.	

Total Points= 50	Music, virtual version of walk-in exhibit	**Score**
Exhibit Title	Virginia Roots Music	
URL	http://www.lva.lib.va.us/whoweare/exhibits/rootsmusic/index.htm	
Institution	Library of Virginia	
Number of Collections Drawn From	Unknown	
Extent (exhibit)	Introductory and 12 category narratives.	
Extent (number of primary source recordings)	7	1
Audio Formats	MP3 @ 96kbps stereo	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	11	1
Extent (Primary source textual documents)	None	
Secondary Scholarship	Narratives	1
Metadata	None in source page, descriptive for each item.	
Simple Index for Audio	Yes	5
Search feature	No	
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Train on the Island" (:46), 5 seconds	10
Download Time Dial-Up (56.6K)	RealAudio streaming "Train on the Island" (:46), >90 seconds	
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	Yes	10
Further resources outside archive	Bibliography	1
Help or FAQ on Playback	Yes	5
Digitization methods explained	No	
About the Institution (Contact, Hours)	No	
User Feedback Capability	No	
Date Visited	3/22/2005	
Date created/Last update	10/62004	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes		

Total Points= 80	Oral history	**Score**
Exhibit Title	Tejano Voices	
URL	http://libraries.uta.edu/tejanovoices/	
Institution	University of Texas at Arlington Center for Mexican American Studies	
Number of Collections Drawn From	1	
Extent (exhibit)	Introduction and interview summaries	
Extent (number of primary source recordings)	79	2
Audio Formats	Quicktime streaming	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	79+ (3-4 per interview)	5
Extent (Primary source textual documents)	Accompanying transcripts.	5
Secondary Scholarship	Summaries	5
Metadata	Meta tags in source page for name, description, keywords, language, author, copyright, rights, ratings, publisher	5
Simple Index for Audio	Yes	5
Search feature	No	
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Bidal Aguero" (time unknown), 5 seconds	10
Download Time Dial-Up (56.6K)	RealAudio streaming "Bidal Aguero" (time unknown), 10 seconds	10
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	No	
Further resources outside archive	Yes	1
Help or FAQ on Playback	Yes	5
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes	1
User Feedback Capability	Yes, email	5
Date Visited	3/23/2005	
Date created/Last update	0/0/2002	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Quicktime details not transparent.	

Total Points= 45	Oral history, based on book	**Score**
Exhibit Title	The Cuban Missile Crisis, 1962	
URL	http://www.gwu.edu/~nsarchiv/nsa/cuba_mis_cri/index.htm	
Institution	The George Washington University	
Number of Collections Drawn From	1 - National Security Archive	
Extent (exhibit)	Introduction and interview summaries	
Extent (number of primary source recordings)	8	1
Audio Formats	RealAudio @ 64kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	46	3
Extent (Primary source textual documents)	41 declassified documents	3
Secondary Scholarship	Summaries of each object	3
Metadata	Meta tags author, description, keywords in source page.	5
Simple Index for Audio	Yes	5
Search feature	No	
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Tuesday, October 16, 11:50 am" (5:51), 15 seconds	
Download Time Dial-Up (56.6K)	RealAudio streaming "Tuesday, October 16, 11:50 am" (5:51), >90 seconds	
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	No	
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	No	
User Feedback Capability	No	
Date Visited	3/23/2005	
Date created/Last update	Unknown, probably 2002.	0
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Simple, informative, rich. Better archival detail would be nice.	

Total Points= 50	Oral history, based on book	**Score**
Exhibit Title	Like a Family	
URL	http://www.ibiblio.org/sohp/laf/index.html	
Institution	Southern Oral History Program, UNC Chapel Hill	
Number of Collections Drawn From	1 - Southern Historical Collection	
Extent (exhibit)	Overview and three main categories: Life on the land; Mill, village, and factory; and Work and protest	
Extent (number of primary source recordings)	70	2
Audio Formats	MP3 streaming and RealAudio streaming @ 20kbps	5
Audio Time or File Size Listed With Link?	Time: Yes File Size: No	3
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	13	1
Extent (Primary source textual documents)	None	
Secondary Scholarship	Summaries of each object	1
Metadata	None in source page, descriptive for each object.	
Simple Index for Audio	Yes, by category	5
Search feature	No	
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Eunice Austin -1" (1:11), 15 seconds	5
Download Time Dial-Up (56.6K)	RealAudio streaming "Eunice Austin -1" (1:11), 8 seconds	10
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	Yes	10
Further resources outside archive	Yes	1
Help or FAQ on Playback	Yes	5
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes	1
User Feedback Capability	No	
Date Visited	3/23/2005	
Date created/Last update	Unknown	1
Google Homepage Ranking (Title Search)	>30	
Yahoo Homepage Ranking (Title Search)	>30	
MSN Homepage Ranking (Title Search)	>30	
Notes	Very nice, straightforward, good resource, but transparency on site construction and digitization could be improved.	

Total Points= 43	Oral history, based on book	**Score**
Exhibit Title	Women Who Dared	
URL	http://www.jwa.org/exhibits/wwd/index.html	
Institution	Jewish Women's Archive	
Number of Collections Drawn From	1	
Extent (exhibit)	Intro and 3 main categories consisting of questions, the answers to which are in audio form.	
Extent (number of primary source recordings)	31	1
Audio Formats	RealAudio streaming @ 16kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	No	
Extent (Primary source Images)	115	5
Extent (Primary source textual documents)	27	3
Secondary Scholarship	Intro only, documents tell story	1
Metadata	None in source page, descriptive for each object.	
Simple Index for Audio	Yes	5
Search feature	No	
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Ruth Abrams - Activist" (:39), 5 seconds	10
Download Time Dial-Up (56.6K)	RealAudio streaming "Ruth Abrams - Activist" (:39), 50 seconds, interruptions	5
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	Yes	1
Help or FAQ on Playback	No	
Digitization methods explained	No	
About the Institution (Contact, Hours)	Yes	1
User Feedback Capability	No	
Date Visited	3/23/2005	
Date created/Last update	Updated 2005	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	>30	
Notes	Nice site, thin on "about" information.	

Total Points= 93	Oral history and Music	**Score**
Exhibit Title	Voices from the Days of Slavery	
URL	http://memory.loc.gov/ammem/collections/voices/	
Institution	Library of Congress	
Number of Collections Drawn From	Various within American Folklife Center	
Extent (exhibit)	Intro and overview, and summary essays with each entry.	
Extent (number of primary source recordings)	69	2
Audio Formats	RealAudio streaming @ 64kbps, MP3 downloadable, WAV	10
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	23	1
Extent (Primary source textual documents)	Transcripts for each interview	5
Secondary Scholarship	Two essays.	1
Metadata	Meta tags for keyword and description in source page, plus full description for each object.	5
Simple Index for Audio	Yes	5
Search feature	Yes	5
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Irene Williams Pt. 1" (4:07), 10 seconds	5
Download Time Dial-Up (56.6K)	RealAudio streaming "Irene Williams Pt. 1" (4:07), 25 seconds, interruptions	5
Links to relevant finding aids/collections	Yes	5
Educational tools or lesson plans	Yes	10
Further resources outside archive	Yes	1
Help or FAQ on Playback	Yes	5
Digitization methods explained	Yes	1
About the Institution (Contact, Hours)	Of LOC only. Collection is virtual.	1
User Feedback Capability	No	
Date Visited	3/23/2005	
Date created/Last update	February 11, 2005 (accessed through "legal" page)	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Probably the best conceived site overall.	

Total Points= 64	Music, from walk-in exhibition	**Score**
Exhibit Title	Oscar Peterson: A Jazz Sensation	
URL	http://www.collectionscanada.ca/oscarpeterson/index-e.html	
Institution	Library and Archives of Canada	
Number of Collections Drawn From	1	
Extent (exhibit)	Intro and summaries with each of 2 main categories.	
Extent (number of primary source recordings)	27	1
Audio Formats	RealAudio streaming @ 80kbps	
Audio Time or File Size Listed With Link?	Time: Yes File Size: No	3
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	42	3
Extent (Primary source textual documents)	0	
Secondary Scholarship	Some narrative.	1
Metadata	Dublin Core in source page. Each object described by title.	10
Simple Index for Audio	Yes	5
Search feature	No	
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Hungarian Dance" (3:01), 10 seconds	5
Download Time Dial-Up (56.6K)	RealAudio streaming "Hungarian Dance" (3:01), 30 seconds, interruptions	5
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	No	
Further resources outside archive	Yes	1
Help or FAQ on Playback	Yes	5
Digitization methods explained	No	
About the Institution (Contact, Hours)	Only for larger Library and Archives of Canada site.	1
User Feedback Capability	No	
Date Visited	3/23/2005	
Date created/Last update	7/10/2001	1
Google Homepage Ranking (Title Search)	5	5
Yahoo Homepage Ranking (Title Search)	10	5
MSN Homepage Ranking (Title Search)	16	3
Notes	Nice intro gallery to physical exhibition.	

Total Points= 86	Oral history	**Score**
Exhibit Title	Studs Terkel: Conversations with America	
URL	http://www.studsterkel.org/index.html	
Institution	Chicago Historical Society	
Number of Collections Drawn From	1 - The Studs Terkel Collection	
Extent (exhibit)	Introduction and seven thematic galleries.	
Extent (number of primary source recordings)	585	2
Audio Formats	RealAudio streaming @ 16kbps	
Audio Time or File Size Listed With Link?	Time: No File Size: No	
Metadata Embedded in Audio File (beyond title)	Yes	10
Extent (Primary source Images)	1	1
Extent (Primary source textual documents)	10	1
Secondary Scholarship	Narrative, including by Terkel.	5
Metadata	Dublin Core in source page. Each object described by title and date, summary, and interview.	10
Simple Index for Audio	Yes, by category.	5
Search feature	Yes	5
Navigation Style	Single page scrolling by category.	
Download Time Broadband	RealAudio streaming "Greatest Hits Rec. 1: terkel-a0a1j2-b" (1:58), 5 seconds	10
Download Time Dial-Up (56.6K)	RealAudio streaming "Greatest Hits Rec. 1: terkel-a0a1j2-b" (1:58), 55 seconds, interruptions.	5
Links to relevant finding aids/collections	No	
Educational tools or lesson plans	Yes	10
Further resources outside archive	Yes	1
Help or FAQ on Playback	Yes	5
Digitization methods explained	No	
About the Institution (Contact, Hours)	No	
User Feedback Capability	No	
Date Visited	3/23/2005	
Date created/Last update	0/0/2002	1
Google Homepage Ranking (Title Search)	1	5
Yahoo Homepage Ranking (Title Search)	1	5
MSN Homepage Ranking (Title Search)	1	5
Notes	Excellent (note 16kbps functionality).	