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Teachers' Tales Go Online: Digitizing Oral Histories on Cassettes

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ABSTRACT

For a time beginning in the 1970s, cassette tapes were very popular for recording oral histories. Today, these cassettes have exceeded their expected lifespan. Photographs, newspapers, and yearbooks fill many online repositories, but libraries and archives may find themselves wondering how to digitize an audio collection. This article presents a case study of one librarian's effort to run a pilot digitization project for twenty-one oral history cassettes.

KEY WORDS

Digitization of archival materials, Digital preservation, Metadata, Online collections, Oral history, Sound recordings

Lamson Library serves the students and faculty of Plymouth State University, a regional institution in Plymouth, New Hampshire that originated in the late nineteenth century as Plymouth Normal School. Seven librarians share responsibility for the reference desk, information fluency instruction, and collection development. Each also has a special area of expertise. My role as digital projects librarian includes responsibility for maintaining digital collections of unique resources contributed by campus entities such as the Spinelli Archives, the Museum of the White Mountains, and others.

Like many institutions, the library often finds itself challenged to restructure its physical space to meet ever-changing expectations and demands. Physical restructuring of space sometimes results in the discovery of buried treasure. In 2016, one such restructuring of the technical services department unearthed a dusty box of bulky file folders containing oral histories recorded and transcribed between 1978 and 1980. These typed transcripts and cassette recordings documented personal experiences of the development of K–12 education in New Hampshire. One folder contained documentation of the project's funding and goals.

The box presented an opportunity for original cataloging work. This collection of twenty-one items was also a reasonable size for an audio digitization pilot, one I could complete in-house without incurring the usual costs associated with hiring student workers or outside vendors. The library could use the resulting documentation to digitize other audio collections on campus.

Identifying the Scope of the Project

The scope of the digitization project initially depended on the first question encountered: should it be limited to the typed transcripts, or should the audio cassettes be digitized as well? Nancy MacKay acknowledges that in the late twentieth century, universities normally considered the typed transcript the item of record: "Print was the unquestioned medium for scholarship, and there was no reason for oral historians not to follow this model."[1] In fact, according to Joel Lieber in his 1966 article "Tape Recorder as Historian," "One of Columbia [University]'s rules of thumb is that, except for a few fragments, tapes are erased and reused."[2] Part of the reasoning was that the written transcript could be reviewed and corrected, and scholars would prefer to have the written document as a resource.[3] This methodology was not without critics. At the first national colloquium on oral history in September 1966, Louis Shores urged his colleagues to "protect the master of the original tape . . . for the possibility that some new truth may be discovered from the oral original not revealed by the transcript."[4] Robert E. Warren et al. also discuss the importance of retaining the

audio, noting that there is no other way to find out exactly how words were spoken in an interview.[5]

Not all institutions threw out tapes, but the typed transcript continued its prominence as a research tool throughout the 1970s. The American Library Association's 1977 publication *Oral History: From Tape to Type* focuses an entire chapter on creating, editing, and proofreading the transcript. Information about caring for the tape is limited to a very brief, 200-word section on "Protecting Tapes and Equipment," reinforcing preference for print.[6]

Time has turned this philosophy on its head. MacKay notes the pros and cons of the effort of transcription and offers alternatives to full transcription, such as writing a summary of the interview or indexing the digital file.[7] Frisch and Lambert acknowledge that transcriptions "remain very important and useful as a practical means for accessing the audio or video stream efficiently," but also point out that "digital recordings can now be mapped and organized and accessed as easily as text through indexing and cross-referencing . . . for oral history these tools bring within reach that content and meanings in interviews not easily captured in transcription."[8] Transcriptions are no longer the sole means of access to an oral history's content.

Theoretical reasoning for preferring audio over transcripts aside, obsolescence is a very real threat. In *Magnetic Tape Storage and Handling: A Guide for Libraries and Archives*, the Commission on Preservation and Access and National Media Laboratory survey of manufacturers' data sheets and other technical literature leads to the conclusion that "thirty years appears to be the upper limit for magnetic tape products, including video and audio tapes."[9] A 2004 International Association of Sound and Audiovisual Archives (IASA) task force report notes, "Around 1990 it became clear that the only viable method of preserving audio contents in the long term is by transfer into the digital domain, and subsequent migration to new formats whenever the need arises."[10] The time to digitize was upon us.

With these considerations in mind, I used a combined approach, digitizing both the audio and the transcripts.

Legal and Ethical Considerations

No digitization project would be complete without some consideration of copyright. At a minimum, United States libraries and archives retain the right to make copies of materials stored on deteriorating media; these rights are provided in Section 108(c) of US copyright law:

> The right of reproduction under this section applies to three copies or phono-records of a published work duplicated solely for the purpose of replacement

of a copy or phonorecord that is damaged, deteriorating, lost, or stolen, or if the existing format in which the work is stored has become obsolete, if—

(1) the library or archives has, after a reasonable effort, determined that an unused replacement cannot be obtained at a fair price; and

(2) any such copy or phonorecord that is reproduced in digital format is not made available to the public in that format outside the premises of the library or archives in lawful possession of such copy.[11]

While cassette tapes are not necessarily obsolete, the uniqueness of these recordings and the potential for deterioration are not in doubt.[12]

Considering Section 108(c)(2), distributing recordings online requires permission. These concerns did not originate with the World Wide Web. In the 1977 publication *Oral History: From Tape to Type*, the authors encourage oral historians to obtain a legal release as soon as possible: "Without a signed release, it is not safe to make the fruits of one's interviewing labor available to researchers, because one does not have the legal right to share another person's recollections."[13] Fortunately, the Oral History of New Hampshire Schools Project used license agreements granting "all my rights of every kind whatever pertaining to this information, whether or not such rights are known, recognized or contemplated, to Plymouth State College."[14]

The question of ethics should also be considered when sharing oral histories online. In their respective publications, Elise Chenier and Nancy MacKay both explore the ethical issues behind making sensitive personal interviews so easily accessible.[15] For example, participants in oral history projects designed to capture the lesbian experience might not be comfortable with sharing their stories online.[16] Interviews with victims of abuse should be carefully presented to ensure the narrators' safety and privacy.[17] In our case, the risks were minimal due to the subject matter and the time periods in question.

The Digitization Process

After considering scope, legalities, and ethics, it is time to plan conversion of the objects to a digital format. This generally involves determining standards to be used for digitizing the physical resource and for describing the resulting digital resource. After determining the standards for a project, I will generally digitize one or two test documents, then reassess the chosen standards to ensure all the appropriate information was captured.

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Master and Access Files

When digitizing analog materials, it is important to consider both the need to preserve the digitized data and the need to create a file the general public can access. Usually, this necessitates saving the data in two different formats: a preservation format, referred to here as a master file, and an access file.

Transcriptions: Master and Patron Access Files

Following the recommendations of the era, each physical oral history file contained two copies of the transcript: one original typewritten copy and one carbon copy.[18] I scanned the original typewritten pages. It was a simple task to use the library's multifunction Xerox machine to scan the pages directly to Portable Document Format (PDF), in black and white at 600 dots per inch (DPI), higher than the minimum digitization capture recommendations of the Association for Library Collections and Technical Services.[19] In fact, the most laborious element was removing the thirty-five-year-old staples before placing the pages in the document feeder; they often broke during removal.

In the absence of a superior optical character recognition (OCR) program, I used the Adobe Acrobat XI Pro OCR recognition tool to create searchable PDFs. While not perfect, the results of the OCR were largely accurate, no doubt due in part to the standard typewriter font. I saved the files as PDF/A, one of the few formats appropriate for both preservation and access.[20]

Audio: Master File

I used a Marantz Professional PMD661 MKII digital audio recorder, borrowed from the university's Classroom Technology Services Department, to digitize the cassettes. The recorder plugs into the microphone jack of any standard cassette player, and it includes settings for recording uncompressed audio files to various standards. The university archives owns a working portable cassette player. The Athens-Clarke County (Georgia) Public Library cited a less expensive option: it reported that a $35 ION cassette player with Universal Serial Bus (USB) cable performed well for digitizing audio cassette recordings.[21]

I saved the preservation master audio file in an uncompressed Broadcast Wave Pulse-Code Modulation (PCM) format (.wav), recorded at a high resolution and sample rate: 24 bit/96 kilohertz (kHz).[22] This standard produces a file approximately 16.5 megabytes in size for every minute of single-track audio.[23] Admittedly, this standard results in file sizes not normally encountered by a librarian or archivist unaccustomed to working with audio: one side of a cassette resulted in a file size of approximately 742.5 megabytes. In comparison,

a transcript PDF was one or two megabytes. Such unexpectedly large file sizes caused problems for both Mary Durio and Mark Grabowski as well as Krystyna Matusiak et al., who devised their own individualized solutions to manage them.[24] Fortunately, the small size of the pilot allowed us to work with these large files without exceeding existing storage space.

Derek Jay Jackson notes many small digitization projects do not meet the 24 bit/96 kHz standard: "The narrow frequency range of the human voice and/or the limits of equipment are often cited when justifying the use of lower tolerances in quality."[25] Jackson argues for recording at 48 kHz, but all of the eight standards he cites recommend 24 bit/96 kHz.[26]

Following recommendations provided by *Sound Directions: Best Practices for Audio Preservation*, I recorded and preserved the master preservation file with little manipulation, only removing dead air from the beginning and end of each recording.[27] Each side of each cassette is an individual file named with that item's identifier. In cases when one oral history recording used more than one side, I added a suffix of a, b, or c to the filename.

Audio: Patron Access File

The open source program Audacity is often cited as an audio editing solution, but I opted to use Adobe Audition CC audio editing software, which is included in the university's Adobe site license.[28] Without access to further specialized equipment, I completed audio editing on my laptop. There were two major tasks to complete for each patron access file: combining multiple files (if the recording exceeded one side of the cassette) and removing background static noise. I discovered that removing static is a tricky business: where one sound was removed, another might appear in its place. After watching the tutorial *Get Rid of Unwanted Sounds that Are Mixed into Your Main Audio* and experimenting with a few files, it was clear that a light touch works best. Instead of trying to remove individual background sounds, the Adaptive Noise Reduction feature could identify and remove the static present throughout the recording. The software allows the user to hear the result before applying the changes, saving a lot of time, as applying or undoing the feature takes a few minutes to complete.[29] Afterward, I saved the files in Moving Picture Experts Group Audio Layer III (.mp3) format.[30]

It became apparent that some recordings were made on used cassettes. Sometimes an oral history would conclude, but seconds later, sounds from another recording would emerge. Because these additional recordings were unidentified and largely out of the project's scope, they were removed. It was interesting to note the increased amount of background static on the re-used cassettes.

Metadata

Lamson Library's existing digital objects are described using elements from the Dublin Core Qualified Metadata Element Set.[31] Each of the library's digital collections uses a locally designated subset of elements, depending upon the needs of the collection.

Elinor Mazé observes there is not yet a uniform method of describing oral histories.[32] I consulted other digitized oral history collections and found the Southern Oral History Program collection at the University of North Carolina (UNC) at Chapel Hill to be a good example of how metadata are presented to the end user. For example, the meaning of the "Interviewer" and "Interviewee" labels in the user interface are clearer to end-users than the Dublin Core elements "creator" and "contributor," respectively. The University of Washington's online Special Collections Oral Histories Data Dictionary[33] was particularly helpful in ensuring all information necessary to our project was included in the metadata. Fortunately, after analyzing these examples, it was apparent that the set of elements already employed in the Plymouth State Historical Images collection also applied to the oral history collection. To further meet the needs of the oral histories, I added two elements to the collection: coverage.temporal to specify the date range covered in the interview and relation.IsFormatOf to describe the original storage medium.

Descriptive Metadata

The original transcriber's attention to detail was a valuable resource for writing descriptive metadata for each interview. A cover page summarizing what was discussed, the time period covered, the type of education, the geographic area, and other relevant details accompanied each transcript. Using the library's local Dublin Core guidelines, this information was loaded into an Excel spreadsheet template designed for use with the library's content management system (CMS).

The transcript cover pages also provided uncontrolled subject keywords. Initially, I thought controlled subject terms could be derived from these keywords, but it became apparent that some of the keywords referred to topics mentioned in passing and did not represent the overall subject matter.

To avoid spending too much time creating subject terms, I decided to keep these succinct. Searches in other repositories and the Digital Public Library of America indicated that three subject keywords should be employed for all of the items: "educating," "interviews," and "schools." I added one or two more terms to describe the type of education, such as "media center," "elementary education," "one-room schools," "art education," and "home economics." Combined

with the time period (described in the element coverage.temporal), researchers should be able to find appropriate results whenever full-text searching is not available.

In addition to the metadata created for discoverability in the CMS, I also used Adobe Audition to embed the descriptive information directly into the audio files, ensuring metadata stay with the file even after it is downloaded.

I filled out the available Dublin Core fields as shown in Figure 1, leaving two elements blank. I was not sure which organization to identify as the publisher—would it be the library, the university, or the Oral History of New Hampshire Schools Project? Indecision resulted in the decision to leave the publisher unidentified. The source element could have referenced the physical cassette, but without the recommended "string or number conforming to a formal identification system," I decided to leave this element blank as well.[34]

Preservation Metadata

The library's CMS creates some preservation metadata upon item ingest, but I also wanted to embed preservation metadata directly into the Broadcast Wave Format (BWF) header of the audio files to " . . . identify the object when it is dissociated from its external metadata."[35]

BWF metadata are brief but provide "seamless exchange of audio material between different broadcast environments and equipment based on different

Figure 1. Embedded Dublin Core elements and their usage

Contributor (interviewee)	Name in natural order (commas were apparently interpreted as two entities; entering in natural order avoided this problem)
Coverage (time period covered)	Example: 1960–1979
Author (interviewer)	Name in natural order
Date (date of interview)	Example: 6/3/1979
Description	Brevity is required. Example: oral history (Plymouth State University)
Format	audio/x-wav [filled in automatically]
Identifier	Example: SA2017044953
Publisher	[Leave blank]
Copyright Notice	[Standard notice]
Source	[Leave blank]
Keywords	[Optional]
Title	Example: Oral history interview with Mrs. Turner
Type	sound

computer platforms."[36] Indiana University explains the intent behind each field and summarizes its use, including examples.[37] Using this information, I created a local guide to BWF metadata as shown in Figure 2.

The Content Management System (CMS)

Dean Rehberger put it simply in his guide to choosing a CMS: "A Content Management System (CMS) is a way to manage online content (text, transcripts, images, audio, and video) and display it on the web."[38] Plymouth State University already subscribes to a hosted version of CONTENTdm, an OCLC product primarily used to present digital images online. The responsive user interface launched in fall 2017 presents streaming audio with the PDF of the typed transcript.

CONTENTdm also provides the option of including the transcript's text in the metadata for the audio file. For complete ease of access, I included the PDF of the transcript and also entered the transcript text into the descriptive metadata.

Digital Preservation

Anthony Cocciolo defines digital preservation as "the activities and planning that help ensure that digital information of enduring value remains accessible and intellectually faithful to its original form over time."[39] It is important to note that making files available to the public online does not usually mean they are digitally preserved.

Like many other institutions, Lamson Library does not claim to have a completely foolproof digital preservation program. However, I believe our

Figure 2. Local guide to BWF metadata

Description	oral history (Plymouth State University)
Originator	Lastname of interviewer, Firstname
Originator Reference	not used by case studies at Harvard or Indiana; leave blank
Origination Date	date file was digitized (change colons to hyphens to validate)
Origination Time	(filled in with default info)
Time Reference	change to 0; if file is side 2 or part 2, enter a 1
UMID	not used by case studies at Harvard or Indiana; leave blank
Coding History	A=PCM,F=96000,W=24,M=mono,T=Marantz; PMD661; MKII

program fulfills Level 1 (Protect Your Data), and possibly Level 2 (Know Your Data), of the Levels of Digital Preservation rubric created by the National Digital Stewardship Alliance.[40]

Much of the compliance with this rubric is due to the library's subscription to OCLC'S Digital Archive service. The library is Level 2 compliant with four of the five categories of the rubric (Storage and Geographic Location; File Fixity and Data Integrity; Information Security; File Formats). The library meets these levels because the Digital Archive service manages these aspects of the library's preservation files. The only category not managed by the service is Metadata. It is probable, because the library subscribes to a hosted version of CONTENTdm, that the library is at least Level 1 compliant for metadata (there are an inventory and periodic backups), but this has yet to be verified with OCLC.

There are a variety of other digital preservation tools to manage multiple copies of files in different locations.[41] OCLC's Digital Archive service is convenient, but expensive compared to other products more recently introduced to the market. Matusiak et al. describe their experience evaluating services for storing preservation masters, and it is likely the library will explore alternatives to digital preservation solutions in the near future.[42]

Challenges

Unsurprisingly, the most challenging aspects of the project were those areas where I had the least amount of experience. Scanning and describing the typed transcripts was relatively simple, as local standards and practices were already in place for printed objects. The primary challenge lay in digitizing the cassette tapes. One inconvenience was the need to play the cassette in real time. Often I would set up the cassette player and the digital recorder to run while I was busy with other duties. As a result, the digital recorder would often run longer than the cassette, requiring the removal of dead air at the end of each file.

The lack of professional hardware was also an issue. The dial for the digital recorder's decibel settings did not encourage specificity. A lighted scale indicated if the decibel level fell within acceptable parameters, and while I watched the first few minutes of each recording to ensure it was not too quiet or too loud, it was difficult to ensure consistency from one tape to the next.

I encountered another hardware issue while editing the audio; I used a consumer-level laptop and earbuds in the absence of more professional equipment. While the resulting patron access files are acceptable, a professional digitization studio would have produced higher quality sound. The large file sizes also proved to be a challenge, quickly filling the laptop's storage. This necessitated temporarily moving the preservation files to a local server until I deposited them in the Digital Archive.

A minor physical problem occurred when one of the cassettes jammed, or was "eaten" by the cassette player. The university archivist sent this tape to a professional recording studio for digitization, for fear that further jams would render the tape forever inaccessible.

I also encountered resource challenges. Digital indexing tools to make audio recordings searchable are available. Tools such as the Oral History Metadata Synchronizer (OHMS) link words in the transcript to the moment they are spoken in the audio file.[43] Such tools greatly enhance the ability to find specific topics within a lengthy interview, but with other responsibilities piling up, I was unable to explore them.

Available time also limited the list of subject terms. Teachers from the early twentieth century addressed social topics such as how religion or marital status affected the ability to find and keep a position; school violence and administrative issues became topics for discussion in the latter half of the century. The original transcriptionist did not include these concepts in the list of keywords, and I did not have time to define a list of subject terms to represent these issues. Therefore, researchers may have to do a little more digging to find items in the collection that discuss concepts such as "marital status."

Conclusion

The Oral History of New Hampshire Schools project found new life nearly forty years later as a pilot project to digitize an audio collection. Remembrances by teachers of rural one-room schools, schools of the Great Depression era, and new-at-the-time disciplines such as art education and special education are digitally preserved and more accessible to researchers.

When I encountered the box of files, much of the transcription and description was already complete. Even so, the amount of time needed for digitization convinced me that such a project is not easily scalable in-house. The fact that each tape must be played in its entirety to digitize it creates complexity when working with student employees, who would need another task to work on during digitization and who would also need to be available when playback is completed. While a student could enter most of the descriptive metadata, a librarian or archivist would likely need to survey the project and determine subject terms. In hindsight, I should have tracked my time on the project; this would have provided better data for determining resources needed for future audio digitization projects.

All this is not to say that the project was without its immediate benefits. The university's Museum of the White Mountains quickly adopted the documentation to process and describe fifty-five of its own born-digital oral history files. These are also now available online, albeit without transcriptions. Accepting the limitations of the resources at hand, the documentation and experience

from this pilot project should enable our institution to continue to share oral histories with the world.

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