

Digital representations of disability history: Developing a virtual exhibition at the Ward M. Canaday Center, University of Toledo

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DIGITAL REPRESENTATION OF DISABILITY HISTORY: DEVELOPING A VIRTUAL EXHIBITION

BY ARJUN SABHARWAL

ABSTRACT: Virtual exhibition can play an important role in archival practice due to the growing volume of digital content in repositories, the growing number and diversity of remote users, and increased sophistication of technologies focusing on Web accessibility. The expanding digital environment affords archives with opportunities to leverage technology to their advantage by integrating archival description and outreach practices. Through virtual exhibitions following guidelines of the World Wide Web Consortium's Web Accessibility Initiative (W3C-WAI), archives can reach out to users with disabilities who can use assistive equipment for research purposes. With a focus on a disability history virtual exhibition at the University of Toledo's Ward M. Canaday Center for Special Collections, this article presents a conceptual framework for developing virtual exhibits comprised of three dimensions: thematic, structural, and semantic. The study presents an experimental methodology involving historical representation, information architecture, and Web accessibility. An overarching theme—the supernarrative—serves as a unifying component, holding the content and narrative together. The relationship between historical representation and the supernarrative manifests itself differently through these dimensions, but supports the position that with the help of planning, sound information architecture, and accurate descriptions, virtual exhibits can be equally effective in presenting history to users of all abilities. Virtual exhibitions should involve archivists, historians, and technologists in collaboration to achieve the best results. The article also presents elements of the W3C-WAI guidelines as relevant to the unique needs of this project.

Introduction

Virtual exhibitions play an important role in archival outreach as archivists seek more effective and innovative ways to reach patrons in the digital environment. Two critical trends have contributed to their elevated status: the proliferation of digital content and the growing emphasis on Web accessibility. The demand and support for digitized content have paved the way for local, regional, national, and global collaboration on developing digital collections, metadata schemas, and preservation standards to share

content and metadata across digital repositories. Virtual exhibitions represent one of the outcomes of these trends, enabling patrons to interact with thematically arranged digital content with descriptions similar to those seen in museums.

The increasing diversity of digital collections coincides with—if not directly results from—the increasing diversity of users, more of whom need assistive equipment to access library and archival resources on-line due to some disability. Accessibility does not exclusively apply to users with disabilities affecting mobility, vision, hearing, and cognitive conditions. Users with temporary disabilities, senior citizens, and others with bandwidth-, network-, or equipment-related technology issues are also likely to benefit from the research and implementations to improve access to information.¹ Web accessibility recommendations by the World Wide Web Consortium provide guidance to archivists and technologists developing virtual exhibitions and other digital resources that users with disabilities can access. From the vantage point of archivists, Web accessibility will be vital to archival outreach focused on patrons with disabilities. This increased need for Web access by a growing group of users with permanent or temporary disabilities, and the existence of guidelines for Web access for such users, presents archives with opportunities to experiment with various approaches to designing content-rich virtual exhibits that are accessible to patrons with disabilities.

This article focuses on the disability history virtual exhibit (DVX)², a collaborative project between Digital Initiatives and the Ward M. Canaday Center for Special Collections at the University of Toledo. Following the literature review, project history, and a description of the conceptual framework, the discussions will concentrate on the individual dimensions—thematic, structural, and semantic—comprising the conceptual framework. One of the aims of this article is to demonstrate through these discussions that virtual exhibitions are integral to archival outreach. The interdisciplinary approach combines topics related to historical representation, information architecture, and Web accessibility with code-embedded descriptions and metadata. While this method may well fall outside standard archival practice, it aims to highlight the experimental framework for the conceptualization of the project. The intended audience for this article, therefore, includes archivists interested in innovative outreach strategies, as well as Web designers interested in working with archival and historical materials.

Literature Review

Professional literature has extensively covered technology trends—mass digitization projects, digital preservation, and metadata standards, for example—in the past nearly two decades. However, fewer works have addressed the significance of virtual exhibitions until more recently, and even fewer—if any—have approached virtual exhibitions with an interdisciplinary perspective. The relationship of Web accessibility and information architecture is vital to historical representation in virtual exhibitions. As emerging technologies enter archival practice, scholarship will likely produce more knowledge in these hitherto unexplored areas.

What are virtual exhibitions? According to Schubert Foo, “a VE [virtual exhibition] is a [W]eb-based hypermedia collection of captured or rendered multi-dimensional

information objects, possibly stored in distributed networks, designed around a specific theme, topic, concept or idea, and harnessed with state-of-the-art technology and architecture to deliver a user-centered and engaging experience of discovery, learning, contributing and being entertained through its nature of its dynamic.”³ According to Chennupati K. Ramaiah, virtual exhibitions comprise a distinct genre in presentation techniques:

Though virtual exhibitions are born digitally they are often based on physical exhibitions, virtual exhibitions demonstrate a great variability in content, structure, navigation, design, and complexity. They vary from a simple selection of images arranged in a given way to highly sophisticated multimedia architectures and narratives. The main difference between a virtual exhibition and other forms of online presentation is a stronger dependency established between context, form, and content, and between the whole and its parts.⁴

Foo addresses the strategic role virtual exhibitions play in outreach programs where Web sites and on-site activities can mutually benefit each other, and where digital preservation of artifacts prolong the life of exhibits otherwise deteriorating as a result of visitors’ handling. Therefore, in Foo’s view, virtual exhibitions are strategically significant to outreach programs at museums and archives, as they present cost-effective ways for these institutions to provide access to various artifacts, cultural heritage collections, and historical knowledge to visitors in remote locations.

Virtual exhibitions on historical topics rely a great deal on narratives similar to historical writing. With the help of long and short descriptions, exhibitions deliver historical representation into the three-dimensional space of a museum, and two-dimensional space of virtual exhibitions. Therefore, exhibitions are effective strategies for presenting history in physical and virtual spaces using physical and digital artifacts. F. R. Ankersmit’s treatment of representation and description presents a conundrum in relating historical representation to exhibits. He explains: “We may ‘represent’ something by presenting a substitute of this thing in its absence. The real thing is not, or is no longer available to us, and something else is given to us in order to replace it. In this sense, it can be said that we have historical writing in order to compensate for the absence of the past itself.”⁵ Ankersmit adds that the represented and the representation can be each other’s substitute, as “both belong to the inventory of the world.”⁶ In the context of exhibits, visitors access the absent world through such an inventory of objects symbolizing the past.

According to Ankersmit, description and representation are opposites: whereas description relies on a fixed and tangible relationship between a subject and its property, historical writing and dialogue—hence representation—are possible due to unfixed and intangible relationships between representation and the represented. What is absent in the present cannot be described but can be represented in historical discourse. Description, in contrast, requires tangible relationships between objects and their properties, both of which represent the past. Description needs to be extended to exhibits, which also rely on concrete descriptions of artifacts on display. The practice of historical writing and archival description are not identical but are mutually informative. Curators and archivists can reinforce the relationship between description and representation

via content and structure. Using a well-researched exhibition catalog may serve as a framework for clarifying the paradox in the relationship between representation and description.

Information architecture is vital to navigation, functionality, and overall design of the virtual exhibition. It builds on metaphors—or mental models—that are vital as well as meaningful to planning Web sites. Louis Rosenfeld and Peter Morville view buildings as the foundation for information spaces when they explain the relationship: “Why begin a book about [W]eb sites by writing about buildings? Because the architectural analogy is a powerful tool for introducing the complex, multidimensional nature of information spaces. Like buildings, [W]eb sites—that is, information spaces—have architectures that cause us to react.”⁷⁷ Information architecture, therefore, is crucial to users’ ability to interact intuitively with the content, and it is vital to Web accessibility since users with disabilities must also be able to navigate information spaces, just as they do buildings.

The World Wide Web Consortium (W3C) defines “[W]eb accessibility” as the ability of “people with disabilities [to] use the [W]eb. More specifically, it means that people with disabilities can perceive, understand, navigate, and interact with the [W]eb, and that they can contribute to the [W]eb.”⁷⁸ The components of Web accessibility include content, browsers, assistive technology, users, developers, authoring tools, and evaluation (validation) tools that offer solutions to navigation and mobility throughout the Web site. The definition is rooted in “accessibility” with reference primarily to buildings, as the Architectural Barriers Act, Americans with Disabilities Act, and the Rehabilitation Act Amendments came into effect to mandate new accessibility standards. For instance, Section 508 of the U.S. Rehabilitation Act requires that technology—hardware, software, media, telecommunications, and networks⁹—be made accessible to people with disabilities. According to the Accessibility Guidelines of the Americans with Disabilities Act (ADA), a “site, building, facility, or portion thereof that complies with these guidelines”¹⁰ is accessible. “Accessible routes”—as defined by the U. S. Access Board¹¹—allow people to navigate the interior space of buildings, and present an analogy to paths followed by Web users while navigating information spaces.

Project History and Conceptual Framework

The disability history virtual exhibition (DVX) at the Canaday Center is based on the physical exhibition titled “From Institutions to Independence: A History of People with Disabilities in Northwest Ohio,” which was on display from September 2008 through April 2009. The featured manuscript collections were accessioned beginning in 2001 and contributed to the Center’s recognition as a regional repository for disability history. The success of the physical exhibition inspired the Center to develop a digital resource that educates the public about disability history and is, at the same time, accessible to learners with disabilities. Upon completion in April 2009—when the physical exhibition ended—the virtual exhibition presented disability history

through digitized photographs, interactive media, and a Web design following Web Accessibility Initiatives guidelines of the W3C.

The decision to create a virtual exhibition presenting disability history emphasized the need to present the original theme as accurately as technology permitted. Because the physical exhibition was time-limited and scheduled to end soon, it was necessary to make the DVX the virtual equivalent of the Canaday Center exhibition. Like the physical exhibition, the virtual rendition would focus on the core collections containing primary sources—rare books, letters, photographs, diaries, reports, and artifacts—at the Canaday Center.¹² The virtual exhibition, therefore, evolved at the intersection of multiple mandates and expectations.

Planning the DVX required a preliminary study of the exhibition in terms of content (documents, photographs, and artifacts), representation (information on exhibit labels), and the overall structure (chapters and timeline). Historical representation in the physical exhibition was powerful, straightforward, and unapologetic throughout the individual chapters, imagery, and documentation that did not spare unprepared visitors. The featured manuscript collections contained various primary sources documenting the perception and treatment of disabled people in detail throughout the history of northwest Ohio, the state of Ohio, and the nation in general.¹³ It was a representation of reality in the nation's, Ohio's, and northwestern Ohio's history—more specifically, the history of a society dealing with anomalies and stigmas and the reversal of trends. The pendulum of history has moved towards a change in popular attitudes about people with disabilities.

The exhibition catalog presents a well-researched narrative containing rich historical information on the topic as well as society in northwest Ohio. F. R. Ankersmit's work on historical representation is instructive in this context, as the exhibition catalog becomes the vehicle for historical writing; it presents in a narrative form the history of people, institutions, events, places, and objects that no longer exist. This narrative, in turn, forms the basis for the supernarrative, which unifies the pieces of the exhibition and focuses on the continuous paradigm shift and transition of values from institutionalization to independent living over almost two centuries of northwest Ohio history. It is not a formal narrative; rather, it presents the historical framework and social-cultural-political context for the information presented in the individual chapter essays. It follows the history of disability from the time when institutions that isolated the disabled developed, to a turning point when many disabled people sought to live independent lives within society, hold jobs, and even pursue political activism. Thus, historical representation—through the detailed descriptions in both the physical and virtual exhibitions, and as preserved in the manuscript collections—supports the work of archivists presenting an unbiased and un-interpreted history to the public.

The DVX presents a model for using virtual exhibitions in archival outreach with three critical concerns in mind: accurate historical representation, adequate descriptions and navigation, and Web accessibility. The experimental approach taken in planning the DVX required a conceptual framework with three interrelated dimensions: thematic, structural, and semantic. The thematic dimension is closely associated with historical representation following the linear, mostly chronological, and narrative-driven structure of the physical exhibition, which outlines the supernarrative. The relationship between

historical representation and this supernarrative overshadows other conceptual links in the other two dimensions.

The structural dimension underscores the hypertext nature of the exhibition and liberates the content from the linearity of the thematic dimension. Information architecture is vital to visitors' ability to navigate the exhibition in many different ways using straightforward text links, navigation bars, breadcrumb trails, and interactive media. The freedom to navigate at will allows users to engage with the content and the supernarrative on a more subjective and user-focused level, as each visit produces varied interpretation and meanings of the content. Finally, the semantic dimension focuses on users' access to code-embedded descriptions and metadata and presents the supernarrative in succinct forms. This dimension is also instrumental in allowing users with disabilities to access information not provided on the screen. In fact, both the structural and semantic dimensions support Web accessibility through navigation schemes and code-embedded descriptions, respectively, in order to enable users with disabilities to navigate and discover the content of the virtual exhibition. The ensuing discussions will focus on the individual dimensions in order to present the various interlinked concepts contributing to the design of the virtual exhibit.

The Thematic Dimension: Historical Representation and Supernarrative

The exhibition catalog provides the foundation for both the physical and virtual exhibitions and simultaneously becomes the vehicle for historical representation. The thematic dimension represents the structure of the catalog in a straightforward, visible, and tangible manner. Each chapter—researched and authored by contributing faculty, staff, and some students—presents material in a narrative form focusing on a specific aspect of disability history. The thematic relationships among chapters outline the supernarrative, and its relationship to historical representation is important: the supernarrative presents both the epistemological and ontological framework for historical representation. Thus, visitors reading about disability history get the opportunity to follow events and trends unfolding in a specific continuum and understand the relationships between this specific aspect of history and broader social, political, and geographical contexts shaping the events. The focus and scope of historical representation significantly depends on the type of records in the collections featured in the exhibition.

In archival theory and practice, organizational records pass from having a primary to secondary value after they leave the record-creating organization and enter the care of a repository interested in preserving them for long-term access. Once archival repositories accession donated records, the records fall into two main groups according to their value. In his work on appraisal standards, Theodore Schellenberg has identified two values: evidential and informational (or research) value. According to Schellenberg, "Materials containing evidence on the organization and functioning of an agency have value for the public administrator to the extent that they are needed for the current or future functioning of his agency";¹⁴ and this value is therefore "evidential." In contrast,

informational value is “research value [that] inheres in public records because of the information they contain that may be useful in research of various kinds.”¹⁵ What once had evidential value may continue to provide informational value as primary sources for researchers using the archives. Items in these collections may or may not be of research value for historical research and representation.

The physical exhibition featured various records once needed for the operation of hospitals, asylums, schools, businesses, and philanthropic organizations. To researchers, they presented knowledge created and shared within such organizations as the Ability Center of Toledo, Bittersweet Farms, David’s House Compassion, Family Service of Northwest Ohio, Sight Center of Toledo, and the Toledo State Hospital (formerly the Toledo Asylum), which no longer operates. Additionally, there were the papers of Hugh Gallagher (with direct connections to Franklin Delano Roosevelt and his struggle with polio, a fact hidden from the public for most of FDR’s presidency) and Josina Lott, who employed a large number of people with disabilities in Toledo. Philanthropic activities of key organizations such as Quota International and the Toledo Rotary Club were recorded in the records of these organizations. Additionally, the exhibition included material contained in the records of the offices of the University of Toledo president and vice president for student affairs.

The catalog’s appendix presents a list of commonly (even popularly) used terms uttered and published in reference to disability and, more typically, to people with physical deformations and mental disabilities. Terms such as “cripple, cretin, mongoloid, imbecile, insane, retarded”¹⁶ and many more have documented the historical perception of disabled people in mainstream society. Additionally, the featured manuscript collections contain pictorial and textual evidence, statistical data, first-person accounts, and correspondence among people with personal knowledge of conditions inside asylums, prisons, and state hospitals handling large populations with disabilities. There was an abundance of contextual information in these collections: information about American society and northwest Ohio communities; the political treatment of the disabled and the social reception of children affected by polio; and depression as well as other mental and physical conditions.

The supernarrative provides the thematic and structural framework for historical representation, as the narratives in the individual chapters form distinct groups that cut across the sequence presented in the catalog. The related chapters cover the following topics in detail: chapter 1 discusses the history of institutionalization in northwest Ohio while chapter 8 focuses on the reversal of earlier trends through deinstitutionalization and independent living. Chapters 2 (“Sheltered Workshops and Social Clubs”), 3 (“Society and the ‘Cripple’”), 6 (“Custodial Institutions to Community Care”), and 7 (“Hire the Handicapped”) present important milestones when society gradually began to tolerate, sponsor, and eventually employ disabled people. Chapter 5 (“Creating the ‘Perfect’ Human”) speaks about eugenics and social engineering whereby some sought to eliminate disabilities through euthanasia, selective breeding, and sterilization. Chapter 4 (“The Disabling Disease”) presents the turning point in disability history, including the nation’s realization that even someone as privileged as President Roosevelt could suffer from a debilitating disease like polio. Disability no longer carried a stigma associated with the fringes of society. The reversal of the trend presented in chapters 1

and 8 is noteworthy on a different account: it lends an element of literary symmetry and resolution to the supernarrative, which is as aesthetically appealing as it is historically accurate. Finally, chapter 9 presents a reflection on disability history with coverage of emerging conditions and perceptions associated with HIV and AIDS. Historical representation and the supernarrative thus mutually affect and inform one another.

Arranging the material for the virtual exhibition presented minimal challenges because the catalog's structure provided the framework for organizing the virtual exhibition. Each chapter occupied a Web page in the exhibition where visitors could view the individual exhibition items. The supernarrative played a self-evident role in the thematic dimension where the order of topics is visible, but its role in the structural and semantic dimensions was equally definitive in the broader conceptual framework of the virtual exhibition. In the structural dimension, the supernarrative presented the framework for the site's navigation scheme, whereas in the semantic dimension, it governed the process of embedding descriptions and metadata into the HTML or XHTML (hereafter abbreviated as X/HTML) code that allows users with disabilities to interact with the content. Both dimensions, therefore, contributed directly to Web accessibility.

The Structural Dimension: Information Architecture and Web Accessibility

The hypertext environment and interactivity of digital media offer users a number of effective ways to turn museum experience into an opportunity to develop new knowledge. For users with disabilities, best practices in information architecture can significantly improve this experience through intuitive navigation and labeling schemes. Users with mobility and visual disabilities may be able to navigate a Web site with simple and consistent navigation systems, just as they would an intuitively designed building with adequate signage. Louis Rosenfeld and Peter Morville have recognized the symbolic parallel between buildings and Web sites, and have described organizational, functional, and visual metaphors used for Web design. The first mimics the layout of commercial, institutional, and other types of facilities, while the functional metaphor presents task- or process-based models, and the visual metaphor emphasizes color- and shape-defined models for designing Web sites.¹⁷

The structural dimension, therefore, transforms supernarrative to suit the development of an intuitive site with historical content. The navigational links in the text, site map, navigation bar, link groups, and breadcrumb trails make the connections between the narratives of individual chapters. The subjectivity of individual experiences with the site, therefore, raises the question whether users perceive the supernarrative as one solid piece, or as one in multiple pieces and versions based on their most recent experience with the site. Moreover, will users perceive the same supernarrative each time they interact with the site? While answering this question falls beyond the scope of this article, it clearly falls in the domain of user experience experts who focus on user behaviors. The expectation is that given the flexibility of users to move around the site at will—and in different patterns—the supernarrative will take a different form

each time a user interacts with the content. With this expectation comes the assumption that the user elects to take a different route through the virtual exhibition each time s/he visits the site. In a 1994 study, Jean Umiker-Sebeok focused on museum behavior, particularly the meanings of gallery visits and the semiotic aspects of interacting with the content. One of her interesting conclusions was that prior museum experiences affected the meaning of subsequent interactions with the content.¹⁸ If the meaning of interaction varies with the route users choose for each visit, it would mean that the supernarrative manifests itself differently at each visit because the user assembles a different part of disability history during each visit.

The physical exhibition space is the metaphor for the virtual exhibition: the concept of the DVX was to emulate visitors' experience in museums where they can walk from case to case, or in an order that they prefer. Hence, the virtual exhibition features a 360-degree interactive panorama that allows virtual visitors to develop a sense of the exhibition space around them as though they were standing at the Center. The panorama allows users to look in the direction they want with the help of a cursor. The cases and shelf levels are individually accessible in order to allow visitors visual connections among multiple exhibits.¹⁹ A noticeable difference between the virtual and physical exhibitions is the availability of large image copies in the former, which open in a new window (with the descriptive text from the exhibit labels) when visitors click the corresponding thumbnail images²⁰ supplied with short captions as hyperlinks to the large views. Links from the virtual exhibition to finding aids, digital collections, rare books, and general library collections can connect researchers with detailed information on the featured collections.

The relationship of the supernarrative to the information architecture of the virtual exhibition exists on two levels of the navigation scheme: *macro* and *micro*. The *macro* scheme corresponds to the thematic organization of the exhibition. A simple solution in the DVX uses navigational arrows labeled "NEXT" and "PREVIOUS" on the left navigation bar, which allows viewers to move between exhibit cases in a manner analogous to turning pages between catalog chapters. Moreover, an index page listing the individual chapters as hyperlinks provides direct access to the individual chapters. Each page with a case view features links to the individual shelves in the corresponding cases. Viewers can move between these shelves using the TOP SHELF, MIDDLE SHELF, and BOTTOM SHELF links, or use CASE VIEW for an overview.

The *micro* scheme, in contrast, refers to different navigational features allowing viewers to navigate the virtual exhibition and interact with the digital content differently. Information architects recommend various methods for navigation systems, including vertical or horizontal navigation bars, simple arrow links, breadcrumb trails, and sitemaps. Navigation bars are consistent throughout the site and help viewers locate important pages in the site. Breadcrumb trails help viewers identify relationships between topically related pages. Some sitemaps present the hierarchical structure of the entire site with the page titles functioning as hyperlinks to corresponding pages on the Web site. Finally, there are links embedded throughout narratives and lists pointing viewers to available resources for further reference. For example, lists with hyperlinks to finding aids or books in the rare book collection are included to invite researchers to learn more about the topic by examining the records and early literature. In all, the

supernarrative presents the framework for setting up key navigational points to direct visitors between related chapters addressed in the section on the thematic dimension. Thus, whereas the catalog in print is restricted to presenting the material in a chronological sequence, the hypertext environment presents visitors with the same flexibility to move around in the Web site as they might do in the physical exhibition space.²¹

In addition to serving as a framework for navigation schemes, through which the supernarrative can manifest itself, information architecture plays a vital role in Web accessibility. The Canaday Center's decision to make this virtual exhibition accessible to users with disabilities serves as a point of reference in designing this project. The Web Content Accessibility Guidelines (WCAG) Web site not only provides advice for best practices in designing Web accessible sites, but it complies with the federal government's mandates under the Americans with Disabilities Acts, which apply to facilities and technologies, as well as information resources. For example, Guideline 13,²² which is written to create clear navigation mechanisms, specifically relates to making navigation accessible to users with disabilities. According to the W3C guidelines, navigation links should:

1. Clearly identify the target content (Guideline 13.1)
2. Be used consistently throughout a site (13.4)
3. Be grouped logically to appear as a unit (as in navigation bars or breadcrumb trails) (13.6)

The structural dimension, therefore, plays two parallel roles: on the one hand, it relies on good information architecture to provide a solid framework for learning through interaction with the content; and on the other hand, it presents users with disabilities the essential pathways to access information about the subject matter. The role of the supernarrative in the design process is more evident, as viewers choose a navigational path to complete the learning process, and each visit may leave viewers with a different meaning or recollection.

The Semantic Dimension: Code-Embedded Description, Metadata, and Web Accessibility

The semantic dimension reinforces the supernarrative, as metadata and description play their vital roles in presenting history to users. In contrast to the solid and linear presentation of the supernarrative in the thematic dimension, the semantic dimension presents a microscopic and fragmented version. It relies on sound information architecture to enable viewers who construct a subjective mental image of disability history through interaction with the digital content. This image is likely to vary with each visit, and Umiker-Sebeok's aforementioned study on museum behavior attests to this relationship between interpretation and interaction with artifacts. In the digital environment, this relationship appears to hold for digital content, metadata, and the viewers' ability to conduct historical research. Joshua Sternfeld addresses the direct relationship between metadata and historical representation; he regards searching and metadata as crucial components of historiography and historical representation in an increasingly digital environment:

Without a robust search engine, the user cannot access historical data; similarly, without quality metadata, a strong search engine is rendered ineffective. While this may seem self-evident, the integration of search and metadata in a representation runs much deeper; it affects, and is affected by, nearly every aspect of the representation, including its interface, aesthetic, design, structure, and functionality. Search and metadata together govern the transformative process by which historical information becomes historical evidence.²³

Sternfeld regards metadata as the bridge between structure and content in the context of historical writing. In an environment with digital libraries, data visualization tools (using geospatial technologies), and other evolving resources, metadata plays a vital role in the work of digital historians. Sternfeld advocates that scholars of digital history must “think archivally when considering how these components contribute to a representation’s historical contextualization.” “Refinement of this mindset through rigorous, systematic, and interdisciplinary theoretical and practical experimentation,” he argues, “could benefit scholarship, peer review, pedagogy, public history, and cultural heritage.”²⁴ The historical work, which includes research, writing, representation, and interpretation with the help of digital content and metadata, is verified by the reliable resources contained in archives. This same argument applies to virtual exhibitions featuring content, and to information verified by archives to support scholarly activity.

The role of metadata extends well beyond the mechanics of description, searching, and retrieval; it is integral to the intellectual aspects of research. Adequate and accurate metadata in well-planned virtual exhibitions can connect users with historical data about people, places, organizations, and events, but this understanding must extend to supporting researchers with disabilities, as well. While metadata standards for integrating Web accessibility have only circulated recently, the application of Web accessibility standards to metadata schemas like Dublin Core²⁵ (DC), Text Encoding Initiative²⁶ (TEI), and Encoded Archival Description²⁷ (EAD) has been in progress for several years. Historians and humanities scholars have used TEI to markup historical documents for digital analysis and searching. Archives have utilized EAD and DC extensively to develop digital finding aids and digital collections, respectively. Although the discussion of accessibility standards applied to these metadata schemas is beyond the scope of this article, the progress archives have made in this direction will facilitate access for patrons with disabilities who will want to use archives for original research.

Web sites (including virtual exhibitions) do not require the systematic use of these metadata schemas, but they do present an opportunity for archives to leverage technology specifically to their advantage by combining some aspects of archival practice—including archival description—with Web design. For instance, key events, people, and places throughout the Web document can be encoded using an elaborated system of TEI (Text Encoding Initiatives) headers.²⁸ This method allows archivists and historians to bring scholarly works into semantic relationships, which maximizes search results. As another example, the following lines show the code in the <head> element of Web pages throughout the DVX, which uses selected fields from the Dublin Core schema:

```
<meta name="DC.title" content="From Institutions to Independence: A  
History of People with Disabilities in Northwest Ohio (virtual exhibition)">
```

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<meta name="DC.creator" content="Ward M. Canaday Center, Digital
Initiatives, University of Toledo Libraries">
<meta name="DC.date:created" content="2009-04-20">
<meta name="DC.subject:lcsh" content="United States – Disability
history">
<meta name="DC.subject" content="disability history">

```

Metadata in the <head> section can describe content at the site and page levels, but it is per se not visible on the display. If used consistently, this metadata will increase the chance of discovery through Web searches. Archivists may consider applying DACS or AACR standards for description, since the evolving Semantic Web environment and wider participation in the Open Archives Initiative Protocol for Metadata Harvesting²⁹ (OAI-PMH) will lead to improved interoperability among digital resources. Therefore, placing critical metadata in the headers of Web documents may facilitate the exchange of semantic metadata between repositories and virtual exhibits. Viewers then will have access to information about other collections at the repository, which, in turn, can lead to new threads of reference interactions and research visits.

Historical representation and Web accessibility are unrelated concepts, but through the semantic dimension, they intersect to an extent that allows users with all abilities to access historical information with the help of descriptive metadata. At this stage of development, archivists can collaborate with technologists and historians to ensure accuracy and accessibility. Virtual exhibitions present archives with opportunities to extend outreach into the digital environment and invite remote users to their resources on-line and at the repository. In order to facilitate this process, digital representation of disability history requires accurate content description at the code level where the W3C-WAI guidelines (WCAG 2.0) and various archival metadata and description practices converge. Since the virtual exhibition is made of X/HTML pages, descriptions meeting Web accessibility guidelines need to be present throughout the pages' code. In the context of archival practice, code-embedded descriptions not only meet Web accessibility requirements, but may also present meaningful information to researchers using archival resources.

Archivists working on virtual exhibitions may consider three approaches to combine selected archival description practices—according to *Describing Archives: A Content Standard [DACS]*³⁰—with those recommended in the W3C-WAI guidelines. The approaches include the following: adding metadata to the <head> element of the Web document; including short and long descriptions for images, image maps, hyperlinks, and other navigational features; and tagging specific information with TEI tags, which was addressed earlier in this article.

A common method is adding collection and page-level descriptions using <meta> tags to the <head> element, as shown previously. *DACS* presents multiple levels of description with 25 elements, not all of which are required³¹. Description in *DACS* can apply to various levels of archival collections, and may correspond to descriptions added to the <head> element of Web pages in compliance with W3C-WAI guidelines³² (Appendix). For example, H25³³ addresses titles between the <title> tags, and archivists may apply *DACS* rules for title as one of the identity elements.³⁴ *DACS* requires a formal title in a natural language order, which is more common in Internet searches. The same applies

to personal names and dates,³⁵ which follow native formats and vary across the globe. Perhaps a benefit of using *DACS* is that the information in the <head> element can be accessible to search engines, meta crawlers, and indexers used by Google, Yahoo, and other services that are used across the globe. This demonstrates that *DACS* and other archival standards can produce meaningful results.

Another common method is to add captions (short descriptions for thumbnails, links, and image hotspots) throughout the Web document, and to provide long descriptions for images with information taken from the exhibit labels. To most viewers, the captions and narratives will provide historical context for the displayed images, while for users with disabilities, these will provide information and instructions associated with navigational features. The information provided in the ALT (or TITLE) tags in the X/HTML code trigger popup windows to open with the encoded information—a feature much appreciated even by mainstream users. W3C-WAI guidelines G73, G82, G92, G95, G91, and H24 (Appendix) address the application of these documents.³⁶ Exhibit labels from the physical exhibition are good sources for long descriptions ranging from a few sentences to a paragraph or two, and some include the title of the collection containing the exhibited item. The virtual exhibit should also include thumbnails with captions (short description) serving as a hyperlink to the larger image. For improved accessibility, the alternate text may include instructions, in addition to the straightforward description of the thumbnail. Image maps are also useful, but require some description and instructions to the viewers. In the DVX, the case view images serve as image maps with regions divided according to the shelf level. Each level is linked to a close-up view of the corresponding shelf with more detailed description and links to the individual items—thumbnails—that open the large-view images. When viewers navigate through successive stages leading to the displays, it is important to provide clear and short instructions in the alternate texts. Therefore, developing an information architecture plan can significantly improve user interaction with the content in the virtual exhibition.

The semantic dimension is a critical link among archival practice, historical representation, and Web accessibility, which connects patrons with disabilities and critically evaluated and preserved historical information at archival repositories. While the structural dimension supports the navigation of such an information space, the semantic dimension is the essential link between researchers and historical information. The standards between Web accessibility and archival description are not interchangeable, but they can certainly overlap to support mutual goals, and this is where archives can leverage technology to reach out to hitherto isolated user communities. Metadata plays a pivotal role, as it becomes a vehicle for historical representation to historians as well as a mechanism for delivering historical information to users with disabilities.

Conclusion

One may question this approach by asking: “Why go through all this trouble when there has been a safe approach in developing text-only sites for users with disabilities and another for the rest of society?” Robert Yonaitis questions the widely-used strategy

for maintaining a digital divide through parallel contents: one for mainstreamed users, the other just for the disabled. In his guide, he addresses the rationale for maintaining the divide:

One frequent ‘misconception’ about accessibility compliance relates to the use of a second set of content that is developed as a text-only version of a site. Some developers have been told that a second set of content, provided as a text-only site, will be an acceptable replacement to making a site accessible. This simply may not be true and defeats the spirit and the years of work and research behind making electronic information accessible to all in equal form and content.³⁷

On a conceptual level, where each dimension presents a distinct aspect of the virtual exhibit, the DVX presents a synthesis of two related visions. One is a continuation of a trend towards mainstreaming people with disabilities. The supernarrative in the exhibition delineates a trend from institutions to independence, as shown through the thematic dimension. The other vision involves integrating two worlds over a digital divide. The virtual exhibit indirectly answers Yonaitis’s call to create a mutually accessible world through adequate navigation options and descriptions. These two visions manifest themselves in the discussion on the structural and semantic dimensions.

Virtual exhibitions merit greater recognition as potentially effective tools in archival practice—mostly through archival outreach, but to some extent, description, as well. Given the significant technological advances in computing, Web accessibility, and digital humanities, scholarship is increasingly relying on technology, metadata, and assistive technologies to support learning among users with disabilities. Another important aspect of the virtual exhibition merits attention: the fact that the hypertext environment facilitates continued learning through knowledge domain navigation, a strategy in research using both human and artificial intelligence. With the help of hyperlinks available for collections features in the virtual exhibition, researchers can discover and access library catalog records, finding aids, and other related resources with metadata leading to resources in more distant areas of the knowledge domains.

This article presents a project that entailed experimentation beyond the traditional field of archiving and where new skill sets, interdisciplinary interests, and openness to new strategies are more than just welcome; they may be necessary. Vice versa, it will be equally important for technologists and historians to understand and respect the accomplishments of the archival profession. The disability history exhibition has demonstrated that archivists, historians, and technologists have yet to forge stronger alliances in order to embrace a more collaborative, interdisciplinary, and innovative future. History is no less important today than it will be in the future, and efforts to preserve history for posterity will remain as important in the future as they are in the present. Moreover, a growing community of scholars with various disabilities will rely on innovative resources developed through a collaboration of scholars, archivists, and technologists, which will require institutions to invest more in their primary source collections and digital initiatives programs, and a more diverse audience for these resources in the future.

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APPENDIX

The following recommendations have informed the design process during the development of the DVX. While they specifically present instructions to Web designers, some decisions should encourage participation from archivists interested in integrating archivally sound descriptive practices into the X/HTML code. As interoperability of existing electronic resources improves, extending sound archival practices—such as description (using the *DACS* for example)—into practices hitherto unexplored by archivists may have favorable long-term implications for archiving.

General Wcag 2.0 Recommendations Applied to the Virtual Exhibition

The following WCAG recommendations were applied to the DVX. Use them for long descriptions on a remote site (G73, G82, and G92), short descriptions (G95), link descriptions (G91), and text alternatives to image maps (H24). The statements and methods below describe how the virtual exhibition followed these guidelines:

G73 (“Providing a long description in another location with a link to it that is immediately adjacent to the non-text content”³⁸)

Application: Used for most exhibits with substantive narrative in the exhibit label. In the virtual exhibition, the link was adjacent to the thumbnail linking to the full-size image and long description in a different location.

Method: ``

G82 (“Providing a text alternative that identifies the purpose of the non-text content”³⁹)

Application: Each thumbnail in the virtual exhibition informs visitors that it will open the full-size image with a complete available description.

Method: ``

G91 (“Providing link text that describes the purpose of a link.”⁴⁰)

Application: Each resource link comes with a pop-up window with information about where the link leads—in this case, to the library catalog.

Method: `Remarks on Prison Discipline`

G92 (“Providing long description for non-text content that serves the same purpose and presents the same information”⁴¹)

Application: Each full-size image was accompanied by long description available in the exhibit labels in the case.

Method: The long description is placed below the full-size image: ``

`<p align="left">Lagoon on the former Toledo State Hospital grounds.
 <p align="left">These lagoons were created by the patients staying at
the hospital. Photography by Kim Brownlee, 2008.</p>`

G95 ("Providing short text alternatives that provide a brief description of the non-text content" ⁴²)

Application: This method was useful to describe the contents at the shelf level
Method: ``

H24 ("Providing text alternatives for the elements of image maps" ⁴³)

Application: Adding hotspots—or hyperlinked areas of images—added functionality to otherwise static images. Here, the image of the Canaday Center presented opportunities to enhance the functionality of the image whereby visitors can click on the door to enter, and then click on window display to view the catalogs or awards received for the physical exhibition. ⁴⁴

Method: `<map name="Map"
id="Map"> <area shape="rect" coords="235,4,355,218" href="canaday.html"
target="_self" title="Enter the Canaday center" />
<area shape="rect" coords="86,42,163,103" href="PDFs/disability_exhibit.pdf"
target="_blank" title="Exhibit Catalog" />
<area shape="rect" coords="454,59,484,119" href="awards.html" target="_self"
title="2008 Community Access Award" /> </map>`

H25: ("Providing a title using the title element" ⁴⁵)

Application: Adding the page title to the header section of each Web page will help some users to identify the page title. This appears in the tabs when using up-to-date browsers set to display pages under separate tabs. The information for the page title goes into the header section of the page.

Method: `<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<title>Canaday Center Disability Virtual exhibition</title>
</head>`

Collection- and Page-Level Description in the Header Section

The header section can contain descriptive site- and page-level information that is not visible to viewers unless they want to examine the page source itself. The `<meta>` tags in HTML, XHTML, and XML ⁴⁶ environments may follow the Dublin Core (DC) standard, and correspond to collection- and item-level descriptions used by archivists. DC contains 15 to 22 elements, ⁴⁷ but there is no W3C requirement to contain this type of information. The header section may contain a few meta tags sufficient to provide collection-level description in the header of the opening page, since this is the start page for most visitors. Page-level descriptions throughout the DVX contain a few lines of DC metadata to describe those pages. This method loosely follows search engine optimization guidelines to facilitate discovery of well-described pages in Internet searches.

```

<meta name="DC.title" content="Photograph of Helen Keller">
<meta name="DC.creator" content="unidentified photographer">
<meta name="DC.subject:lcsh" content="United States – Disability history">
<meta name="DC.subject" content="disability history, women">
<meta name="DC.description" content="Photographs of Helen Keller">
<meta name="DC.contributor" content="Name of donor organization">

```

Item-Level (Short) Descriptions

DVX pages contain several photos, image maps, and hyperlinks requiring short descriptions with information about the content. Hyperlinks and image maps with hotspots (or hyperlinked regions of images) often call for quick explanatory instructions to users with visual disabilities, so that such users understand the purpose of those hyperlinks. Descriptions following the ALT (or TITLE) fields in the X/HTML code trigger popup windows to open with the encoded information—a feature much appreciated even by mainstream users. In fact, the DVX features image maps to enhance the virtual experience associated with stepping in and moving from case to case, as visitors would do in a physical museum. Designers must add these instructions to the code of the image map as illustrated below:

```

<p>Click on the door to enter the exhibition space.</p>

<map name="Map" id="Map">
<area shape="rect" coords="235,4,355,218" href="canaday.html" target="_self"
alt="Enter the Canaday Center" />
<area shape="rect" coords="86,42,163,103" href="PDFs/disability_exhibit.pdf"
target="_blank" alt="Exhibit Catalog" />
<area shape="rect" coords="454,59,484,119" href="awards.html" target="_self"
alt="2008 Community Access Award" /> </map>

```

Long Descriptions

Unlike short code-embedded descriptions, long descriptions contain the exhibit label text accompanying the corresponding items in the physical exhibition. Therefore, long descriptions are intended to be visible on the page where they provide detailed information as well as space and time for learning. In the DVX, long descriptions are available at case, shelf, and item levels, providing visitors and researchers some context for the images' and documents' sources and the critical information to locate sources in special collections and the libraries. As such, both styles of description play a vital role to historical representation at the narrative and semantic levels, and this is where historically correct data and information about disability history is so crucial. Disabled users use assistive equipment to access information, which needs to be correct in order to support accurate historical representation of disability.

NOTES

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8. W3C Web Accessibility Initiative [W3C-WAI], "What is Web Accessibility," *Introduction to Web Accessibility*, <http://www.w3.org/WAI/intro/accessibility.php> (28 April 2009).
9. United States General Services Administration, IT Accessibility, and Workforce, "Summary of Section 508 Standards," *Summary of Section 508 Standards*, <http://www.section508.gov/index.cfm?fuseAction=stdsSum> (23 March 2011).
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11. Ibid. In compliance with the ADA, the Canaday Center has replaced older doors that did not offer visitors with disabilities a reasonable ease of access to the exhibit and research areas. ADA-compliant computer equipment is available for use by disabled patrons, as well.
12. Some items were on loan from organizations outside the University of Toledo; these organizations have granted permission for items on exhibit to be photographed or scanned for the virtual exhibition.
13. Some exhibits may even have afforded some visitors the opportunity to revisit family memories tied to stigmatized, even forsaken, ancestors resting namelessly in unmarked graves around Toledo and elsewhere.
14. T. R. Schellenberg, *Modern Archives* (Chicago: University of Chicago Press, 1956): 139.
15. Ibid., 140.
16. Barbara Floyd, ed. *From Institutions to Independence: A History of People with Disabilities in Northwest Ohio* (Toledo, OH: University of Toledo Press, 2011): 162. The same section on terminology documents how people with disabilities have been referred to in public discourse in recent times.
17. Rosenfeld and Morville, *Information Architecture*, 253.
18. Jean Umiker-Sebeok, "Behavior in a Museum: A Semio-Cognitive Approach to Museum Consumption Experiences," *Signifying Behavior* 1:1 (1994) <http://www.slis.indiana.edu/faculty/umikerse/papers/museum.html> (10 October 2011).
19. The technology would have allowed adding hotspots to the regions of the panorama, which would have allowed users to click on the exhibit cases for a detailed view. This approach was included in a more recent virtual exhibition, however.
20. Although it is possible to include very large images, not only may such content occupy storage space, but it may also open very slowly for visitors in low bandwidth networks. The compromise between open access and accessibility for digital projects has been to lower resolution to 72 ppi and use jpeg as image format. Given the most popular screen sizes and the emergence of mobile devices, using images wider than 800 pixels may not be practical, either.
21. A study of visitor behavior in the physical space and the supernarrative is beyond the scope of this study, which does not postulate any theories of whether such a connection exists.
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32. W3C-WAI, *G73: The global structure of an HTML document*, <http://www.w3.org/TR/html4/struct/global.html> (28 May 2011).
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34. SAA, *DACS*, 17-23.
35. The date in *DACS* may appear in natural order except when using the Dublin Core date element, which follows the ISO-approved format of YYYY-MM-DD. There is also a difference in encoding geographical names, which appear differently in the Getty classification system—Country – State – City—and in that of the Library of Congress—City(State).
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