Strategic Library™

What Can Libraries Learn From the Future of Public Media?

BY CHRIS KRETZ

INTRODUCTION

I am a long-time fan of public media, as I suspect many librarians are. However, I had never given much thought to the inner workings of the public media system nor, in fact, considered it as a system at all. To remedy that, I spent a good deal of time studying the current state of public media and the concerns that people in the field are facing. I took a deep dive into their world, delving into the mission statements and strategic plans of radio and television stations, watching videos of their conference proceedings, following threads down the rabbit holes of Twitter and Facebook. I monitored their press coverage and eavesdropped on their industry podcasts and publications.

What I found was a parallel universe sharing much in common with libraries. Both public media and libraries can be seen as civic-minded, outward-facing institutions concerned about their future and adapting to changes in their respective audiences.

Even a cursory glance at the titles of public media conference presentations will strike a familiar chord in a librarian's ear: "Design Thinking for Radio," "Creating a Digital Dashboard," "Innovation You Can Afford," "Insight on Millennials," and "What Does America Think About Us – If They Think About Us at All?" We are kindred spirits striving to stay relevant and maintain our place in the modern world.

Studying the state of affairs in public media can be of value to libraries, both academic and public. Knowing the problems and challenges they face, as well as the strategies and innovations they are pursuing, can help inform our own decision making. There are many areas where our mission and activities overlap with public media. There are lessons we can learn from each other. And somewhere in that Venn diagram of overlapping concerns there are opportunities to work together.

THE PUBLIC MEDIA SYSTEM

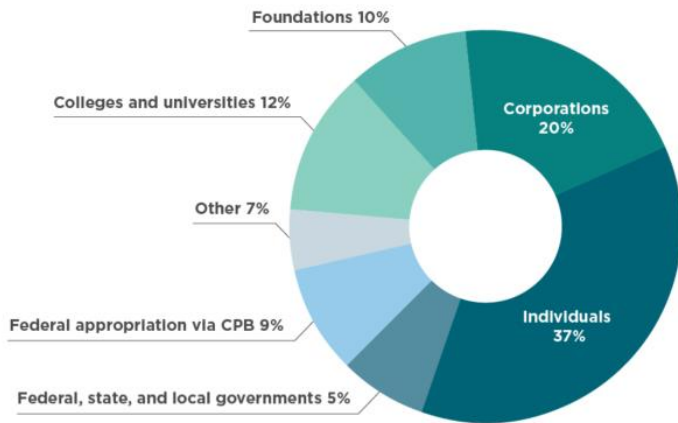To provide some background in broad strokes, the public media system as we

Public Radio Station Revenues (FY 2015)

Data Source: "Public Broadcasting Revenue Fiscal Year 2015, CPB"
CPB

Figure 1: Public radio station revenues for fiscal year 2015. Public Radio Finances (n.d.). Retrieved May 1, 2017 from http://www.npr.org/about-npr/178660742/publicradio-finances

know it today started with the Public Broadcasting Act of 1967, signed into law by President Lyndon B. Johnson. Congress recognized a need for a system of public radio and television stations dedicated to "instructional, educational, cultural purposes" that could focus on "the needs of unserved and underserved audiences" as well as "solve local problems through community... and outreach programs" (Public Broadcasting Act of 1967, 2017).

The Public Broadcasting Act created the Corporation for Public Broadcasting (CPB) to oversee and distribute funds to the two arms of public media: over 900 radio stations as represented by National Public Radio (NPR) and 350 television stations as represented by the Public Broadcasting System (PBS). CPB currently receives $445 million dollars in appropriations and is funded two years in advance (CBP's Federal Appropriation, n.d.). One interesting statistic to note – two thirds of public radio licenses are held by universities and educational institutions (Member Stations, n.d.).

The outlook on public media funding has become more precarious in the recent political climate although CPB's current funding level is, at the moment, still in place. That's not to say that funding isn't a large area of concern in current public media debates – it is and probably always will be. While this is one of the areas in which drawing direct parallels to the library world is difficult, a look at funding sources for public radio stations will give some context to their situation.

NPR member stations receive 9% of their revenues from the CPB while 37% comes from individual donations (Public Radio Finances, n.d.). This reliance on listener donations has led to some criticism, the fear being that programming is geared towards the demographics most likely to donate to the station. Christopher Chávez, Assistant Professor of Communications at the University of Oregon, charges just that, finding public media to be full of programs catering to "an almost exclusively upscale audience of baby boomers" (2017).

PUBLIC RADIO PROGRAMMING

In fact, a vigorous debate over programming has been going on within public radio for some time. One clarification: I had long thought of all public radio programming as being synonymous with NPR. That is not the case. To use an imperfect library metaphor, picture NPR as a large consortium made up of public radio stations. Now think of individual radio programs (All Things Considered, Car Talk) as databases each station can license. Some of these programs are produced by and are licensed from NPR. But as libraries know, you can subscribe to databases from a number of different sources: consortiums, publishers, third-party aggregators, etc. Just as we license databases from a number of different sources, stations can get programming from a number of different entities beyond NPR. Public Radio International (PRI), Public Radio Exchange (PRX), and American Public Media (APM), in addition to individual stations like WHYY are all sources that produce and distribute programs.

The fact remained, however, that until recently all of this programming was produced for only one market: public radio stations. That is no longer the case. With a surge in popularity, podcasts are now seen as a viable alternative market to public media. In the past, if you wanted to hear (or create) compelling audio content, those "driveway moment"-type stories with emotional content and strong narrative momentum, public radio was the only place to go. That model has been disrupted in the last few years by the rise of podcasting. By 2016 a new market had arisen for audio stories, ironically hastened by the popularity of the podcast Serial which itself began life on public radio.

In a 2016 article in Slate entitled "The Fight for the Future of NPR," Leon Neyfakh documented the shifts that were occurring through a migration of personnel: NPR's head of programming left to join Audible. NPR journalist Alex Blumberg left to found the podcast company Gimlet. Other talent would soon depart to create content for

Figure 2: Austin Music Map. Austin Music Map (n.d.). Retrieved from http://austinmusicmap.com

other outlets. With podcasts now seen as a viable market, audio storytelling skills were in demand. Adam Davidson, a journalist who co-founded and subsequently left the influential NPR program Planet Money called it the "private sector audio industry" (2016). What had once been a unique job of public radio – audio stories - was now being done by start-ups pitching their programs directly to the public. Librarians who have seen the rise of Google, Amazon, and Netflix know what that feels like.

This was not, however, the end of public media. One of the arguments public radio can pose against this "private audio sector" is a focus on journalism. Many of these new podcasting networks can compete on the level of narrative storytelling but it is harder to duplicate the journalistic work of public radio stations that have newsrooms and reporters in the field. This is a core part of the public media mission and one they are uniquely qualified to do. Finding such a key strength within an organization can be used as a strong differentiator in a competitive landscape.

INNOVATIONS

Regardless of competition from the outside, there have been ongoing efforts to foster innovative new programming within public radio. The Association of Independents in Radio (AIR) has been running a series of Localore projects since 2013 in an attempt to create new types of programs and reach new audiences. They embedded teams of audio producers in radio stations and charged them with getting out of the studio and creating. Their key findings include: the value of public radio stations as community hubs, the importance of developing networks within communities, and the power of creating teams of talent to "throw...like a lightning bolt at a problem or an idea" (What's Outside, 2014, p. 5). Two of the projects that came out of Localore point the way towards possible public media/library

Figure 3: Third-party partners for public broadcasters. Chaudhuri, T. (2016). Partnering with third-party organizations around community engagement [PowerPoint Slides]. Retrieved from https://drive.google.com/file/d/0B6UjHl_XHUPuc05XaG5ELVhULTA/view

collaboration.

The Austin Music Map documents the world of music and performance in that city. The project collects digital recordings and interviews and photographs into a topography of music captured on street corners, in backyards, and other out-of-the-way places. From the perspective of an academic librarian, this type of project is within hailing distance of the digital humanities. Is there a way to bridge that gap, to pursue projects like these using the expertise of audio producers and bringing in the structure and standards of digital humanities?

Another project, Curious City from station WBEZ in Chicago, incorporated help from the public to pose and help answer questions about the city. A number of episodes used the resources of Chicago Collections, a consortium of libraries and related cultural organizations. This type of programming draws directly on the strengths of library collections and librarians' expertise and could be expanded indefinitely.

MEMBERSHIP

The role and definition of "member" is another aspect of public radio that is being re-examined. Melody Kramer, a Nieman Center Fellow and former public media digital analyst, issued a report in 2015 on new ways to view membership in public media. She found that a new generation of listeners were looking for more meaningful experiences and opportunities. She proposed a number of approaches to membership, including letting users contribute skills instead of money and using the station as a platform for people to connect and collaborate on projects.

Kramer also makes a number of interesting suggestions regarding public radio stations and students, positing an online repository of NPR stories for use in a school's curriculum (2015). Think of all the work being done with open educational resources (OER) and LibGuides. What role can libraries – particularly academic libraries – play in making this type of public media content accessible for faculty and teachers?

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Figure 4: WGBH radio studio in Boston Public Library. WGBH. (n.d.). WGBH's Boston Public Library studio. Retrieved from http://www.wgbh.org/support/BPLStudiocalendar.cfm

WGBH's Boston Public Library Studio

WGBH's new studio at the Boston Public Library feature weekly tapings of *Boston Public Radio*, public events and filming of specials such as *Hear at the Library* and *Listen Up! with Craig and Edgar*. Take a look below at our calendar of events.

PUBLIC TELEVISION

I want to touch briefly on public broadcasting, particularly to mention an event that many of us may not have seen: the FCC's broadcast incentive auction. This plan let public broadcasters sell back some of the spectrum they had been assigned, the impetus being the need to accommodate the huge demand for broadband access faced by telecommunication carriers like Verizon and AT&T (Spectrum, n.d.). Through a complex and drawn-out process, participating public television stations received an estimated $1.9 billion dollars (Hand, 2017). Imagine what kind of future that windfall could build for your library. Craig Aaron, writing in the online site Current, asked:

> What if they used the money to set up cutting-edge investigative newsrooms in cities across the country? Or built new tools to help the public sort through data and public records? Or leveraged it to support community-engagement efforts to attract and grow new and diverse audiences? (2016, para. 4)

Some specific ideas on public broadcasting's engagement efforts were offered in Toby Chaudhuri's presentation "Partnering with Third-Party Organizations around Community Engagement" at the 2016 Public Media Marketing and Development Conference. Chaudhuri lists some of the positives that public television offers to potential partners, technical expertise and the allure of PBS' "public service halo" being two of them (2016, p. 4). He also notes that collaborating with a PBS station needs to be seen not as an end in itself but rather as "an ongoing effort to create impact" (2016, p. 7). He maps out a number of potential partners that mirror the types of institutions that libraries can and have worked with themselves.

COLLABORATIVE PROJECTS

I'll conclude with a review of projects going on in the public media world right now, some that already involve libraries and some that offer intriguing possibilities.

Wyoming Public Media (WPM), which incidentally is licensed to the University of Wyoming, currently employs a reporter/content creator who is shared with the Buffalo Bill Center for the West. This reporter operates out of a recording studio at the Buffalo Bill Center, creating content for the Center while also covering stories for WPM (Conner, 2017). Imagine an academic library with an embedded producer or "audio producer in residence" tasked with creating stories from the library's special collections or collaborating on projects with the library's students and staff.

The Boston Public Library recently redesigned part of its central library complex in Copley Square to include a recording studio for public radio station WGBH. The new space gives WGBH more visibility in public and creates a centerpiece for the library. WGBH has used the space to tape shows and record special programs with the public (WGBH, n.d.). So far they are recording in the library but not with the library. Having come so close, why not? What if they developed programs and events that incorporated the library more?

Another avenue to be explored are collaborations based on libraries' existing expertise. Philadelphia station WHYY worked with Drexel University Libraries to catalog and make accessible over 8,000 interviews from the WHYY-produced Fresh Air program. The project was supported by a grant from the Council on Library and Information Resources (CLIR) (Lee, 2015). Extrapolating from here, and including Kramer's call for more educational access to content, might there be an open access corollary to public media? With an (admittedly small) portion of their funding coming from federal funds, could there be a mandate to make a certain portion of public media content available in some kind of open access repository of sound?

CONCLUSION

The priorities of NPR's current strategic plan are shown in **Figure 5**. If we leave aside the issue of revenue generation, which will always be unique, we can see that they have a clear mandate to collaborate, create exceptional content, and expand and engage with audiences. On the right are some of the library-related themes raised in this paper as well as emerging trends. Public media, in order to reach its goals in a changing marketplace, has formed innovative partnerships, explored new models of operation, and identified core areas of their mission that make them unique. These are all practices to take to heart. Even if libraries are doing these things already, it's informative to see how and with whom public media has taken similar steps.
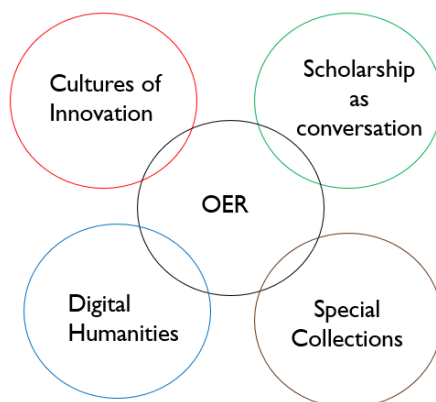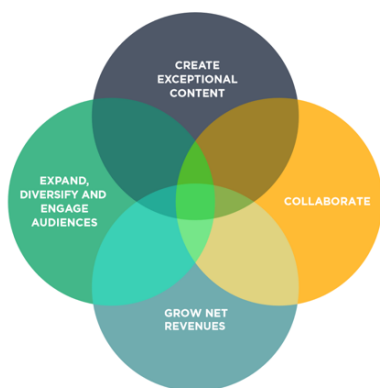
In addition, we can learn from the in-

Figure 5: NPR's strategic priorities juxtaposed with potential areas of library overlap. Priorities from NPR: A strategic plan. (2014). Retrieved from http://www.npr.org/about/strategic_plan/2014_StrategicPlan.PDF

novative attitudes and creative spirit of the Localore projects. We can think of new ways to have students and patrons contribute to the work of the library. And we can seek out deeper partnerships with like-minded organizations, finding ways to sustain and broadcast our core values and mission. Once you recognize that, the idea of public media and libraries working together sounds promising indeed. ■

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Breaking the Ice

» Using a Sword to Slay Patrons' Fears in Special Collections

BY JEREMY BRETT, JENNIFER REIBENSPIES, AND PILAR BASKETT

Lord Eddard Stark dismounted and his ward Theon Greyjoy brought forth the sword. "Ice", that sword was called. It was as wide across as a man's hand, and taller even than Robb. The blade was Valyrian steel, spell-forged and dark as smoke. Nothing held an edge like Valyrian steel (Martin, 1996, p. 12).

INTRODUCTION

Library anxiety was famously defined in 1986 by East Carolina University (ECU) library science professor Constance Mellon as the cluster of fear and insecurities that many university students report when visiting an academic research library for the first time to do research. Mellon collected data from several beginning composition courses over two years at ECU and determined that 75-85% of students responded to these initial visits using words such as scary, overpowering, lost, helpless, confused, and fear of the unknown (Mellon, 1986, p. 162). She developed a theory that "when confronted with the need to gather information in the library for their first research paper, many students become so anxious that they are unable to approach the problem logically or effectively" (Mellon, 1986, p. 163). Mellon's anxiety model has endured over the last few decades, and researchers have looked at finding ways of counteracting such anxiety, including formal instruction, personal interaction with librarians, acknowledgment of the emotion itself, the modification of behavior by librarians towards their patrons, making the library more user-friendly, and in general providing students with an overall positive library experience (Carlile, 2007).

This article makes two main points. First, we argue that the anxiety to which library patrons are often prone can be particularly endemic to special collections libraries. Second, we propose that items in a collection with particular pop culture relevance or that

Figure 1: Selected weapons from the George R.R. Martin Collection.

are immediately recognizable can go far in providing such a positive experience to the point, hopefully, where hitherto reluctant students will become more interested and engaged with other primary historical materials. They will also leave the library feeling more enthusiastic, confident, and likely to return. In the case of the Cushing Memorial Library & Archives at Texas A&M University, the existence and display of a particular

collection of artifacts (described below) has enjoyed notable success in raising our institutional profile among students and visitors and in engaging students with the idea that a special collections library might be accessible, exciting, and relevant to their own personal cultural interests.

Cushing Library is noted for, among other things, its Science Fiction and Fantasy (SF-F) Research Collection, one of the largest of its kind in the world. As stewards of tens of thousands of books and other monographs, serials, objects, and fanworks, librarians curate over one hundred archival collections from SF-Fi creators and collectors. The largest of these collections is that of George R.R. Martin. Martin is a well-known and best-selling American author, best known for *A Song of Ice and Fire* (1996-ongoing), an epic fantasy series chronicling the massive political and social upheavals surrounding the struggle for the throne of the Seven Kingdoms of Westeros. These upheavals take place alongside an increasingly dark and menacing magical conflict in the North that threatens to engulf the continent. Martin's popularity has grown immensely with the 2011 debut of *A Game of Thrones*, the HBO television series based on the novels, which has captured a wide audience and much critical acclaim.

THE GEORGE R.R. MARTIN COLLECTION AT CUSHING

She could see the rippling deep within the steel, where the metal had been folded back on itself a hundred times in the forging. Catelyn had no love for swords, but she could not deny that Ice had its own beauty. It had been forged in Valyria, before the Doom had come to the old Freehold, when the ironsmiths had worked their metal with spells as well as hammers. Four hundred years old it was, and as sharp as the day it was forged. The name it bore was older still, a legacy from the age of heroes, when the Starks were Kings in the North (Martin, 1996, p. 20).

A sword can be a powerful thing. On the continent of Westeros, the greatsword Ice has been wielded for some four hundred years by the patriarchs of House Stark, Lords of Winterfell and Wardens of the North. Ice has been used to fight in wars and rebellions, to mete out capital justice, and to defend the people of the North. Most famously, it has been used—with tragic irony—to execute its last owner, Eddard (Ned) Stark, before being melted down and reforged by his enemies into two new weapons.

Of course, *Ice* is a completely fictional object—it does its dramatic work strictly within the sprawling, colorful, and often bloody universe of the *A Song of Ice and Fire* cycle of fantasy literature by Martin (and its televised adaptation *Game of Thrones*). But, again, a sword can be a powerful thing; even a fictional sword physically represented by a carbon-steel replica has what Paul Moser called "sacro-power," the power to attract which emanates from the very being of primary materials" (Allen, 1999, p. 111). Cushing Library is privileged to have in its holdings not one but two versions of Ice as well as a number of other weapon replicas from the same media universe, and both our user statistics and our anecdotal information prove that this arsenal is absolutely electric with sacro-power.

We find that many of our patrons, especially students, are familiar with the books and the television series and are lured into the library by word of mouth about the George R.R. Martin Collection or through outreach events. Whether patrons come to Cushing specifically to see the weapons or are introduced to them proactively by Reading Room staff (and both instances happen not infrequently), they are invariably entranced by seeing, handling, and taking photos of *Ice* and its fellow replicas. By being able to touch and interact with these items—which we stress are part of a larger archival collection—new and anxious patrons learn how approachable a special collections library can be.

With this particular group of materials as a gateway, Cushing is using the inherent attractive power of both Martin's books and the *Game of Thrones* television series as a method of instilling a greater sense of comfort among its patrons. Indeed, it might be said that Ice and its fellows have been called into service to wage yet another war, this one against the powerful adversary commonly known as library anxiety.

The Martin Collection at the time of writing is composed of nearly 300 boxes holding the manuscripts, correspondence, and other materials of Martin. Included among the last are a number of replica weapons from the *Song of Ice and Fire* books and the *Game of Thrones* television show that are part of the Valyrian Steel Collection issued by Jalic, Inc. (Martin receives complimentary copies of some of Valyrian Steel's weapons, which he then passes on to Cushing Library for inclusion in his archives). Amongst these weapons are two versions of Ice. The complete contents of the Martin arsenal, as of this writing, include the following:

- *Ice*, modeled on the weapon described in the *A Song of Ice and Fire* novels;
- *Ice,* modeled on the weapon seen in the *Game of Thrones* television series;
- a Stark Infantry Shield, modeled on the item seen in *Game of Thrones*;
- a Lannister Shield, modeled on the item seen in *Game of Thrones*;
- King Robert's Warhammer, the weapon wielded by King Robert Baratheon and modeled on that described in the novels;
- Longclaw, the sword of Jon Snow and modeled on the item seen in *Game of Thrones*;
- Jaime Lannister's Sword, modeled on the item seen in *Game of Thrones*;
- Oathkeeper, the sword of Brienne of Tarth and modeled on that seen in *Game of Thrones*;
- Needle, the sword of Arya Stark and modeled on that seen in *Game of Thrones*;
- Khal Drogo's Arakh, modeled on that seen in *Game of Thrones*;

- the Night's Watch Dragonglass Dagger Set, modeled on the weapon described in the novels.

LITERATURE REVIEW

Valerie Harris of the University of Illinois at Chicago has written several pieces explaining the possibilities for academic special collections departments to make their holdings more accessible to users and to use those holdings as platforms for increased and more focused outreach opportunities. Harris's 2012 article, coauthored with Ann Weller, notes, in particular, that

> while the academic library's mission is primarily to support the research needs of its students and faculty, special collections departments welcome and serve a broader community of scholars and researchers, giving special collections librarians a unique opportunity to serve as ambassadors for their institutions... Special collections departments generally have dual, almost conflicting, roles with the collections that they own, process, and house—to both preserve the collections and make them accessible to users (Harris & Weller, 2012, p. 295).

This observation from Harris applies perfectly to *Ice* and its fellows; we believe that these objects hit the sweet spot of being legitimate special collections artifacts within an institution and part of an archival collection of scholarly merit while at the same time being objects that can be approached, handled, and wielded by any user.

Articles by Greg Johnson (2006) and Magia G. Krause (2010) have sought to improve the ways in which archives and special collections might be more welcoming to intimidated students. Susan Allen (1999) describes a survey she conducted in 1996 among special collections in liberal arts college libraries that concluded, among other points, "[a]ppropriate texts and manuscripts may...be put on view for the participants....The glimpse of a beautiful page, an intriguing manuscript hand, a gripping photo, or an important name may be all that is necessary to bring at least a few participants back on another day" (p. 115). At Cushing we frequently encounter this kind of emotional resonance between students and our collections, and few such encounters are more immediate and visceral than those with the weapons, especially because we allow physical contact and interaction with the items.

Daniel Traister (2000) has written several

Figure 2: Cushing Library patron wielding the book version of Ice.

pieces that put the special collections library and its outreach components into perspective. He writes in a self-titled polemical essay that such libraries need to rethink the ideologies of the past and begin practicing more proactive and aggressive forms of outreach. In his article "Public Services and Outreach in Rare Book, Manuscript, and Special Collections Libraries," Traister (2003) continues to argue for serious attitudinal changes in the ways in which librarians interact with users and allow those users to interact with collection items, notably that "readers must feel invited and welcome to, and comfortable in, the rare book department" (p. 89). The Cushing experience, we believe, reinforces the effectiveness of such a change in attitude.

THE SITUATION

Mellon and subsequent researchers studying library anxiety note the frequency of the phenomenon among students although it needs to be kept in mind that they describe a situation in a typical academic library. These libraries in form and function are not unlike those of public libraries with which we assume most students are familiar. Circulation, reference, media services, reserves—these are features common to both public and academic libraries. Therefore, if students are feeling anxious in an institutional setting that at least has something to do with a known quantity, imagine their insecurities when entering a special collections library with its own peculiar practices and requirements. Archivists and special collections librarians take for granted the pro-

cesses by which archives function because of their formal training and work. We know why we have guidelines on closed stacks, temperature control, safety, and maintaining the order of materials, but patrons may not. Traister ably summarized this state of affairs in 2003, noting that

> the closed- or limited-access stacks and storage facilities inherent in the nature of rare book collections (my shorthand for "rare book, manuscript, and special collections")...prohibit would-be readers from browsing shelves to locate materials of interest....Second, the generally persistent formidability characteristic of rare book collections and their staffs does not make them seem any easier to use than their closed stacks suggest (p. 87).

Traister's point is that special collections can come across as difficult and unwelcoming to many user groups. This is especially evident in light of recent trends in academic libraries to create a more informal and welcoming atmosphere—coffee shops, more dedicated study rooms, more comfortable furniture, and so on. In contrast, special collections have all kinds of specialized user procedures that may require explanation, ranging from stern warnings against the presence of food and drink, the requirement that patrons check their bags in lockers and then sign in (often multiple times), to the forbidding prospect of closed stacks that deny patrons immediate access to materials and the chance to browse (Johnson, 2006). Cushing Reading Room staff frequently observe patrons becoming intimidated by

> **» With these considerations in mind, it has become clear to Cushing staff that *Ice* and its fellows are natural candidates as gateway artifacts, that is, collection materials that help a patron become more comfortable in a special collections space. At Cushing we let patrons interact with the material by holding and/or wielding the weapons under staff supervision.**

these requirements.

Furthermore, patrons often bring preconceptions to a special collections library. They imagine the universal need for white gloves, are reluctant to touch anything, and feel vulnerable asking questions. People who are new to the library may feel that archivists do not trust them or are hiding the "cool items." They are scared to even hold the material or question why the stacks appear secretive and closed. It is imperative that all faculty, staff, and archivists explain in an open and welcoming way and without a negative or patronizing attitude to all patrons why particular procedures exist. However, the problem is that patrons can become terrified into a fight or flight response during interactions with special collections staff. Patrons in this high-stress mode are less likely to listen or become engaged with the archivist/librarian who is trying to assist them in their research.

At Cushing we have been breaking the "*Ice,*" so to speak, between archivists and new patrons through a proactive approach to customer service by providing supervised access to the Martin arsenal. Our formula is wonderfully simple:

- Many people are fascinated with weapons.
- Many people are fascinated with popular culture.
- Many people are fans of Martin's novels and of *Game of Thrones*, and many come into the Reading Room already aware of the existence of the George R.R. Martin Collection in Cushing's holdings.
- Cushing Library's main user population consists of Texas A&M University students, young people who form the perfect intersection of the three points given above.

With these considerations in mind, it has become clear to Cushing staff that *Ice* and its fellows are natural candidates as gate-

way artifacts, that is, collection materials that help a patron become more comfortable in a special collections space. At Cushing we let patrons interact with the material by holding and/or wielding the weapons under staff supervision. The range of patron engagement is wide—some simply look at the weapons in awe and delight whereas others like to hold them and wield them like the real weapons they imitate. Still others love to pose with them in particular tableaux—as *Ice* was used to behead Ned Stark, for example, so do many students pose in the act of beheading their fellow patrons. Another popular pose is that of the student sitting in a chair while grasping Ice's hilt, imitating the iconic image of Ned (as played by Sean Bean in the TV series) sitting pensively upon the Iron Throne. And many, many pictures have been taken of these interactions, either by the patrons themselves or by Cushing staff who often offer to take such souvenir photographs for patrons.

Some may see this behavior as strange or even frivolous in a traditional scholarly environment. We think it unlikely that researchers will use the weapons as major sources of research into, for example, the life and career of George R.R. Martin, the history and development of fantasy literature, or the study of popular culture. However, we have observed through multiple patron encounters that these objects have true psychological power, and, though that might be hard to quantify, that power has a demonstrable effect on making patrons more willing to engage with special collections. David B. Gracy (1989) pointed out the importance of "a personal connection with history....What draws genealogists into archives in such numbers that they constitute the largest single body of archives users if not a personal connection with the past? The concept of the importance of a personal connection with history should not take us by surprise" (p. 78). This intimate

connection, we repeatedly find with the weapons, is not restricted to items drawn from history—indeed, it extends to create an emotional bond that people have with literary works and with media products derived from those works. Modern popular literature and pop culture can be as cherished and as emotionally resonant with people as can more traditional historical and literary works and artifacts. By publicly and freely welcoming patrons to see and interact with the weapons and by explicitly linking them to the rest of the Martin Collection and the Science Fiction & Fantasy Collection as a whole, Cushing is fulfilling Gracy's contention that "archivists, you are what people think you keep" (Gracy, 1989, p. 78).

Since arriving as part of the Martin Collection, the arsenal's existence at Cushing Library has brought a noticeably increased number of patrons into the Reading Room. (It first came to the attention of the general public in March 2013 when the "book" version (that is, the version based on descriptions in the novel) of *Ice* and of King Robert's *Warhammer* was on display for Cushing's exhibit devoted to Martin.) Cushing Reading Room staff have been systematically maintaining user statistics for all collecting areas, including science fiction, university archives, military history, rare books, and colonial Mexico, to name a few, since at least 1993 and specifically on the Martin Collection and the weapons since May 2013.

METHODOLOGY

This is a preliminary observational case study, relying on monthly pull slip circulation data combined with anecdotal observations from Cushing faculty and staff. Reading room pull slip statistics are used to manage collections and track trends in our collections. The data are broken down into number of items used in the collections. The pull slips are tallied monthly and compiled yearly.

Figure 3: Cushing staff members Pilar Baskett (at left, wielding Jaime Lannister's Sword) and Jenny Reibenspies (wielding the sword 'Oathkeeper'), waging battle in the Reading Room.

Texas A&M University (TAMU) Archives is a conglomerate of university-related material, of which Cushing is the sole repository. The TAMU Archives—which are the largest and best-known group of archives in the library—are the ones most used, which is fitting considering our nature and mission as the repository for the institution's history. The Science Fiction and Fantasy Collection is the second largest collection and is also well-known due to its size, the intrinsic interest of the subject matter, and various outreach efforts. The pull slip data include requests from e-mail, telephone, and in-person visits. (The Martin weapons are only considered as in-person visits.) The time period of the study was from January 2014 to December 2015. The weapons arrived at Cushing in early 2013 and were part of an exhibit from spring 2013 through January 2014. Therefore, we gathered pull slip data from January 2014 forward when patrons could request the material on their own rather than being able to view them on display.

ANALYSIS

The total circulation (pull slip) statistics gathered from January 2014 to June 2015 reflect the usage of the Martin weapons. For January-December 2014, the Sci-Fi Collection had 539 total patron requests, of which the Martin weapons alone comprised 19 (3.5% of the total). For January-December 2015, the total number

of items circulated (that is to say, items requested by patrons and pulled for use in the Reading Room) increased considerably for the Martin weapons. There were 387 requests for Sci-Fi materials, of which 250 (an astounding 65%) were for the weapons. One variable to consider in this study is an increase in overall student population at Texas A&M from around 35,000 to over 40,000 students between the 2013/2014 and 2014/2015 school years. We believe the popularity of the Science Fiction & Fantasy Collection, and the George R.R. Martin Collection more specifically, is also due in large part to a sharp increase in public awareness of the Martin Collection. Two large-scale public events, *Deeper Than Swords* (2013-2014) and *5 Millionth Volume* (February 2015)—both of which included Martin's presence on campus — were coordinated with the TAMU Libraries Marketing and Communications staff, which created and distributed fliers, e-mail announcements, pins, and exhibit catalogs, as well as promotional banners for Cushing. The publicity resulting from these events shined a bright light on the Martin Collection. Another factor contributing to the increase in usage, we believe, is the widespread amount of public attention that Martin, his image, and his works have generated since the 2011 debut of *Game of Thrones*.

We grant that more research is needed to determine beyond a doubt whether there

is a direct association between the use of the Martin weapons and a positive association with new users. We hope to conduct a quadratic or in-person survey with individual researchers who come in to view the materials and ask them about library customer service and the materials they use. Such a survey would also ask patrons how they became aware of the weapons so that we can gauge the efficacy of our publicity and outreach efforts. In this case, however, we can at least establish an increase in usage and therefore an increase in popularity. From the data, along with staff observations, we also infer an increase in potential satisfied users.

When the data is taken overall, it may appear that the Martin weapons rarely circulate. However, that observation fails to take into account the size of the collection. Bearing in mind that they are only one segment of one series of one larger collection within a very large collecting area, it is clear from available user statistics that the Martin weapons are popular quite out of proportion to their numbers in the Cushing stacks.

Cold numbers—cold as *"Ice"*, as it were—of course, can only tell so much of a story. Reading Room staff members, who receive the vast majority of the responses from patrons, can supply numerous anecdotes about individual and group patron encounters with the Martin weapons. A few are given below. Together with statistics, the emotional responses, as shown here, demonstrate a clear and ongoing fascination and enthusiasm for these objects.

SELECTED PATRON OBSERVATIONS BY THE AUTHORS

Upon hearing of our 2013 Deeper than Swords exhibit, a patron came to view the weapons with a small group of friends. The group arrived, nervous and excited. They asked in a whisper whether we still had "Ice", because they had heard about our collection of *Game of Thrones* items. I confirmed that we did. They then nervously told us that they'd never been in an archive and did not know what to do or if they were allowed to see the weapons. We explained the policies and had them fill out new patron forms. At first they were hesitant until we reentered the Reading Room carrying Ice. Immediately the students opened up, sharing their interests in Sci-Fi and the works of George R.R. Martin. Other students came over to share their interest in the

> **A patron who visited the reading room came up to the desk and quietly asked if he might be allowed to see the Martin materials. I confirmed that he could and I pulled out Ice along with the manuscript of the first book in the *Song of Fire and Ice* series, *A Game of Thrones.* He was impressed and seemed more at ease than when he walked in.**

material. We received positive feedback and were called the "cool library" because of our interesting material, friendly staff, and awesome building.

An EMS responder and his colleague visited Cushing on their break. They heard about the *Game of Thrones* exhibit and were curious to see what we had available. I retrieved the weapon replicas "Ice" and the Warhammer for them. The responders had never been to a special collections library before and held preconceived notions that this type of library was restricted and off limits. However, after viewing the replicas, they immediately asked if we had any rare medical books. Confirming that we did have related material, I brought out a few of our 19th century medical books. A month later the same EMS responder returned with new friends to show them the same material from his previous visit. He also requested more books to view so we showed the group the cuneiform tablets and the Second Folio of Shakespeare. Huge grins appeared on the patrons' faces when the materials were brought out, and the patrons were amazed they were allowed to physically handle as well as examine the materials up close. The EMS responder mentioned that medical books brought to life his work, and the swords brought out his imagination. It was good to see that members of the community outside of the university were able to feel welcomed and were engaged in the wonder of the archives.

A patron who visited the reading room came up to the desk and quietly asked if he might be allowed to see the Martin materials. I confirmed that he could and I pulled out Ice along with the manuscript of the first book in the *Song of Fire and Ice* series, *A Game of Thrones*. He was impressed and seemed more at ease than when he walked in. I explained what we do at Cushing, what special collections involved, and how to ask for materials. He returned a month later

with a friend to look at our *Don Quixote* materials. He was excited to look at some early *Don Quixote* books since Cervantes was one of his favorite authors. We made a huge impression on him and sparked his interest in learning more about the authors and materials held in the special collections that might be used for his class projects.

One patron came in with her friend who was visiting from out of state. They came to view the weapons (*Ice* and the *Warhammer*) after having heard about the George R.R. Martin material. After realizing they could view additional material, the patrons inquired about other material housed at Cushing but admitted they were nervous about handling rare items. I told them if they ever wanted to look at material, we would help them find what they need. We must have made an impression as the same patrons returned the next afternoon and asked for our rare material in the early Spanish language. We pulled early editions of *Don Quixote* and Mexican colonial documents that inspired the patrons to do more research on early Spanish translations. A replica of a fictional weapon can encourage and engage patrons to find their interests in both Game of Thrones and early Spanish language.

A patron dressed in full cap and gown came in a few hours before his graduation ceremony. He informed us he was taking his own informal Elephant Walk. (The Elephant Walk is one of many A&M traditions. In particular, the Elephant Walk is an event where Aggie Seniors join hands and walk around visiting campus landmarks for the symbolic last time.) Cushing was one of the landmarks as he wanted his picture taken in his graduation attire with a sword from our George R.R. Martin collection. We decided the book version of Ned Stark's Ice sword would be the best choice for his photograph.

Two visiting patrons entered the Reading Room while we were showing the

swords to other patrons. They were drawn to our display and were informed about *Game of Thrones*, George R.R. Martin, and his collection here at Cushing. The two patrons took photos of the swords as they wanted to show them to their grandchildren. They were very excited to be the cool grandparents and stated they would make plans to bring their grandchildren to Cushing in the future.

A woman came in with her son, touring various colleges to decide which one he wanted to attend. He had never been in a special collections library before, but was a fan of Martin and had heard that we had Martin's papers. He was incredibly enthusiastic when we brought out the weapons for him to look at and handle. Between the weapons and examples from Martin's *A Game of Thrones* manuscripts (which we also brought out as a kind of a Martin introductory package), he clearly had a very enjoyable experience in a place where he was not expecting anything of the kind. As they left, his mother said to me she thought this might have swayed him in the direction of attending Texas A&M.

CONCLUSION

In 1989 Randall Jimerson quoted a 1969 article on the marketing of museums that stated "for many people, museums are cold marble mausoleums that house miles of relics that soon give way to yawns and tired feet. To counteract this, museums should pay closer attention to their users' concerns and needs….Archivists face similar challenges" (Jimerson, 1989, p. 336). Those challenges threaten special collections librarians and archivists alike. They include patrons' fear of an unfamiliar learning environment, their nervousness at interacting with rare and potentially fragile materials, their perception of a seeming formal and standoffish library staff, and their lack of emotional and psychological engagement with materials.

> » **We believe that our experiences with the Martin weapons offer examples for our sister institutions. Many collections hold items that carry intrinsic interest to patrons and would not suffer unduly from repeated viewing or handling.**

Free and open display and use by patrons of the George R.R. Martin weapons at Cushing Memorial Library have proven to be an immense boon to us and, we believe, effective methods for overcoming some of these challenges. The weapons, drawn from a literary and televised universe of incredible popularity, bear that sacro-power so crucial to the formation of psychological links between patron and object. And the marketing is self-perpetuating: as more patrons become aware of the existence of the weapons, the word naturally spreads. Many of the patrons who view the weapons mention that they were informed by friends or fellow students.

We believe that our experiences with the Martin weapons offer examples for our sister institutions. Many collections hold items that carry intrinsic interest to patrons and would not suffer unduly from repeated viewing or handling. If the institutions holding such items— such gateway artifacts—are willing to engage a general public as well as specific researchers, our experience demonstrates that an atmosphere of lively interactions may be fostered.

As Susan M. Allen notes, a "book or any other object in special collections is nothing until a human being interacts with it.... When students, alongside their teacher, gain access to original material, then a conversation of mythical proportions becomes possible. Students and their teacher can converse over these materials. When the sacro-power of books takes hold, they themselves will begin to converse with human beings of every other age without regard for the normal restrictions of time, culture, or language" (Allen, 1999, p. 111). It may seem presumptuous to place replica weapons on the same emotional level of Shakespeare's First Folio, a medieval book of hours, or a Sumerian clay tablet. However, the psychological power at work is very much the same—patrons who know the *Song of Ice & Fire*

books or the *Game of Thrones* TV show can grasp the hilt of a sword, and we can see their imaginations fire. Inside the confines of the Reading Room they see themselves as noble-therefore-doomed Ned Stark, as Jaime Lannister, deeply flawed yet working towards redemption, or as intensely honorable and duty-conscious Brienne of Tarth.

In holding these objects, patrons are interacting not with the object creators (as in Allen's example) but with the characters who wield them, which is an equally valid relationship. The strong emotions, those that relics of popular culture can generate, open doors—patrons learn that the special collections and archives in which these materials reside contain an air of familiarity, and their anxiety is significantly reduced.

As we mentioned above, further analysis is required to prove definitively our contention that this reduction in stress and discomfort produces repeated visits. However, on a visceral and observational level, at Cushing Library we have found that *Ice* and its brethren can serve ably as weapons of a different sort to combat fear and to carve out in a manner sharp as Valyrian steel new avenues of approachability and openness in special collections. ∎

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A Practical Guide to Improving Web Accessibility

BY CYNTHIA NG

INTRODUCTION

This article is intended to provide guidance on making library websites and other digital content accessible within the constraints of most organizations' technological environments. Accessibility can mean different things depending on the context, but the focus in this article is on web accessibility, which the World Wide Web Consortium (W3C) defines as "enabling people with disabilities to participate equally on the Web" (W3C, 2016). Many existing articles provide an overview of the big picture aspects of accessibility, including benefits to the organization (see Rowland, Mariger, Siegel & Whiting, 2010), legislation (see Fulton, 2011), statistics (see local census data), and general principles (see Quesenbery, 2014). The focus of this piece will be on specific best practices and guidelines, as well as their benefits for content creators, who frequently have limited access to edit digital content and cannot always apply recommended solutions that assume full control and access.

BENEFITING EVERYONE WITH UNIVERSAL DESIGN

Web accessibility is often considered separately from other aspects of web design and development, pigeon-holing accessibility into a single point on a checklist (Quesenbery, 2009) instead of being integrated throughout the workflow. Unfortunately, such practice ignores the fact that accessibility impacts usability, findability, user experience, and other aspects of digital content, and affects all users, not just those with disabilities (Quesenbery, 2009). In order to provide a user experience that allows people to achieve their goals, accessibility guidelines and best practices need to be integrated into the regular content lifecycle.

Understanding accessibility requires us to consider the use of websites and other
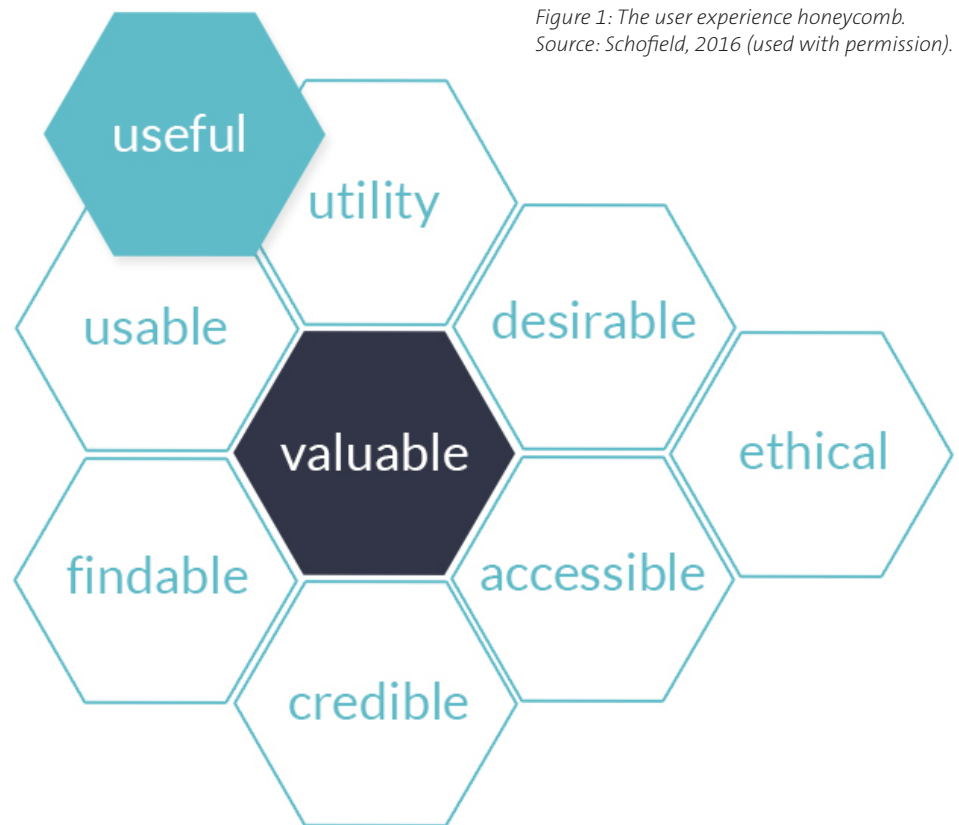

Figure 1: The user experience honeycomb. Source: Schofield, 2016 (used with permission).

digital content holistically, encompassing:
- Hardware including desktop and mobile devices, pointing and input devices
- Software including operating system, browser, assistive software
- Environmental conditions such as lighting (Shneiderman & Hochheiser, 2001)

Accessibility does not refer only to website design or code creation. The vast majority of most library websites are composed of content written and created by contributors outside of the team that maintains a website or digital service or system. All aspects of a website or digital services need to be considered when creating or maintaining content (**see fig. 1**).

Taking so many considerations into account can be difficult, but one potential solution is a holistic approach called universal design—also known as universal

usability, or design for all—"to enable the widest possible range of users to benefit" (Shneiderman & Hochheiser, 2001). Ensuring that users with disabilities can make use of digital content is vital, but most of the recommended guidelines make digital content accessible to a broad range of people, not just those with disabilities. Thus, making content accessible to those with disabilities means it will be more accessible for all users.

MAKING CONTENT ACCESSIBLE

In many organizations, staff are encouraged to create and edit content in a variety of digital systems, including content management systems, LibGuides, and learning management systems. In these systems, content creators are usually limited to a WYSIWYG (What You See Is What You Get) editor that offers a very limited range of control over

the content and its presentation. However, it is still possible to make content more accessible by following some content creation best practices.

WRITING FOR THE WEB

While it is easy to focus on the technological aspects of digital content, the written text itself also affects accessibility. The average person, for example, can make simple inferences but will have difficulty with lengthy, dense text that requires constructing meaning across multiple chunks of text (National Center for Education Statistics, n.d.). Even without specific accessibility concerns, when text is presented in large and long paragraphs, users may have more difficulty reading the text and will have to spend more effort referring back and looking for specific pieces of information. Well written and spaced text decreases the chances of a reader getting lost, thereby improving the likelihood that users find what they want or need, and improving user experience.

There are many books published on writing for the web, but at the core, there are three main points to keep in mind when writing content:
1. Be clear and concise.
2. Format text to include considerable white space; break up longer paragraphs, and use bullet points.
3. Write in simple language with everyday words; avoid jargon and acronyms, or make sure to explain them.

Simple and clear writing improves accessibility, particularly for users with reading disabilities and those with difficulty concentrating. It is important to have white space so that users can easily scan text, and find their spot should they be interrupted. Jargon and acronyms can be difficult to mentally parse if they are not part of a user's everyday vocabulary, and if not properly explained may impede understanding. Following these writing guidelines will improve the user experience since users can better understand and interpret the content (Kammerer, 2009).

HEADINGS

A heading is a topical or subject phrase, describing the content below it. Often headings are treated as a visual element, created by changing the size and weight of the text, but they are an important semantic element that helps structure and organize the text for all users. Headings in digital content
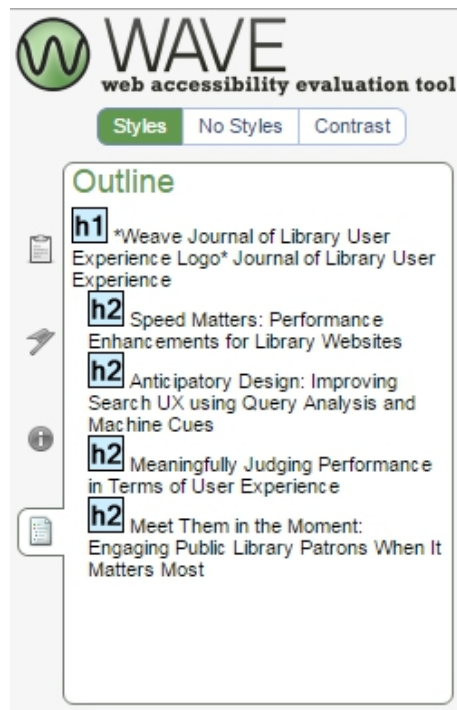

Figure 2: Weaveux.org outlined by WAVE, an accessibility tool.

are used much like in formal writing or writing done for print. The top level heading is heading 1, and typically reserved for the title of a page, with headings 2 through 6 used for page content.

Example:
- Heading 1 (Title): Making Content Accessible
- Heading 2 (Topic): Creating Documents
- Heading 3 (Subtopic): Using Headings
- Heading 2 (Topic): Creating Media

Using headings properly also makes content more consistent, as each level of heading is typically styled by the system, such that even if changes are made to the code, the change will be applied uniformly to each affected heading. As users become familiar with a site, they will also become more familiar with what each level of heading looks like, making it easier to look for information within the content.

Many reading tools and assistive technologies allow users to read the headings first like a table of contents (see fig. 2) or to skip content by heading, so using headings to organize writing greatly increases the navigability of longer content.

Finally, using headings not only makes the content easier for people to mentally parse, but also makes content more searchable and findable. Some search engines use headings to help determine what a page is

about, so without headings, a page may end up lower in search results (Purtell, 2016).

LINKS

Much like headings, many assistive reading tools and software allow users to view all the links on a single page while ignoring the surrounding text, or to jump from one link to the next. Therefore, the textual description of a link needs to signal clearly the purpose of each link. Content creators need to particularly avoid uninformative phrases, such as "read more," and "info" (WebAIM, 2016b).

Consider the following short piece of text (where underlined text is a link):

If you want to know more about descriptive links, **click here**.

In a list of links, a user using a "links only" view would only see or hear the text "click here," making it difficult to distinguish from other links that have the same text. In order for links to be accessible, link text should be descriptive, ideally explaining what is linked to:

You can learn more about **descriptive links from WebAIM**.

Even if the user only sees the link text, it is now clear that the link goes to a WebAIM article about descriptive links. Assistive software users frequently show or read links only, so using "click here" does not allow users of such software to distinguish the differences between all the links with the same link text. Users of visual browsers also scan links when looking for relevant content, so using descriptive link text improves the user experience for all visitors by allowing for an easier understanding of where links go, letting users quickly find links, and preventing repetitive content.

AUDIO AND VISUAL CONTENT

For all audio and visual content (such as images and videos), an alternate version of the information should be provided to make the information accessible to users who cannot hear audio and/or see images and video. Not only is a textual alternative to audio/visual content necessary for deaf and visually impaired users, it can be helpful to users whose software cannot load the visual content, such as if the link is broken, or there is a bad connection. Almost one-third of the United States is not on broadband connections (Horrigan & Duggan, 2015), and many more are on slow connections, such as users in rural areas, on cheap internet packages, or on cellular network connections. These

users are more likely to have images and video fail to load due to unreliable networks, and are more likely to intentionally turn off audio/visual content from loading in their browser to speed up page load times or save on data usage. Creators should keep in mind that they often have access to better hardware, software, and network connections than many, if not most, of their audience.

IMAGES

Images need either "alt text" (alternative text) or a caption filled in with a brief description of what the image is trying to convey. The alt text is the textual description used in place of the image when the image cannot be loaded or read to the user when accessed using screen readers. The caption is text that is kept with the image and typically displayed below it. Most WYSIWYG editors provide fields to add text for alt text and caption, allowing for both to be filled in (**see fig. 3**). They should not repeat each other, but can be used to complement one another. For example, the alt text might describe the image itself, and the caption might have commentary or a source note.

In cases of images of charts or datasets, it is recommended to provide a summary of the data in the alt text, and if possible have an equivalent data table available either on the same page or an easily reached other location.

Note that not all images need captions or alt text. No text description is needed if the image is purely decorative, or if the image is a duplicate of textual explanation. For example, in a tutorial with step-by-step instructions, screenshots or other images to simply show what each step looks like do not necessarily need alt text. In **figure 4**, the flowchart helps people decide when alt text is required.

Images of text should be used sparingly, if at all, as actual text is accessible by default. For example, an organization's name and contact information should be in text so that anyone can easily copy it for use elsewhere, such as a map application. Having contact and other basic information in text format is also very important, not only for direct accessibility purposes, but also to improve search results in search engines.

ADDING AND CREATING OTHER MEDIA

Like images, any audio/visual material should have an accessible alternative version. For audio the alternate version is a text transcript, either presented on the same
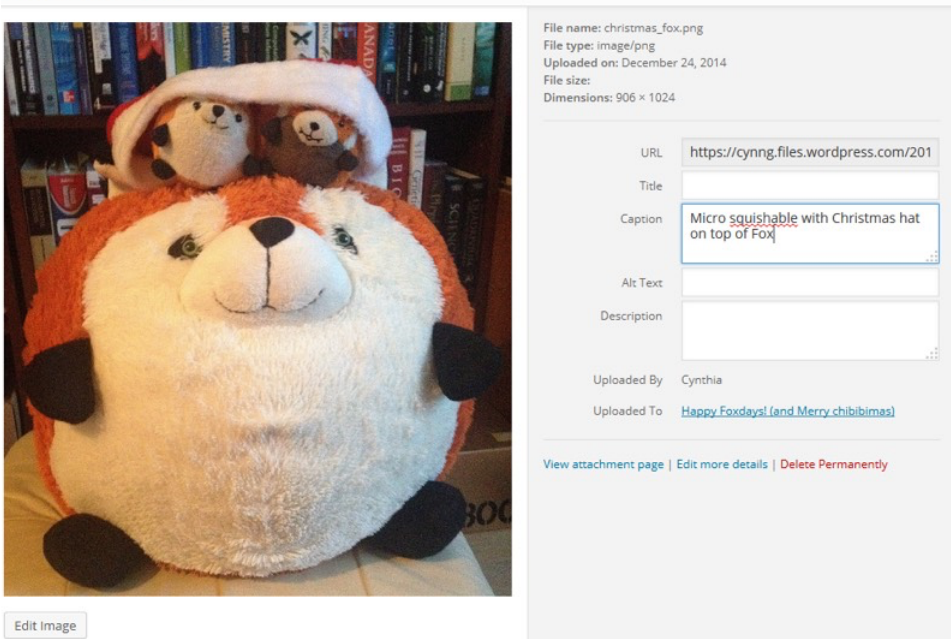

Figure 3: Screenshot of WordPress image editor with caption field filled in.
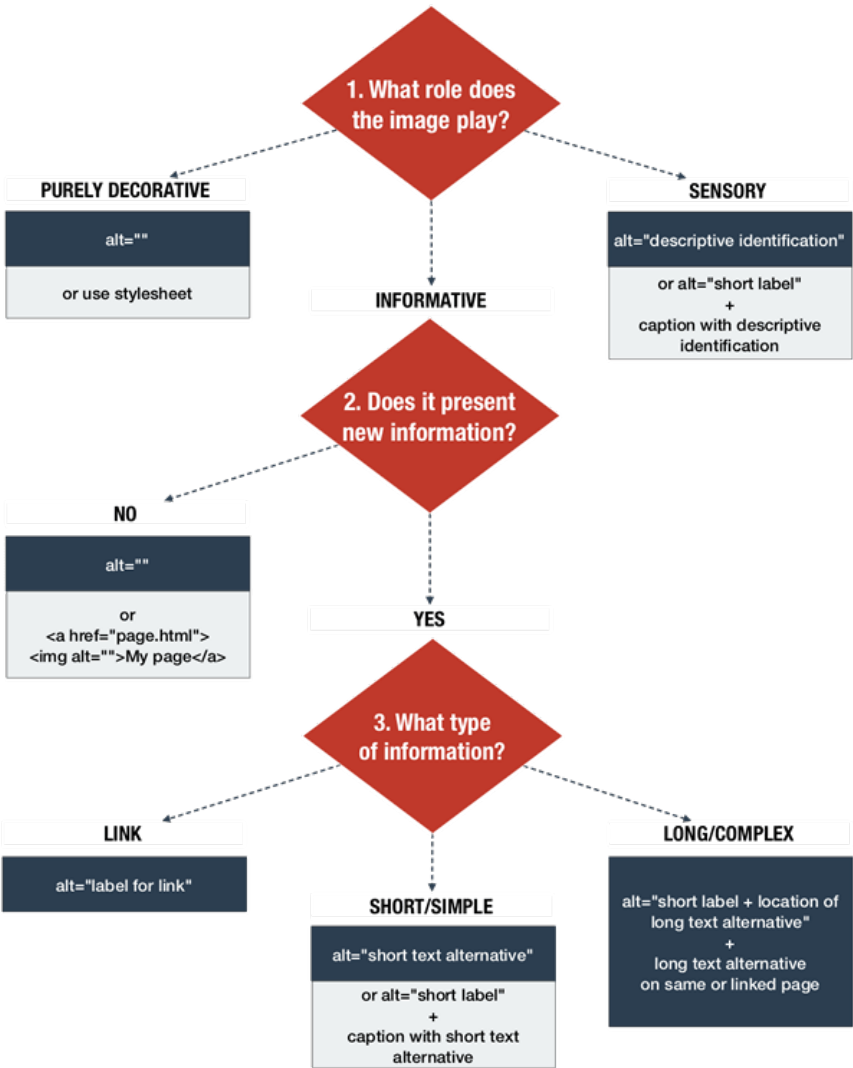

Figure 4: Image alt text decision flowchart. Source: Alexander, 2010 (used with permission).

page or as link to the transcript. Video alternatives include:

- text transcripts,
- closed or open captions: subtitles with description of non-speech elements, and
- descriptive video: video with an audio track describing the visuals.

If adding media that is not created in-house, consider asking the person or organization who created the material for a copy of the transcript. If that is not possible, consider using an automatic transcription program and then editing the transcript. There are a number of free and paid software, installable and online, such as **PopUp Archive** and **VoiceBase**. Commonly, video creators will use the transcript from YouTube's automatic caption service that is generated after a video is uploaded.

Since it is time consuming to create or edit transcripts of existing material, consider making use of existing services within the organization or hiring a transcription service to provide accessible versions of required material on-demand, when requested by users with related disabilities. While that can be daunting, consider offering transcription services on-demand for users if you have a large backlog of non-captioned or transcribed media. At an academic institution, there may be a department with experience in making material accessible, who can provide assistance.

Transcripts and captions are useful not only for those using assistive software, but also for those who are hard of hearing, listening in noisy environments, and are less familiar with the spoken language (Griffin, 2015). One study showed that 80 percent of the respondents used captions to watch television even though they did not have a hearing impairment (Ofcom, 2006).

EMBEDDING THIRD-PARTY MEDIA
When adding media from a third-party (such as YouTube) in such a way that it can be played on the web page, also add a link to where the original source can be found. A link allows users to view the content on the original site, which may have more controls, accessibility features, and other features not available in the embedded version, including auto-generated closed captions.

Most embeds also include a small set of options the designer of the page can set (**see fig. 5**). While often these can be left to the defaults, it is worth making sure that the embedded media:
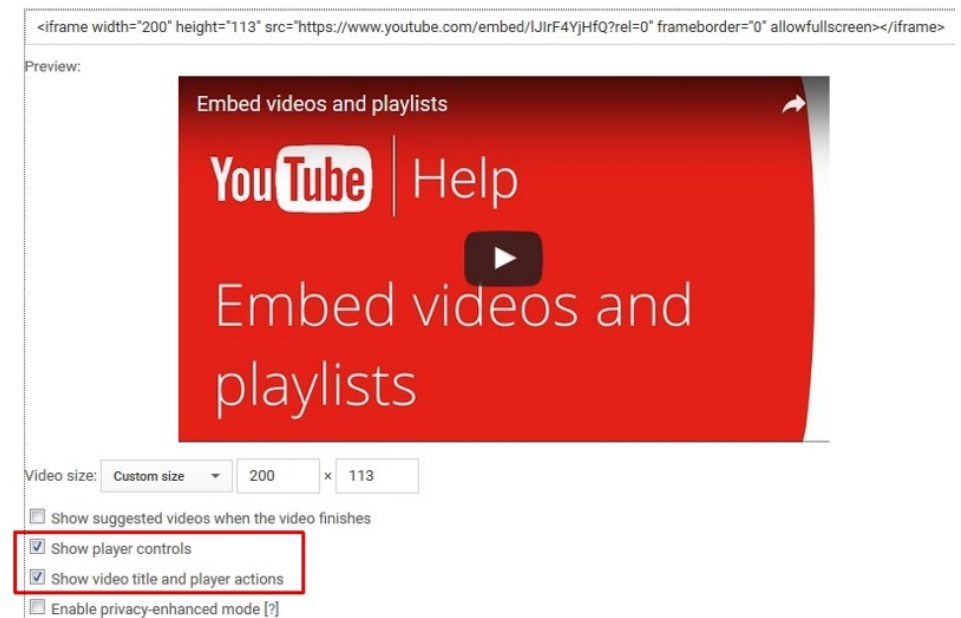
Figure 5: Screenshot of YouTube embed options with "Show player controls" and "Show video title and player actions" checked.

- has controls to play and pause at a minimum,
- has keyboard functionality for its controls, and
- does not automatically start playing (autoplay).

These guidelines also apply to other interactive features on a website, such as carousels or slide shows.

Many embedded videos can be set to autoplay when the page is loaded or at some other time, as in figure 6. Media that autoplays can be distracting or confusing. For those using assistive software, autoplay is especially problematic because depending on how the media player is coded, the cursor or page focus may move every time the media automatically triggers an action, interrupting what the software is reading to the user. A user navigating the site by keyboard will constantly find the cursor jumping back to a carousel every time the image changes. For these reasons, autoplay should be avoided or switched off whenever possible.

Controls for media elements should be clearly visible with keyboard functionality enabled. Generally, media players will either be built into the system or originate from a third party, but should be properly tested before use.

Adding links to sources, disabling autoplay, and providing playback controls, ensures a positive user experience by allowing users to decide how they interact with the content. In WordPress YouTube embedded

videos have controls and do not autoplay by default, so that the only other thing needed is a link below to the actual YouTube page with the video. Users come to a site for the content, but for the best user experience, the user should be allowed to decide how to access, view, and interact with that content.

COLOR CONTRAST AND TEXT STYLES
For text and media, color should not convey meaning. For example, charts and figures are frequently made with different solid colored sections. However, about 8 percent of men and 1 percent of women (Mandal, 2014) have a form of colorblindness, and may not be able to tell which color reflects which piece of information. For example, in figure 8, the green at the top and the red to the right of it are difficult to distinguish in the grayscale version, being divided only by a very thin line. The two yellows on the left may also be difficult to distinguish in both versions.

While this is particularly relevant to images, this guideline applies to text content as well. Assistive software will frequently indicate if text is bold or italic, but not if it is simply displayed in a different color. Some users may need to view a site using monochromatic displays. Users may also print information, and will appreciate being able to print in black and white, or grayscale.

Good color contrast also increases visibility in poor lighting conditions. For example, when viewing a screen in bright light that causes glare on the screen or if the screen is set to a low brightness level to save battery

life, content is more viewable if it has high contrast. These are situations that affect all users, not just those with assistive devices.

DOCUMENTS

Document creation (Word, PDF, etc.) should follow the same general principles as web content. Making documents accessible allows users not only to read them with assistive software, but also allows all users to annotate and make notes, copy, and print information. Most document creation programs, including Word and Acrobat Reader, have built-in accessibility checkers. Document content is not guaranteed to be viewable in a web browser, which may force the user to open the content in a separate application. Text that is meant to be read online should not be put into a document, but made part of the page.

ASSESSMENT AND EVALUATION

Many excellent strategies for evaluating and assessing websites and digital content are covered in other articles or resources on usability, analytics, and user experience (see usability.gov/ for more). While a full exploration of this area is out of scope of this article, this brief overview should provide a starting point, and focuses on assessment and evaluation centered on meeting accessibility guidelines.

There are many types of tools that can help determine whether digital content is accessible:

- Documents and other non-web page content: most popular commercial document creation software, such as Microsoft Office and Adobe Acrobat, have built-in accessibility checking tools. Otherwise, following the content creation guidelines above should cover most cases (see WebAIM, 2016a for more).
- Emulation/simulation tools: These tools provide a different representation of what users see or hear. Examples:
  ○ WAVE Toolbar can display a web page in different ways, such as an outline of headings, and a text-only version.
  ○ Colorblind Web Page Filter simulates different common types of colorblindness.
  ○ Fangs, a Firefox plugin, emulates a screen reader by providing what would be read out loud in text format.
- Automated code checkers check whether a web page meets guidelines based solely on the output code. Examples:
  ○ HTML Codesniffer, a bookmarklet,

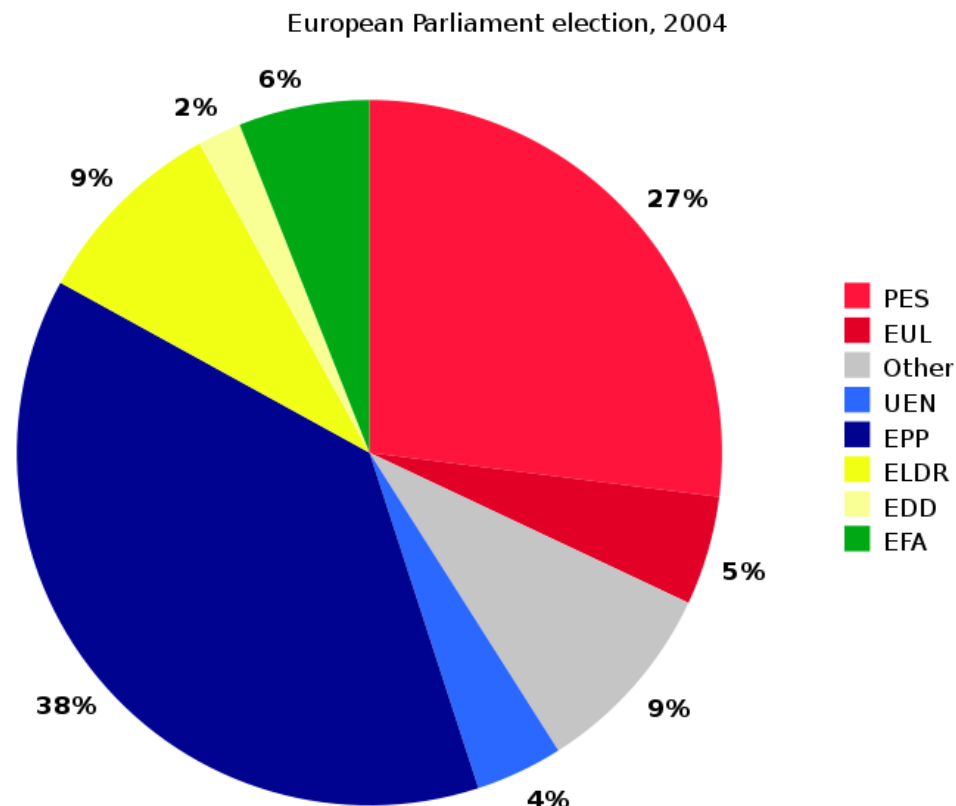which checks whether code conforms to either Section 508 of the Americans with Disabilities Act or Web Content Accessibility Guidelines (WCAG).
  ○ WCAG Contrast Checker, a Firefox plugin, which checks color contrast of all elements.

Assistive technology: directly test a website's accessibility, usability, and overall user experience using screen readers and other assistive technology. However, many specialized software and devices require training to use.

The difficulty with many of these assessment and evaluation tools are that they assume the user will understand and know how to interpret the results and apply the necessary changes to fix any issues. Unfortunately, many of these tools do not have an "easy" or "basic" mode, flagging all instances of possible accessibility issues, which can be overwhelming.

Content creators may also find errors in parts of the website that they have no control over, such as the header or the default styles of content. Focus on the content pieces that can be easily fixed (see W3C, 2015 for more information), and then, if possible, speak to the administrators or developers of the website (see next section on Talking to Vendors).

False positives are common with automated tools, so the results they produce need to be carefully scrutinized. For example, some checkers will flag all instances when an image has no alt text. However, if the image is decorative, then that particular instance of the error can be ignored.

Even without automated tools, content creators can still do periodic checks of their own or their peers' content following the guidelines presented in this article.

The most important evaluation method is to get feedback from users. Design decisions are frequently made based on assumptions that cannot be validated or invalidated without testing by real users (Loranger, 2014). Whenever possible, find users who use assistive technology to help with testing. Make the effort to include such users in any usability testing.
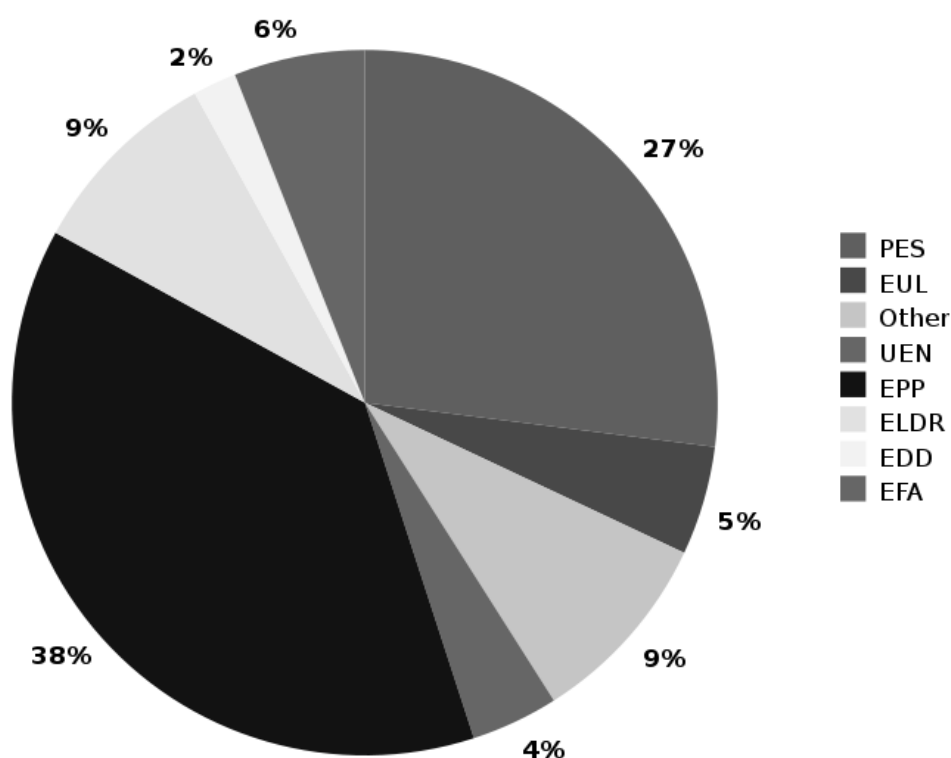
TALKING TO VENDORS

Because many content creators or organizations do not have full control of the digital services provided by the library, it is important to have a review of third-party digital content and services and report any issues to the appropriate vendor.

When reporting issues to vendors, it is critical to provide as much detail as possible about the problem, and how or when

Figure 6: Screenshot of carousel from shouldiuseacarousel.com with autoplay enabled as It is changing slides.

European Parliament election, 2004

Figures 7 & 8: Example pie chart using various solid colors with grayscale version for comparison. Source: Liftarn, 2009.

it occurs. Simply saying "the website is broken" or that the product needs to be "made accessible" is uninformative and makes it difficult for the person receiving the comment to assist, resulting in very little change. However, if there are specifics about the issue, then it is at least possible for the vendor to fix the issue. If there are multiple issues, report the issues separately, addressing each one as they are found. Possible solutions to the problem should be included or a link to such a solution provided. If providing a link, the page or a section of the page should clearly solve the specific problem, preferably with code examples if applicable.

Always provide information on the device's operating system, browser (if ap-plicable), vendor software or service where the problem is encountered with version numbers, if applicable. Try to detail the specific steps that were taken and whether the issue could be replicated in another session. Also, include an annotated screenshot of the problem if possible.

For example, a simple request might look something like this:

I think this change could improve the accessibility for images added in the system. When a user adds an image:
1.   Choose the file to upload.
2.   Fill in the alt text field.
3.   Leave the title field empty.
For some reason, the alt text always shows up as the title instead.
Example: http://library.com/location/;

the picture of our main branch has alt="" and title="large red brick building" but in the media library, it's the opposite.
Using: Library Website v1.2.3
Browser: Firefox 43.1
OS: Windows 10

ACCESSIBILITY STATEMENT

After making digital content more usable and accessible, an organization can increase transparency and show commitment to providing equivalent access to users by writing and posting an accessibility statement.

An accessibility statement can be relatively short, but should include some basic information, including:
· what has been made accessible
· whether the site conforms to one or more specific sets of guidelines
· what part of the content is not controlled in-house (namely vendor products, but it can include a line to say the organization works with vendors)
· who can be contacted, and how, if there are any issues.

Some examples of accessibility statements are:
· University of Toronto Accessibility Statement,
· University of Oxford Accessibility Statement, and
· North Carolina State University Accessibility Statement.

CONCLUSION

Many organizations do not have complete control of the online systems used to provide information and services to their users. Off-the-shelf vendor tools make up a large amount of the digital tools many libraries offer users, so often organizations leave it to vendors to make the needed improvements. However, as this article shows, there are things staff likely can do within the

» **After making digital content more usable and accessible, an organization can increase transparency and show commitment to providing equivalent access to users by writing and posting an accessibility statement.**

> » **Accessibility is not simply a way to meet legislation or avoid litigation, but a fundamental aspect of a user's experience of the organization's digital space. Libraries should integrate accessibility concerns into the larger picture of user experience to benefit all users, not just those with assistive devices.**

constraints of vendor tools and systems to make their content more accessible, as well as communicating more effectively with vendors about accessibility issues.

Accessibility is not simply a way to meet legislation or avoid litigation, but a fundamental aspect of a user's experience of the organization's digital space. Libraries should integrate accessibility concerns into the larger picture of user experience to benefit all users, not just those with assistive devices.

Note: For a more technical look at creating accessible websites and applications, see the author's recent co-authored article in Code4Lib Journal: **A Practical Starter Guide on Developing Accessible Websites**. ■

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Between the Sheets

» A Library-wide Inventory with Google

BY CRAIG BOMAN AND RAY VOELKER

In the summer of 2015, the University of Dayton Roesch Library needed to scan, reshelve, reorder, or restore item statuses for all of the books in our circulating library collection. The previous library-wide inventory was conducted the summer of 2008 or "that summer when the library air conditioning went out." At that time, our predecessors used a portable Percon barcode scanner and barcode data was imported through the ILS inventory module (then III's Millennium, now Sierra). Even when the shelves were scanned in the right order and the Percon battery did not die, finding a computer with a serial port to get the data off of it was not easy. Although there are certainly better upgrades available to older Percon scanners, in 2015 the library did not have the budget to buy lots of devices for an inventory. In our department (Information Systems and Digital Access), we did, however, have spare USB barcode scanners, some spare laptops, and a handful of student workers we could hire.

To be entirely honest, we started our 2015 inventory with the question, "What if we use Google Sheets for our library inventory?" Discussions of why and how you should do a physical library inventory (Sung, Whisler, & Sung, 2009) and how you should avoid doing a physical library inventory (Loesch, 2011) all served as evidence which encouraged us to further explore alternatives (like Sheets) for our new inventory.

We made a decision to explore a Google Sheets-based inventory based on the flexibility it would provide to create better inventory data than most vendor-supplied inventory products; products which we, and many other libraries, cannot afford. This article will not be a ROI study but more of a case study of the tools and methods we used to conduct our own physical book inventory. It also should be clear that we are not advocating this as the best way to conduct a library inventory; this is simply a method that we chose to use at the time, and one that worked reasonably well for our defined goals.

IDENTIFYING PROJECT NEEDS AND REQUIREMENTS

When we began thinking about doing a library-wide inventory of the University of Dayton Libraries' public collections we naturally started examining the tools that were available to us in the Integrated Library System (ILS) in use at our institution. At the time of writing this article, that system was Sierra ILS. Thanks to the 2008 inventory, we had some documentation from that process to work with. As we examined the documentation, we were quickly able to identify several problem areas with the methods and tools used for that process. While we were both with the library during the previous inventory, we were in different roles at the time and therefore not involved with the inventory planning process, so we were excited to take an ownership role in this 2015 inventory. We wanted to get started with the process of streamlining the inventory to make it more efficient right away.

The first thing that we noted from our previous inventory was that the method was slow, laborious, and prone to scanning errors and data loss. The Percon barcode scanners used had to be of a very specific type, and were, for all intents and purposes, pretty dumb devices. First, they had no way of telling the user the last series of barcodes scanned. If the person scanning got distracted and lost their place scanning, they had no way of knowing where to pick back up with scanning on the shelf.

Another downside was the small amount of memory built in for storing the scanned barcodes. This meant that the data had to be "off-loaded" from the device frequently, often while scanning the middle of a range or some other inopportune time. The task of moving the inventory data from the device to the ILS system had to be done by a staff member—one with full permissions to edit and update records—and had to be done at a workstation that had the ILS system client installed. This meant that capable staff had to be available at the time any scanning was taking place to perform these importing and updating functions. Student workers had to sit idly by and wait for these tasks to be completed before they could get back to their inventory scanning work.

On top of these severe limitations, the scanners were unreliable; on several occasions—either through some user error or malfunction of the scanner itself—entire scanning sessions had to be repeated, wasting time and effort. We wanted something better, and we were determined to develop the tools and methods to make it so.

After examining the previous methods used for conducting an inventory, we concluded that our needs could be broken down into the following three categories:

1. **Accuracy/Reliability:** If what is on the shelf at the time of scanning is not accurately and consistently captured and recorded, then what was the point of even doing an inventory? We also wanted to minimize any chances of data loss and corruption. Additionally, we wanted to be able to quickly identify any problems with the scanning process—in real time—if at all possible.

2. **Speed:** Time is a precious commodity, and we wanted to perform this inventory as quickly as we possibly could. Since this was an academic institution, carrying out our work over the course of a summer

and finishing up before the start of the fall term was ideal.

3. **Ease of use:** We wanted to un-complicate the process as much as we possibly could for everyone involved. For the individuals doing the scanning, it should be easy to do the scanning, see what was scanned, and know what still needs to be scanned. Also, the individuals doing the scanning should be able to do so with almost zero training. From the perspective of the library employees managing the inventory, it should be easy to assign work, examine the accuracy of that work, and then finally act upon that inventory data.

In order to successfully capture, examine, and act upon the inventory data, we felt that we needed to answer two very important questions: first, how could we connect to the Sierra ILS to get synchronous data out during our scanning process, and secondly, what was to be captured from the ILS for each scanned barcode?

The How
In answering the first question, how, we knew that the Sierra ILS conveniently provides a method of connecting to the backend database by way of a feature called, "Sierra Direct SQL Access". This feature provides read-only access to the database tables by way of database table "views", which expose the live catalog data running on Sierra's PostgreSQL database. While this data is read-only, it still provides us with a great way to extract what we need from bibliographic and item record data associated with a barcode in real-time. The real-time aspect is important if we are to consider the inventory process to be a "snapshot" of the state of the shelf at the moment in time that we examined or inventoried it.

Since the database server runs the popular PostgreSQL object-relational database management system, many different software libraries for connecting to this type of database exist for different programming languages. This gave us a great deal of flexibility in selecting a programming language to script and process the queries we needed to perform on the database. We picked the PHP language as we had a great deal of background with the language, having done other development projects it.

The second step after getting the data out of the database, is getting the data into the spreadsheet. As mentioned previously, Google Sheets can be augmented with Google Apps Scripts. This makes it possible

```
http://127.0.0.1:8080/?barcode=35054031024744
```

Figure 1: An example of a RESTful API HTTP GET request

to create "triggered" events that can call additional custom functions to make external API calls; our custom PHP RESTful API is one such API that, when called, queries the database and returns formatted results that can be processed by Google Apps Scripts. We will discuss more specifics on these two scripts and how they work together a little bit further into the article.

The What
As for the second question, what, we determined that the following data about the item would be essential and should be recorded when each item was scanned:
- Item Barcode
- Normalized Call Number
- Item Location Code
- Item Status Code
- Check Out Status (date due)

With that data, we are able to identify and address several problems rather quickly.

First, by checking **Item Location Code** we were able to identify books that did not belong in the section, or did belong but had incorrect information in the catalog. Some of the item record data was fixed as a result of this discovery. With the **Status Code** we were able to flag items that have any status code other than "-", which in Sierra indicates that there is some other status other than Available. Items on the shelf should all have an available status.

After a short period of testing, we later determined that some of the books on the shelves were still checked out; checking the **Check out** status proved to be essential as part of this process as well. With **Normalized Call Number**, we are able to sort the sheet either ascending or descending to determine the correct shelf order of the items scanned and to pull items that did not belong in the range.

It is worth mentioning that using unformatted (or non-normalized) Library of Congress (LC) Call numbers in a spreadsheet is problematic because they do not follow normal lexicographical sorting methods used in spreadsheet applications like Google Sheets. In order to make LC call numbers alphabetically sortable, the call numbers must be normalized. Normally, Sierra performs such a normalization—storing the value in the database for easy retrieval—but there are certain circumstances where

this may not be the case—when retrieving call numbers directly from MARC fields for example. A possible solution to this problem is to incorporate a function that filters the call number data, normalizes it, and then returns the normalized form to our application. Our normalization function is available for those in need of such a feature.

The following additional data about items were also identified as being helpful to the inventory process:
- Volume Number
- Item Record Number
- Title
- Shelf Position
- Date Scanned
- Sheet Name (or Range Number)

Volume, Item Record Number, and Title come from the database. Shelf Position, Date Scanned, and Sheet Name are produced by the spreadsheet itself. The entire query we developed to return all this data can be found here: **https://github.com/rayv oelker/2015RoeschLibraryInventory/blob/ master/sql/inventory_barcode_query.sql**

IMPLEMENTATION AND SCRIPTS
Server Consideration
We decided to write the script to fetch the data from the database using PHP and that the script should act as a RESTful API endpoint. This decision made it much easier to write the Google Apps Script as it has simple functions built-in for interacting with RESTful API endpoints. And since this API is RESTful, that meant that we needed a web server to host and execute the PHP. For that purpose, we chose Linux (Ubuntu Server), the Apache HTTP server, and of course PHP, installed as an Apache Server Module. (if you have a domain certificate in place, ports 80, or 443 will need to be open to the Internet so that Google services can interact with the endpoint. Google has more information on this requirement.)

RESTful API Endpoint
We picked a RESTful architecture for our method of developing the script for a number of reasons. First, the architecture makes it easy to test and use the script. Secondly, this is ultimately a web application, and as such, certain components of the application (Google Apps Scripts for example), are designed to easily interact with RESTful

```
 1   {
 2       "barcode":"35054031024744",
 3       "item_record_num":"i9233953a",
 4       "item_record_id": 450976172208,
 5       "call_number_norm": "PZ    7 G1273 GR 2008",
 6       "call_number_050": "PZ 7 G1273 GR 2008",
 7       "volume": null,
 8       "location_code": "mdju",
 9       "item_status_code": "-",
10       "best_title": "The graveyard book",
11       "due_gmt": null,
12       "inventory_gmt": null
13   }
```

Figure 2: An example of the JSON response produced from the PHP-based RESTful API HTTP GET request

endpoints. As a quick example to demonstrate how this RESTful API functions, and especially for those not familiar with the method: if we were to scan the barcode of an item on the shelf, we would send the following HTTP GET request to the API. Since the request is a standard GET request with no authentication, it is easy to test this in a web browser.

The output of this GET request is in the JSON format, and would look similar to **Figure 2**.

A few things to note that are important about that script before we move on: first, we want to "sanitize" the barcode input to be searched based on the type of barcode that is used at the institution. This is as simple as limiting the length of input as well as the type of characters accepted as the "barcode" argument in the HTTP GET request. If implementing this for another institution, we advise modifying the code to accept barcodes that fit the description of those

in use. The practice of input sanitization is much more important when making updates—making modifications to a database or inserting new items for example—but is still a good habit to maintain. Additionally, you may want to change the query for the non-normalized call number (call_number_050 in the SQL query, and JSON results) to reflect local cataloging practices or to get the non-indexed call number. Some Sierra ILS sites have reported that the call number may not appear in the "call_number_norm" field; a support call to the ILS vendor may be required to remedy that.

Google Apps
The majority of the inventory was centered around Google Sheets and conveniently, our institution had recently transitioned to using G Suite for Education (formerly called Google Apps for Education), which included this easy-to-use spreadsheet tool. Using Google Sheets offered several benefits, in-

cluding access for every student, faculty and staff member from their University account and easy sharing options. This made assigning spreadsheets to student workers a quick and easy task for the inventory coordinator. Lastly—and perhaps most importantly—Google Apps Scripts effectively allowed us to construct our inventory application almost entirely from within the Google Sheets tool—pretty powerful stuff!

As an added bonus, Google Sheets works well in "offline" mode. This is important, since taking a laptop and USB scanner into the stacks and then losing wifi access still means that you will be able to complete the task of scanning barcodes into the Google Sheet. Data placed into the spreadsheet are automatically synced to the cloud when network access is restored. Unfortunately, this requires an additional manual step of having to run a command from the Google Sheet that fetches the additional information from the ILS after re-establishing a network connection. Luckily, that task is a relatively simple one, especially when compared to the re-scanning that the previous inventory method often required. The "cloud-based" nature of Google Sheets is also a positive as it helps to reduce the possibility of data loss as well as data corruption.

Google Apps Script
Google Apps Script, with its various custom functions, is the method that "triggers" the import of bibliographic and item data on each barcode scanned into Google Sheets. Below we have crafted a simplified example of the "onEdit()" trigger method that is assigned to a Google Sheet to demonstrate how we handle importing data.

In this simplified example, the Google Apps script reads the value from the cell when data is placed there, forms the URL string (appending that cell value as the argument), then passes it to the built-in Apps Script service UrlFetchApp. This service then interfaces with our PHP RESTful API operating on our web server which produces the JSON response. The data is then parsed into the "json_data" variable where part of it ("json_data.best_title") is then finally output back to the spreadsheet.

When scanning a single barcode (R008818288 in the example) into the sheet (with the above trigger enabled for the sheet), we would see the two cells (under column B and column C) populated with data as demonstrated in **Figure 4**.

```
function onEdit(e) {
  try {
    var value = e.range.getValue();
    var url = 'http://domain.edu/inventory_api/v1.0/barcode.php?barcode='
      + value;
    // populate column B with the API call
    e.range.offset(0,1).setValue('=\"' + url + '\"');

    // make the API call, and then parse the results into a JSON object
    var result = UrlFetchApp.fetch(url);
    var json_data = JSON.parse(result.getContentText());

    // populate column C with the title (replace double-quotes with
escaped versions)
    e.range.offset(0,2).setValue('=\"' +
      json_data.best_title.replace(/"/g, '""') + '\"');
  } // end try

  catch(e) {
    // TODO:
    // something more to catch errors
  } // end catch
}
```

Figure 3: Google Apps Script for the Google Sheets onEdit trigger

Figure 4: An example of data output to a row in Google Sheets

In addition to the OnEdit method discussed above, we also used the Google Apps script to perform a handful of other important inventory functions as well. These functions included a method of "fixing" missing column data (for when the application was operating in "offline mode" and not collecting additional bibliographic and item data from the external API). This method was often used by the staff member after the student submitted the finished sheet of scanned barcodes, by selecting this function from a special inventory menu from within the sheet itself, as illustrated in **Figure 6.**

A second custom function, called "Produce Reshelve Sheet" (seen as a menu option in **Figure 6**) would produce an additional sheet in this spreadsheet based on two sets of data contained in separate sheets: the inventory "snapshot" and the inventory "shelflist". The "snapshot" consists of our scanned item information, and the "shelflist" consists of a list of items we expect to be on the shelf. That is to say, given the Item Location Code and the start and end Normalized Call Numbers we produce an SQL query (https://github.com/rayvoelker/2015RoeschLibraryInventory/blob/master/sql/create_shelflist.sql), importing the results into the spreadsheet.

Once that data is imported into the sheet and scanning on the main inventory sheet is completed, running the "Produce Reshelve Sheet" function would take these two sets of data and perform something similar to an SQL join, matching the items from "shelflist" (left) with the items from the "snapshot" (right). This will tell us what items we found in our shelflist or items we expect to be on the shelf, as well as which items we did not find on our scanned shelf. Figure 7 should help to further illustrate the concept. The overlap in orange in the second image represents the items appearing in both lists and therefore "found".

Lastly, there is an additional custom function that can be run from Google Sheets called "Check Sort Order". The intended use of this function is to create visual indications on the "reshelve" sheet when items are on the shelf in incorrect shelf order based upon the item's assigned call number (a demonstration of this can be found in the same video in Figure 8, starting at the 30 second mark.

The full Google App Script that we used in this project is included at the end of this article. For more information on using Google Apps Script and setting up triggers please see the Google Apps Script documentation.

EXTENDING GOOGLE SHEETS AND GETTING STARTED

With the web server set up, the types of data to pull identified, and the Google Apps script ready, we were on our way to getting this inventory started. Soon there would be large amounts of inventory data (this is sort of the point though, is it not?). Again, Google Sheets shines in its ability to organize; we were able to maximize features available to us through Google Sheets to help us extend the use of the application to organize all of our scanned inventory data.

Google Sheets has seemingly endless methods of transporting inventory spreadsheet data between different sheets. Every Google Sheet has a sheet ID in the URL string, evident in **Figure 9** between the final set of forward slashes:

Using this sheet ID, we built a Google spreadsheet-based inventory data dashboard which aggregates metadata from all of the Google Sheet ranges currently being scanned into one spreadsheet, creating a simple user interface in the process. In our Inventory Dashboard, we were able to assign ranges to students in one column, and note when the range scanning started and ended in another column. Additionally, using sheet IDs, we could view the total number of books we anticipated in a range (based on books between the start and end call number range pulled from our ILS), and compare that against the actual number of scanned books on the range. While the ranges were scanned, we also counted item statuses that were anything other than available ("-" in our case). The moment the range had been completely scanned, we had a count or report of exactly how many books needed attention, and the specific types of statuses encountered in that range.

Early versions of our Inventory Dashboard were simple. Through various iterations, our dashboard developed into what it is today: a comprehensive and practical at-a-glance workflow, management, and reporting tool (see **Figure 10**).

In **Figure 10**, you can see one of the formulas which is using the sheet ID stored in cell T2 to count the total rows of data in column N from the sheet named "inventory". At a glance, we can see that the total number of scanned books in range rc6-01 has 3436 books, but we were expecting

Figure 5: Example of scanning process 2015 Roesch Library Inventory: Scanning

Figure 6: An example of the menu produced by the custom Google Apps Script

the image we are again using our sheet IDs stored in column T in the dashboard to count the total number of books with a status of missing or "m" in column E of the sheet called "inventory". Similarly, all columns on this dashboard between J-Q are using some combination of a spreadsheet function, countif(importrange()), to create reports about our inventory data while we are scanning, without delay or manual intervention. We can then use these data to justify to our stakeholders the value of our inventory by showing that we pulled a specific number of books from each range for various reasons including: items had bad status codes, were not in correct locations, etc.

Google Sheets Limitations

Using our Inventory Dashboard to manage inventory workflows and create post-inventory reports is not without some limitations. To allow one Google spreadsheet to import data, or in any way access data from another Google spreadsheet, Google requires spreadsheet users to grant permission to access data stored in another Google spreadsheet. There may be a way to script this permission-granting using Google app scripting, but at the time of our inventory we were manually interacting with a row which contains an importrange() formula to permit it to access another spreadsheet's data. For other cynical thoughts about Google's use of this permission feature, see also: any Google spreadsheet support forum.

Additionally, when we conducted our inventory, we manually created every Google spreadsheet for the project. We had 150 ranges (3000–5000 books each) for which we needed to create a spreadsheet for each range, and put that sheet ID into our dashboard to pull in data from those inventory spreadsheets. In our case, with a brief bit of instruction, our fantastic student employees were quickly trained to make a copy of a previous range's spreadsheet they had just finished and use it to continue scanning the next range. A solution to consider for next time would be to create a Google Apps script that would create a new spreadsheet and set it up automatically.

3571 books. In some cases you may end up with more books in the range than you expected, for various reasons.

Continuing into the spreadsheet (**Figure 11**), we can see more specific information about the range rc6-01 starting in column J:

In **Figure 11**, we can see from column L and the formula displayed at the top of

Figure 7: An example of the left join performed by the script to help users determine what items should and should not be on the shelf

Getting Student Workers Involved

In the course of a library inventory, it may be important to augment the actions of library staff with help from library student employees. When training library students

it is important to anticipate the minimum level of knowledge necessary to successfully scan and reshelve books. Below are some recommendations for training students, in case it is helpful:

- Basic call number training–without this training, books may be pulled and reshelved again in similarly incorrect locations, making a follow-up inventory necessary. In our case, we had the advantage of being able to use circulation students already familiar with re-shelving
- Shelf orientation introduction– even after training students, within the first hour we observed a student scanning books in the wrong shelf-order into the spreadsheet. Quickly, we were able to take corrective action, which potentially saved us large amounts of additional work.

Inventory Progress

Running a library wide inventory is a major project. At our peak, we managed four student employees over three months working thirty-five hours each on average, or 140 total hours per week. Coordinators of inventories should not underestimate the amount of work that will go into an inventory or the variability of student worker progress speeds. The transparency of Google Sheets may help mitigate this variability by encouraging slower students to emulate the pace of their peers as spreadsheets are populated.

POST-INVENTORY

Resolving Bad Statuses

Just because your library is done scanning books in a range, does not mean you are done with your library inventory. After a range of books has been scanned, some information in our ILS had to be updated starting with the incorrect item record statuses.

Any item found to have a bad status—one without a status of "-"—was routed to the correct staff in the library who was best suited to resolve the issue. In some cases, no record was found in our ILS because we had deleted the bibliographic or item record many years prior, requiring additional cataloging. Other status issues included incorrectly shelved consortium books and books requiring reshelving in the correct order.

Getting Data Back into the Sierra ILS

Another large part of our post-inventory processes included importing the scanned barcodes into our ILS and applying an inventory note. This inventory note–applied as a global

Figure 8: Creating and sorting the reshelf sheet

update–included where the item was scanned last (which was also the range's Google spreadsheet title). We also globally updated the inventory date on our item records, so we know when the book was last inventoried. An added benefit of the inventory note field is that if, for whatever reason, the book was not pulled from the shelf during our inventory, all library staff had an idea of where the book was last inventoried and could reference the Google Sheet to find the location in the range where the book was scanned.

As an Innovative Sierra library, getting our inventory data into Sierra was as simple as importing a list of item record numbers as a Review File. We created a PHP-based web tool to convert our list of scanned barcodes, range by range, into item record numbers. This web application can be found in our git repository.

The web tool queries Sierra ILS and returns the list of item record numbers. In future iterations, we will pull in item record numbers and corresponding bibliographic record numbers for each book scanned in a spreadsheet. There has been some discussion of Sierra allowing for the importing of barcodes directly as a review file in future release updates, but this is not possible in Sierra v3.1, which is the latest version of the software at the time this article was published.

COMMUNICATION CONCERNS

Similar to the conclusions reached by Kohl, Bénaud, and Bordeianu (2017), communication will always be an issue in library

inventory projects. In our case, we did notice that although we were communicating well with staff in other areas, the impact of the inventory was not always communicated well to student employees who were responsible for shelving books. More information could have been communicated by the inventory coordinator to student employees directly, informing them that their reshelving work would increase dramatically during the inventory.

Additionally, a primary goal of our inventory was to communicate our progress and our findings to stakeholders before, during, and after the inventory. Even though this should be obvious, we needed to collaborate closely with our library technical services and access services (circulation) to process changes to our books. Overall, communicating our progress to our library community helped the overall project go more smoothly, and avoided stepping on any metaphorical toes.

CONCLUSIONS

Although our method worked reasonably well for our staff and the needs of the University of Dayton libraries, the needs of other libraries may be different. Having said that, we have presented a method which should be easily transported between libraries. We hope to encourage other libraries, regardless of ILS vendor, to consider the benefits described when using Google Sheets for a library inventory. As libraries continue to share methods like these, we can all benefit from local solutions moving into collaborative, open source projects. If

```
https://docs.google.com/spreadsheets/d/1nJdQ06ZFV0jaZ5bjwyLZumRRA44W4IldnqP6O
RLPLm8/
```

Figure 9: An example of the Google Sheet ID, and the method of linking to it

```
=iferror(IMPORTRANGE(T2, "inventory!N1"),0)
```

	A	B	C	D	E	F	G	H
		Range	Assignment	Started	Finished	Range Start	Range End	In Range
pulled		rc6-01	Ty	7/13/2015	7/15/2015	A 131 M67 1991	B 395 G144	
pulled		rc6-02	Ramanuja	7/15/2015	7/15/2015	B 395 G15	B 945 S23 L7 1962	
pulled		rc6-03	Santhoshini	7/15/2015	7/15/2015	B 945 S23 P4	B 3312 A2 1967	
pulled		rc6-04	Ramanuja	7/15/2015	7/16/2015	B 3312 E5	BD 632 A413	
pulled		rc6-05	Santhoshini	7/15/2015	7/15/2015	BD 632 B35 2010	BF 176 H35 1990	
pulled		rc6-06	Sree	7/15/2015	7/15/2015	BF 176 H36 2001	BF 575 A3 S37 1975	
pulled		rc6-07	Sree	7/15/2015	7/16/2015	BF 575 A3 S4313	BF 698.8 M5 L3	
pulled		rc6-08	Sree	7/16/2015	7/16/2015	BF 698.8 M5 M2	BJ 1401 K44 2002	
pulled		rc6-09	Santhoshini	7/15/2015	7/15/2015	BJ 1401 K73 2007	BL 626.4 C64 2013	
pulled		rc6-10	Ramanuja	7/15/2015	7/16/2015	BL 626.5 B37 2007	BP 605 N48 Z85 1990	
pulled		rc6-11	Santhoshini	7/16/2015	7/16/2015	BP 605 O88 B73 199	BR 162 R6 1857	
pulled		rc6-12	Ramanuja	7/16/2015	7/16/2015	BR 162 R6 1857	BS 410 V452 V 46	
pulled		rc6-13	Santhoshini	7/17/2015	7/17/2015	BS 410 V452 V 47	BS 1199 B3 K57	
pulled		rc6-14	Ramanuja	7/17/2015	7/17/2015	BS 1199 B3 S55 2002	BS 2575.3 L8913 1989	
pulled		rc6-15	Santhoshini	7/17/2015	7/21/2015	BS 2575.3 M4 1966	BT 121.2 B57 2000	
pulled		rc6-16	Ramanuja	7/17/2015	7/21/2015	BT 121.2 B77	BT 810.2 H46 1989	
pulled		rc6-17	Ramanuja	7/21/2015	7/21/2015	BT 810.2 H58	BV 4011.4 H64 2005	
pulled		rc6-18	Ramanuja	7/21/2015	7/22/2015	BV 4011.5 B38 1990	BX 850 M5 1911	
pulled		rc6-19	Ramanuja	7/22/2015	7/22/2015	BX 850 M67	BX 1535 B5	

Figure 10: Google Sheets-based dashboard for location "rc6"

you would like to collaborate on improving our processes, please reach out to us.

As promised, the scripts used in this project, as well as a short presentation that was prepared for OH-IUG in 2015 can be found in the following GitHub repository.

Videos demonstrating this process can also be found in the Internet Archive.

THANKS AND ACKNOWLEDGEMENTS
We would like to thank the University of Dayton Roesch Library and our supervisor at the time of this inventory, Fran Rice, for allowing us the opportunity to develop

this method, and carry it out. Ray Voelker would like to thank everyone at Roesch Library who had to put up with him during the development of this project. Also we would like to thank all of the student workers whose patience with us helped make this project possible; they did all the heavy lifting too. ■

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nally published by Code4Lib Journal, Issue 38. **http://journal.code4lib.org/articles/12783**

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```
=countif(IMPORTRANGE(T2, "inventory!E:E"), "m")
```

	A	B	C	J	K	L	M	N	O	P
		Range	Assignment	Pulled from each range	Checked-out items	m missing	s on search	@ off campu	r repair	$ billed
pulled		rc6-01	Ty	21	0	0	1	0	1	0
pulled		rc6-02	Ramanuja	14	2	2	4	0	0	0
pulled		rc6-03	Santhoshini	11	1	1	4	0	1	0
pulled		rc6-04	Ramanuja	5	0	1	1	0	0	0
pulled		rc6-05	Santhoshini	7	0	2	0	0	0	0
pulled		rc6-06	Sree	10	0	2	3	0	0	0
pulled		rc6-07	Sree	18	1	2	3	1	1	0
pulled		rc6-08	Sree	18	1	0	1	1	3	0
pulled		rc6-09	Santhoshini	21	0	0	3	0	0	1
pulled		rc6-10	Ramanuja	21	0	0	5	0	0	0
pulled		rc6-11	Santhoshini	16	4	2	2	0	0	0
pulled		rc6-12	Ramanuja	34	1	6	4	0	2	0
pulled		rc6-13	Santhoshini	18	0	2	5	0	0	0
pulled		rc6-14	Ramanuja	29	0	0	8	0	2	0
pulled		rc6-15	Santhoshini	15	0	1	3	0	1	0
pulled		rc6-16	Ramanuja	25	3	2	4	0	1	1
pulled		rc6-17	Ramanuja	45	9	3	8	0	2	0
pulled		rc6-18	Ramanuja	34	2	7	8	0	3	0

Figure 11: Google Sheets-based Inventory Dashboard for location "rc6"; additional columns shown
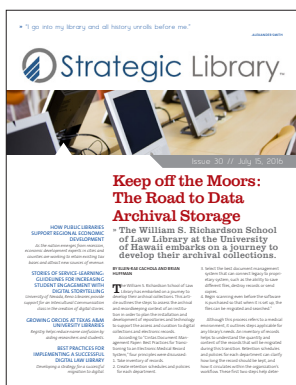
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