The *Digital Drawer:* A Crowd-Sourced, Curated, Digital Archive Preserving History and Memory

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Abstract. While many digital asset management platforms and digital libraries exist, most have been designed for technically savvy users and not the older adults who are a key audience for our *Digital Drawer* platform. In the domain of digital humanities collections, our project is significant in that we are utilizing a participatory design (PD) process wherein all of the stakeholders and potential users of a system are actively involved in the design process to help insure the result meets their needs and is usable. This paper presents a case study on the PD process and the challenges of designing a crowd-sourced media and metadata submission tool for the Historic Rural Churches of Georgia to accommodate older adult users with low technical savvy and disabilities. We report on the PD process to design the user interface and user experience (UI/UX) for this user demographic, present conclusions and plans for future work.

Keywords: Access to education and learning · Design for aging ·
Design for all best practice · Design for all methods · Techniques and tools ·
Evaluation of accessibility · Usability · User experience

1 Introduction

The *Digital Drawer* partnership is a rare collaborative partnership formed to pilot a method of gathering, curating and disseminating crowd-sourced community memory. This effort of the Georgia state library system, universities, humanities and non-profit organizations is testing an online concept through a program permitting Georgians to upload their carefully preserved documents, photographs, images of artifacts and oral memories of historic churches that were the foundation of their community life. The *Digital Drawer* platform, being developed by the Georgia Institute of Technology's Interactive Media Technology Center (IMTC), in collaboration with Emory University's Center for Digital Scholarship (ECDS) and the Historic Rural Churches of Georgia (HRCGA), is unique in that it will be designed to accommodate the limited technical capacity of an anticipated older demographic with disabilities. The platform

will be a cloud-hosted media and metadata repository with data sharing service available to the public through their public libraries or partner websites.

The goal of the *Digital Drawer* partnership is to create a methodology for gathering, curating and disseminating these crowd-sourced collections of rural church histories, establishing a digital community memory. We intend for the *Digital Drawer* to become an international, open-source platform to be used by humanities scholars and the general public to access collections of these historical and often lost voices in our past.

While many digital asset management (DAM) platforms and publicly accessible digital libraries exist, most have been designed for technically savvy users (to the extent that these systems were designed with the involvement of end-users) and not the older adults who are a key audience for our *Digital Drawer* platform. In the domain of digital humanities collections, our project is significant in that we are utilizing a participatory design (PD) process wherein all of the stakeholders and potential users of a system are actively involved in the design process to help insure the result meets their needs and is usable.

We have engaged our target user community in a series of participatory design activities, including focus groups, UI prototyping interviews and collaborative design exercises.

This paper presents a case study on the participatory design process and the challenges of designing a public-facing media and metadata submission tool for our identified user population. We report on both the PD process and activities as well as our initial findings and conclusions.

Our findings are helping to inform a preliminary report on design guidelines for the public-facing *Digital Drawer* web application that is uniquely innovative in its universal approach to accessibility, accommodating the needs of this older audience. Having recently secured funding from the National Endowment for the Humanities (NEH) to design, implement and deploy the *Digital Drawer*, we plan to continue to employ the PD approach, involving all stakeholders from end-users to public library personnel and humanities researchers, as we refine the UI/UX design and user requirements and implement the *Digital Drawer* platform. Our goal is to develop a platform, including a publicly accessible API and data sharing service, upon which future applications, data visualizations and collection sharing can be developed. We plan to open source the API and documentation to encourage further development of the *Digital Drawer* platform and its use in other domains.

1.1   History and Cultural Importance of the Project

Religion has played an important role in forming America and from its first settlements, rural churches formed the vital core of community life in America [1]. Many of the churches that once functioned as centers of rural life are today physically disintegrating. As congregations disappear and church structures are abandoned, local historical memory of communities that date back to the beginnings of the European occupation of North America are also endangered. In fact, society may lose many of these records that generations before us preserved, but are now at risk.

Churches are often key sites for examining several important strands in American history. In Georgia, rural churches document the settlement of the state in the wake of the forced removal of Native Americans. Churches tell stories of the state's racial history in the post-Civil War era through the long Civil Rights Movement, and they document the rise and fall of population centers as the state's political economy shifted. Church records, replete with names, dates, and descriptions of events large and small, contain information useful in understanding the state's history from the bottom up. Rural churches, scattered across often resource-poor sections of the state, are significant yet under-represented sites preserving components of this history.

1.2   Historic Rural Churches of Georgia

Saving this important part of American history is the mission of Historic Rural Churches of Georgia (HRCGA) [2]. Historic Rural Churches of Georgia was founded in 2012 by Sonny Seals and George Hart with a mission to research, document, and ultimately preserve historic rural churches across Georgia. They initially created a pictorial archive of endangered churches and associated history around Georgia that is featured on their website, launched in 2013 (see Fig. 1). With over 50,000 followers on Facebook, over 30,000 monthly visitors to the website and a Georgia Public Television show broadcast in the Fall of 2018, HRCGA engages a large public audience interested in and involved with Georgia's historic rural churches. Visitor and follower data from HRCGA's web site and social media pages reveals that their primary demographic is older women (65+) living in rural areas of the state.

Fig. 1. Church detail page from hrcga.org.

A key component of preserving these vitally important structures is collecting and disseminating information about their history. The HRCGA's *Digital Drawer* was conceived as a platform and editorial structure to crowd-source the collection of such documents and it has the potential to build an archive of significant historical importance while providing a model to extend such work beyond the state of Georgia. Crowd-sourcing documents also helps build community around historic structures in need of preservation, providing an extensible model for such work. The Digital Drawer platform is being designed to better serve HRCGA's identified primary demographic (elderly, female, rural).

2   Designing the User Experience for Older Adults

Recent survey data shows that technology adoption is steadily rising among older adults, including adults 65 and older, but this population still has lower than average technical savvy and a relatively higher incidence of disabilities, attributes that should inform user interface/user experience (UI/UX) design of apps and web sites [3].

There have been many efforts to improve the accessibility and usability of web sites and web apps, including the development of accessibility guidelines for web content (i.e. the WAI's WCAG 2.1) [4, 5] and authoring tools [6]. The W3C's WAI-AGE project, in fact, concluded that existing web accessibility guidelines such as WCAG 2.0 adequately address the accessibility needs of older web users [7]. Aside from explicit adherence to accessibility guidelines, other possible indirect contributors to improving accessibility include new browser capabilities and page layout technologies, wide application of search engine optimization (SEO) techniques and an increasing need to create cross-device web designs [8].

It is important to adhere to accessibility guidelines when designing and building web pages and apps, especially for older adult users, but as some researchers point out, relying on guidelines alone to improve the accessibility of web sites and apps for older users and users with disabilities doesn't necessarily also result in better usability of those sites and apps [9, 10]. Guidelines for designing systems for older adults often recommend simplifying the graphical UI of a system, increasing the size and visual contrast of fonts and icons to increase accessibility, but it is also important to address the ease-of-use of such systems by employing other techniques such as using a system navigation style which is more familiar to older adults [11]. Castilla et al. (2016) found that when designing software user interfaces for older adults, it is often beneficial to leverage their previous experience with analog media which presents information in a linear format (i.e. books, video) [11]. Their experiments comparing perceived ease-of use, satisfaction and task performance on a web mail application with participants aged 60 or older showed a clear preference for a simplified, linear navigation version of the UI compared with a hypertextual version (i.e. Gmail).

2.1   *Digital Drawer* User Requirements Gathering

In designing the UI and UX of the Digital Drawer content submission web app, we take a user-centered design approach with an emphasis on maximizing usability for our

target user demographic. We employ a participatory design (PD) process wherein all of the stakeholders and potential users of a system are actively involved in the design process to help insure the result meets their needs and is usable.

As part of our PD approach, we conducted user requirements gathering activities with members of our target user demographic, expanded to include public library personnel who could provide insights into what typical technology troubles that library patrons experience when using similar tools and how such a tool could be used by the library system.

We conducted two focus groups at the Waycross Public Library in Waycross, Georgia on Thursday May 11, 2017. The first focus group included four library personnel (3 women, 1 man) and the second group for content researchers (i.e. members of the general public who have an interest in historic rural churches, genealogy, Georgia and American history, etc.) included five participants (3 women, 2 men). Overall, participants were enthusiastic about a proposed web-based online content submission system for the facilitation of research on historic rural churches in Georgia. Library personnel made suggestions on the design and feasibility of a dedicated kiosk within a library for content submitters. Researchers described their research methods, use of and familiarity with technology, and design recommendations for the online system.

Focus Group 1 - Library Personnel: Questions for this focus group were designed to assess three main topics: (1) current process in assisting library patrons with technology, (2) acceptance of proposed dedicated space for content submission system, and (3) advice on design of this system based on their experience and expertise.

Currently, these library personnel spend a significant portion of their daily duties assisting library visitors with using computers. Requests include basic computer help (e.g. starting the machine, using a mouse or web browser) and setting up online profiles for banking systems and social media. For a dedicated machine set up for historic rural church content submission, our participants had the following advice:

- If visitors anticipate needing help for any stage (e.g. creating a profile, scanning, uploading content), they should schedule a 30 min time slot through the library website so library personnel can make sure they have the human resources available to assist
- Appointments for assistance using the space would need to be limited to a couple of days a week
- Equipment this library would need and does not currently have is a flat bed scanner
- Particular attention to the accessibility design of a system that is W3C compliant is paramount.

These participants suggested capturing oral histories and this library is equipped with high quality audio equipment they purchased for their maker space. They recommended partnering with local high schools to create a program where students would assist and interview content submitters, then edit the captured media to create short projects (e.g. podcasts, videos). This would satisfy the requirement that high school students complete community service hours to graduate while also teaching them how to interview, as well as media capturing and editing skills. Additionally, this

would solve the problem of having sufficient human resource hours to assist content creators while resulting in finished content that can be posted online for the public.

Focus Group 2 - Content Submitters and Researchers: Questions for this focus group were focused on understanding the (1) motivations, (2) research process, and (3) technology familiarity of the demographic involved in researching and submitting information on historic rural churches.

In this group, two were current content submitters/researchers and two were interested in doing so, but had experience with similar projects (e.g. graves). All participants were enthused at the prospect of having a dedicated online system to assist in the research and aggregation of information on Georgia's historic rural churches. Their current research process involves exploring an area by car or on foot, investigating if there is a written history associated with that church by contacting people nearby or those associated with the congregation (if any), examine names in the nearby cemetery (if there is one), and checking with nearby church phone directories. One experienced researcher takes extensive notes on paper in addition to taking video with a point-and-shoot camera while verbally annotating the features he sees around the site. He later transcribes these notes and supplements photos with more information. The most important tool cited was a point-and-shoot camera, though many in the group were beginning to prefer using their smartphone for picture and video taking. This may be a good opportunity for a mobile version of the site, where participants can upload photos directly from their smartphones.

Each current and interested researcher had favorite interests they preferred to begin their research on and continue the focus on throughout their process. This included architecture/church design ("I like to see if the church has a special reinforced floor, suggesting that dancing was important to services"), age of the building and of attached cemeteries ("I like to look for extremes – what is the oldest gravestone in the cemetery, who lived the shortest length, who the longest?"), and longevity/persistence of the church ("If an old church has been well cared for and is still used, that shows the success of a community").

In this small group, the younger participants (40–55 years) were interested in using technology and fairly adept at common activities such as using a smartphone, web browser, and similar online resources like Ancestry.com. An older participant (90 years old) self-described himself as "old-fashioned" and preferred analog tools, though he noted that a video camera was his most important tool and that he had interest in using a web-based content submission system.

Ideas Generated by the Group for Wants in This System Were:

- Easy, concise site use tutorials
- A "general help button" to be connected with a "buddy" that could help them use the site
- Ability to search preferred localities, such as by county
- Ability to view and search by historical maps
- Upload audio recordings
- Ask questions through a board or forum and communicate with other site members
- Ability to organize local events so that researching members of a community can meet together in person: a picnic or clean-up event, for example

- A feature to flag at-risk churches (e.g. slated for demolition, in need of preservation)
- Individual log-ins and profiles so that users can track their progress researching specific church profiles.

Conclusions: Our initial design hypothesis describing a submission system similar to Ancestry.com appears to be on the right track based on the feedback received from our second focus group. The home landing page should be a simple site allowing for two main functions: (1) search the database for current church profiles by location, name, or other tags (e.g. date, architecture), and (2) create a new profile for a new researched church not currently in the database.

The home page may also have a carousel with a "featured church", links to tutorials (e.g. video how-tos), and information on the project. Each church may have a social media-esque profile, like Facebook, to leverage user familiarity with these systems. For example, the most prominent features of a church profile would be the common name (in addition to "also known as" names), date built (if known), a carousel of user submitted photos, fields for other known and submitted information beneath, and possible a Timeline-esque space for comments and questions by community members.

Some Important Design Considerations of This System Include:

- Many churches have many historical names that have changed throughout the years (based on town name changes, re-dedications, etc.). Each church profile should have an "also known as" field with other common names the church has existed under. This may help prevent duplicate submission, as well.
- Community moderators would be a useful addition. These mods may be locally specific (for example they moderate all submissions within a particular county), can review submissions for accuracy and can remove or consolidate duplicate church profiles.

2.2   Prototyping Interviews

Having established that our target user demographic may have a desire for a research and content contribution tool for users interested in historic rural churches, we next conducted one-on-one design prototyping interviews with several potential *Digital Drawer* users. We constructed a series of UI/UX paper prototype screen variants of a hypothetical *Digital Drawer* search and contribute workflows. Our prototype search and contribute workflow screens were designed to have a linear flow and to require or allow a minimum number of branching decisions or options, a navigation style.

Three older men (ranging from very low to moderate technical savvy) met individually with a Georgia Tech researcher to work through paper prototype use cases and usability requirements of a proposed content submission for the Historical Rural Churches of Georgia (HRCGA) Society. Paper prototyping consisted of proceeding through a hypothetical use case of uploading pictures and text information to an online church profile within the proposed system. The researcher asked questions regarding usability (e.g. what would you expect this button to do?), familiarity (e.g. have you uploaded photos to a website before?), acceptability (e.g. is this a process you would be

interested in learning how to do?), and their expert research advice (e.g. do you have recommendations for the functioning of a system like this?).

Mockups of the proposed system were created and provided by Amy Lambeth, IMTC's graphic designer. The proposed system is modeled after popular content submission procedures championed by social media sites (e.g. Facebook) to leverage user experience and knowledge of these functions. Over the course of 1 h through a participatory design process, a Georgia Tech researcher led each participant through a hypothetical use case of uploading photo and text to an existing church's profile.

Searching for a Church: In this proposed use case, a user possessing information (e.g. pictures) on a certain church would visit this page to search for the church of interest (see Fig. 2). Our participants greatly enjoyed the textual nature of the search that had them fill in the search terms as blanks within a sentence.
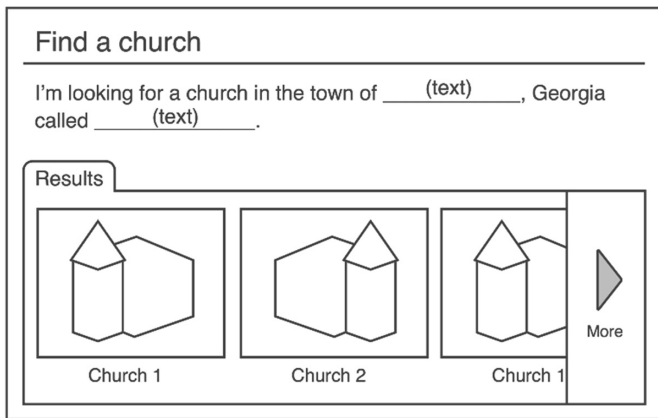
Fig. 2. Searching for a church screen

For users who are more intimidated by technology appreciated that this search function operated within a complete sentence so there was no confusion for what terms to insert. Our participants were familiar with the picture carousel design and understood that their search term results would scroll horizontally.

Selecting the Target Church: Figure 3 represents a search screen with supplementary church profile information, like a map. Our participants were enthused about the map, particularly if it were a Google Maps display, which most participants were already familiar. They cited this was helpful in planning daytrips to churches in their area, knowing if they could get gas or food nearby, and studying the satellite imagery to understand the road terrain and nearby natural features (e.g. forests, rivers). The prominence of the church image, name, and map were most important to our participants in their understanding if this was the correct church they were searching for.
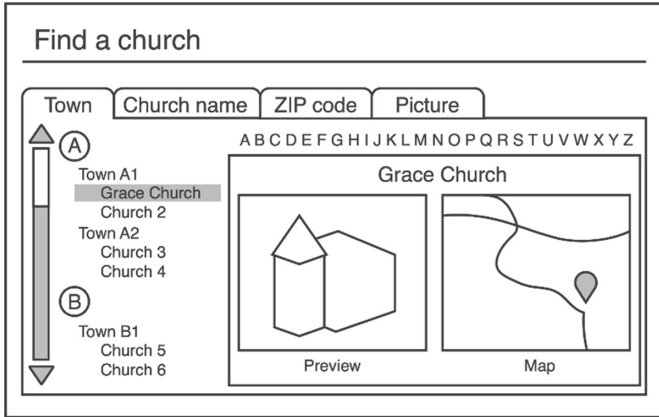
Fig. 3. Selecting the target church screen

Adding Church Information: This screen (see Fig. 4) leverages existing profile display designs utilized by sites like Facebook and Wikipedia. Our participants were most familiar with using Wikipedia for daily research and they appreciated the tab organization and prominent display of summary information beside the main church image. The "add more information" button was more clear to them on its function, as opposed to hyperlink text.
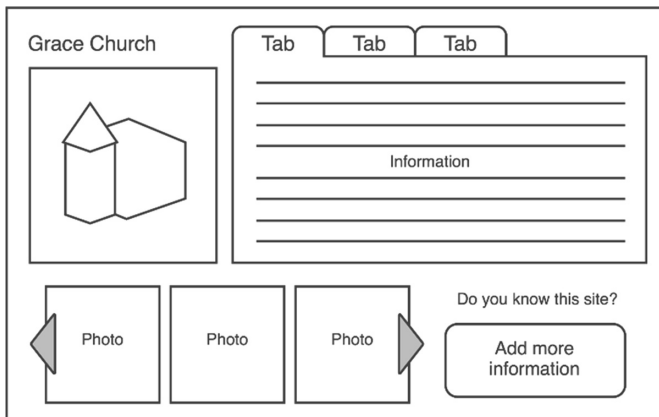

Fig. 4. Church information screen

Uploading Photos: Our participants were not as familiar with a drag-and-drop uploading function, but felt confident they could learn that or use the traditional file system exploring function for the file of interest.
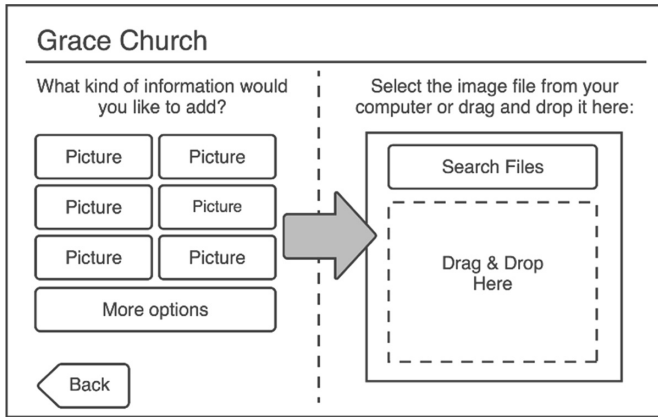
Fig. 5. Uploading photos screen

Adding Metadata to Uploaded Media: Figure 6 shows a screen design wherein users would populate information on the submitted content (here, a picture) such as date of the content, context (i.e. event/occasion), and people. Back, next, and save buttons guide users through the process without overwhelming them with too many actions at once. Participants had no privacy concerns for uploading people's names associated with images, particularly if the image were old and the members of the photo deceased. They felt that including historical names was an important archiving feature to having a complete record.
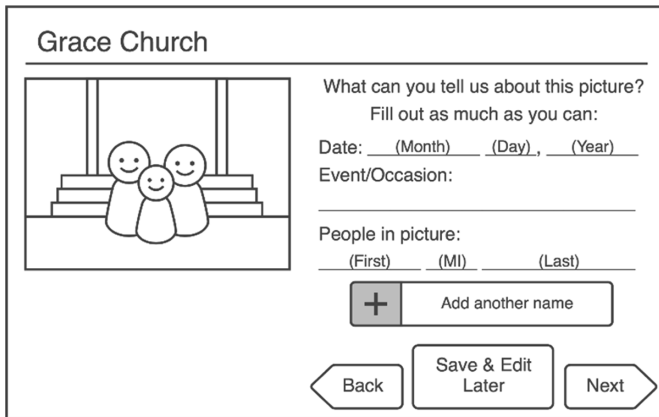
Fig. 6. Adding metadata to uploaded media screen

Adding Tags to Uploaded Media: Our participants were not as familiar with the concept of "tags", but were familiar with keywords. All participants understood and liked that content could be given accompanying tags to help with search for other users. Figure 7 shows a screen design for adding tags/keywords to an uploaded image.
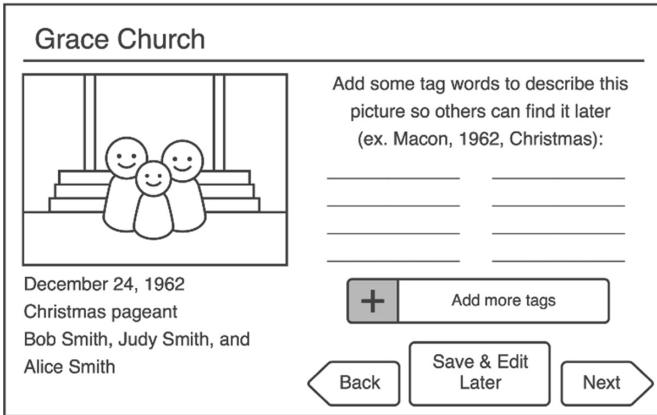
Fig. 7. Adding tags/keywords to uploaded media screen

Adding Freeform Information: Figure 8 shows a screen which allows users to input other information such as stories, anecdotes, and informal notes about the submitted information. Our participants felt this was particularly important to include because so much of this content exists within personal stories that need to be captured.
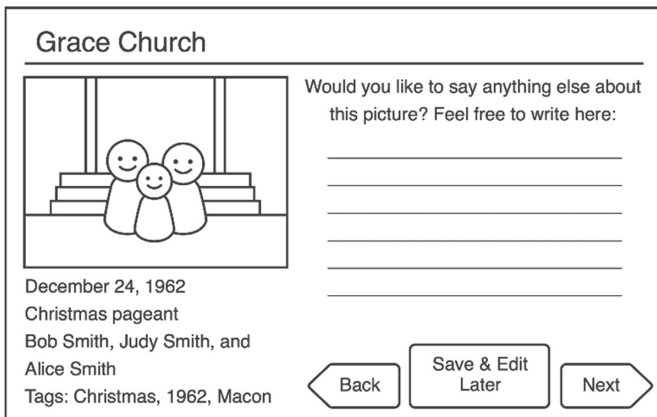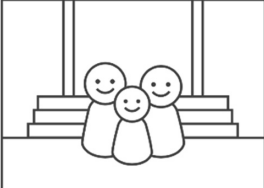

Fig. 8. Adding freeform information screen

Final Review and Submit: Figure 9 shows a screen design where users would review the uploaded content and the information they have provided for final edits before submitting it to the church profile.

Fig. 9. Final review and submit screen

Design Recommendations: Overall, our initial prototype design seemed appropriate and clear to our three participant users. Incorporating familiar designs provided by Facebook and Wikipedia was useful in supporting their understanding of how such a system would work. All participants said that a system like this exceeds the functionality of other sites, like Find-A-Grave. Even the participant most intimidated by technology said he would be interested in learning to use a system like this, especially if he had some help.

3 Conclusion

Based on our PD activities with target users, we recommend using a conversational style for instructions throughout the site's functions to make the system more intuitive and approachable for this demographic of older, less confident technology users. Gating users through the search, upload and metadata annotation process by dividing the content submission procedure into simple steps, each with only the minimum required choices and decisions, is also recommended. Dividing steps into separate screens also allows more of the display to be magnified and simplified making it easier for older users to operate. This finding, a preference for a simplified, linear navigation style, agrees with results reported by Castilla et al. [11].

Our participants were mostly familiar with how image file types work and how they need to be uploaded. The most complex process by one participant to import photos to his computer was to take a picture with his phone and then fax the photo to his home computer's native faxing application. Our other participants preferred to email the photo taken from their phone and download it to their desktop.

The Google Maps function was particularly important to our participants and they would want to be able to zoom in/out from the church profile page, download or save the location, and complete navigation functions within the church profile tab. Other recommendations for content fields include if the church has a cemetery (active or not),

denomination, event calendars, relevant community and newspaper article links, and links to social media pages for that community and church.

4   Future Work

The *Digital Drawer* project is ongoing and at the time of writing we have completed the first two phases of our participatory design process. Beyond the user-facing components of the *Digital Drawer*, the platform will include a web API and back-end database and will be designed to interoperate with other digital libraries and repositories using common metadata schemas (i.e. Dublin Core [12]) and will support 3rd party applications via a public web services API (see Fig. 10).
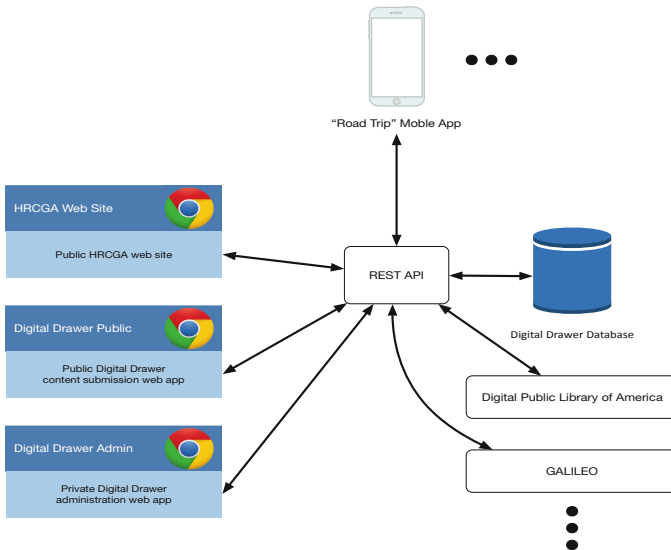

Fig. 10.   Digital drawer platform web services architecture

Future work on the *Digital Drawer* will include implementing a prototype content submission web app based on the sequential screen designs resulting from our UI/UX prototyping interviews. We plan to continue our PD activities by engaging our target users in user testing sessions with the prototype, for example, A/B testing a sequential screen design for the content submission app against a more monolithic design incorporating all of the information and input fields of the sequential design on a single screen (i.e. a design more akin to Gmail, Facebook, Ancestry.com and similar web apps).

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