Use of Louisiana’s digital cultural heritage by Wikipedians

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Abstract:
Analysis of how cultural heritage institutions’ (CHI) digital assets are being cited on Wikipedia can be beneficial to understanding user needs and interests as well as priorities for collection development and digitization. This case study details an analysis of Wikipedia links to online resources from Louisiana cultural heritage institutions in order to determine what types of cultural heritage resources users are citing on Wikipedia, what is the content of the Wikipedia articles with Louisiana CHI citations, and how this can influence the work of CHI. The results of the study include findings that digital library items and archival finding aids are the most cited sources from cultural heritage institutions on Wikipedia and are particularly popular for Louisiana-specific Wikipedia articles on society and the social sciences and culture and the arts. Some possible strategies for determining digitization and collection development priorities based on these findings are also detailed.

Keywords:
digital library, assessment, reuse, marketing, finding aids, Wikipedia, collection development, citation

Article Classification:
Article

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Introduction

Cultural heritage institutions (CHI)\(^1\) generate and publish digital content including unique digitized and born-digital resources, online finding aids for archival collections, resource guides for topics of interest, and much more. The evaluation of when, how, why, and by whom these resources are used is crucial to understanding user needs and may be used to drive collection development, digitization, and marketing efforts. As one of the top five most used websites in the world, the free online encyclopedia Wikipedia provides ample opportunities for CHI to connect with an enormous user base (“Alexa Top 500 Global Sites” 2017). For over a decade, CHI staff have been promoting their collections on Wikipedia by adding links and citations to their digital content to Wikipedia articles (see “Marketing Digital Collections Through Wikipedia” section later in this article for examples). CHI that have done so have almost unanimously seen web traffic to their digital resources increase, sometimes by tens of thousands of page clicks (Belden 2008; Lally and Dunford 2007; Szajewski 2013). Studies into the efficacy of linking Wikipedia articles to digital cultural heritage objects have largely focused on promotional attempts undertaken by staff at the institutions creating such collections. However, little to no analysis has been published considering what types of resources users unaffiliated with these institutions are

\(^1\) For the purposes of this article, “cultural heritage institutions” are defined as libraries, archives, museums, historical societies, and other organizations dedicated to long-term access and preservation of artifacts and information.
adding to Wikipedia articles. While it isn’t possible to tell for sure whether the editor of a Wikipedia article is affiliated with a CHI, studying the frequency of Wikipedia links to digital cultural heritage objects in a geographic area in which no known attempts at strategically linking Wikipedia to digital libraries has been documented may reveal some possible digitization strategies for the CHI in said area.

Furthermore, existing case studies focus on the efforts of individual institutions—primarily doctoral universities—to market their digital collections and finding aids through Wikipedia. For the purposes of this case study, a statewide digital library system, the Louisiana Digital Library (LDL), was selected for its diversity of membership. Institutions in the LDL include public and private universities, museums, state and regional libraries, and historic collections of varying sizes. In analyzing links from Wikipedia to digital objects created by these institutions, it may be possible to identify existing areas of interest ripe for further marketing as well as areas needing more robust promotion through Wikipedia. The strategies discovered through this case study will be useful to institutions within the state of Louisiana but may also be applicable to other statewide consortia as well as individual institutions of comparable size to those studied here.

This article details an analysis of links to Louisiana CHI online resources on Wikipedia in order to determine what types of cultural heritage resources users are citing on Wikipedia, what is the content of the Wikipedia articles with Louisiana CHI citations, and how this can influence the work of CHI. The article includes an overview of literature relevant to Wikipedia’s research value, CHI efforts to market collections on Wikipedia, and citation analyses for CHI. The methodology for this research study, and analysis and discussion of results with directions for further research, are also discussed.
Literature Review

Wikipedia as Research Tool

Wikipedia’s use as a research tool by both students and even some professional researchers is steadily increasing (Colón-Aguirre and Fleming 2012; Noruzi 2009; Lamb and Johnson 2013; Okoli et al. 2014; Tomaszewski and MacDonald 2016). Students in particular find Wikipedia to be a useful research tool, especially for introductions to new topics or for clarifications (Selwyn and Gorard 2016), although they are also reticent to use it for school without direction from faculty and instructors (Todorinova 2015). Though scarce, a slow increase in the number of citations to Wikipedia in high-quality scholarly publications may imply a growing acceptability of it as an authoritative resource (Brazzeal 2011), and Wikipedia is used (at least informally) by scholars, librarians, students, and health professionals for researching topics as varied as entertainment and sexuality, health, and legal information (Okoli et al. 2014). In an attempt to capitalize on Wikipedia’s popularity, many CHI are hosting events to improve Wikipedia articles. Wikipedia edit-a-thons are collaborative events where participants receive training on Wikipedia authoring and then work on articles, frequently built around a specific theme. The advent of edit-a-thons at CHI has been rising, with institutions working collaboratively with librarians, scholars, and seasoned Wikipedians on themes such as art and feminism (Farry 2016, Potter 2017), #1Lib1Ref (where librarians add references to Wikipedia) (Soito 2017), botany (D’Acunto and Jackson 2016), and regional water topics (Free 2014) to name a few.

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2 Defined by Wikipedia as “the volunteers who write and edit Wikipedia's articles, unlike readers who simply read them” (Wikipedia, “Wikipedians” 2017).
While analyses of Wikipedia use in scholarly and popular resources have not yet focused on digital library collections and objects, an increasing amount of scholarship points to the validity of using Wikipedia citations as evidence of impact. Impact within educational resources and wider audiences can logically be measured through Wikipedia citations of articles and books (Thelwall and Kousha 2015). A large-scale analysis of citations to scholarly articles and monographs on Wikipedia across different disciplines found few results for articles but 33 percent of analyzed academic monographs were cited on Wikipedia (Ibid., 12), particularly in the arts, humanities, and social sciences (Ibid., 21). This subject-specific intensity probably relates to the accessibility of these topics to wider audiences (Ibid., 21). Additional studies have focused on references used in drug-related Wikipedia articles (Koppen, Phillips, and Papageorgiou 2015), articles about country histories (Luyt and Tan 2010), and citations to scientific journals (Nielsen 2007).

In addition, Wikipedia itself is working to increase and improve the connections between its resources and published scholarly resources. The Wikipedia Library (TWL) was established in 2013 to provide Wikipedians access to proprietary research databases, guidance on finding cited sources in library collections, outreach for librarians to become Wikipedians, and access to paywalled sources for all users (Askin 2016). Similarly, the GLAM (Galleries, Libraries, Archives and Museums) Wiki initiative was established to increase CHI/Wikipedia collaborations (Wikipedia, “GLAM” 2017). After finding that Wikipedia’s article on the Rosetta Stone, held by the British Museum, was viewed five times more often than the page about the Rosetta Stone on the museum’s own website, the British Museum hired a volunteer “Wikipedian-in-Residence” to improve relationships between Wikipedia and the Museum, thus sparking the international GLAM-Wiki initiative (Ellis 2014).
Marketing Digital Collections Through Wikipedia

Initiatives involving Wikipedia and CHI cross-pollination efforts such as the GLAM Wiki initiative and the British Museum “Wikipedian-in-Residence” are beneficial, and digital collection managers are increasingly taking advantage of them. After adding links to Wikipedia from the University of Washington Libraries Digital Collections, the University of Washington found that Wikipedia was driving traffic to their website, and that edited articles were being mirrored in other online dictionaries and encyclopedias (Lally and Dunford 2007). The University of California adapted this same strategy with Calisphere, a part of the California Digital Library. During this project, staff found that some links to Calisphere already existed on Wikipedia (Zentall and Clountier 2008). The University of North Texas staff edited over 700 Wikipedia articles to include links to their digital collections resulting in almost half of web traffic to the digital collections now coming from Wikipedia (Belden 2008).

The University of North Texas most often placed links in the “external links” section of Wikipedia articles and occasionally in the “references” section. The University of Wisconsin Digital Collections Center added links to the “external links” section of articles as well; as a result, six percent of visitors to the digital collections were found to begin their searches on Wikipedia (Tomaiuolo 2009).

Small-scale efforts, where a handful of articles were created or edited, have been undertaken at Villanova's Falvey Library, the New York State Library, and Central Connecticut State (Ibid.). Ball State University Archives and Special Collections increased visibility to the Ball State University Digital Media Repository’s Hague Sheet Music collection by adding 57 links to Wikipedia (Szajewski 2013). Pageviews of the digital collection items links increased by
an average of over 600 percent in the following year, and between 50 percent and 75 percent of traffic to the digital collection came from Wikipedia (Ibid.).

The University of Houston Digital Library’s pilot program to add links to Wikipedia was so successful that it has grown into a permanent program. Unlike previously discussed projects, University of Houston focused on sharing digital items in Wikimedia Commons, the open access media repository used by Wikimedia Projects, either instead of or in addition to the external links section of articles (Elder, Westbrook, and Reilly 2012, 35). Wikipedia is now the number one referring site to their digital collections and the third traffic source overall after direct traffic and Google (Ibid., 44).

University of Pittsburgh staff utilized Wikipedia’s Education Program resources and created a Wikipedia course to train interns working in the Archives Service Center and the Special Collections Department to edit Wikipedia articles and include citations for digital collections and finding aids (Galloway and DellaCorte 2014). The students found the most success adding citations to articles about popular or notable topics that were poorly covered on Wikipedia, consulting with library and archives staff with subject expertise throughout the process (Ibid., 90–91). Preliminary online usage statistics showed increases in traffic to the digital collections and finding aids, and an increase in general email reference may also have been related to the finding aid links on Wikipedia (Ibid., 95).

Finally, the Digital Resources Unit at Texas Tech University have had success linking specialized collections in what they term “focused community collections,” including Wikipedia. After adding a single item from a digital collection to Wikipedia, 22 percent of lifetime traffic to the digital collection was from Wikipedia (Perrin et al. 2017, 199). They were surprised to find that Wikipedians were already linking to their digital collections and, in studying these usage
statistics, unearthed unknown strengths in their repository holdings (Ibid.). In experimenting with Wikipedia, the Digital Resources Unit found that student workers lacked the contextual subject understanding of collections to add items to Wikipedia and plan on making librarian edits to Wikipedia part of their general workflow moving forward. While adding links to Wikipedia may be tedious work, it requires little to no maintenance after implementation and may help connect collections to specialized audiences.

**Citation Analyses and Cultural Heritage Resources**

Web traffic provides one means of assessing the use of digital collections. Citation analyses can also aid CHI in assessing use of collections and showing their value as research materials. While existing literature does not include such analyses for digital collections and Wikipedia, they have been conducted to determine use of both physical and digital holdings in scholarly publications. A research study of digital collections’ citations in the *American Historical Review* found that 10 percent of citations were for archival materials, in addition, almost half of the articles analyzed used archival materials, and 24 percent of articles cited web resources and digital archival collections (Sinn 2012, 1532). The content of the digital sources used tended towards specialized topics (such as the slave trade, French literature, and government legislative information) rather than collections solely devoted to history (Ibid., 1534). The study was complicated by defunct URLs to collections, and the author suggests that long-term preservation of digital collections is needed (Ibid., 1535). The article also notes that while usage patterns may help institutions prioritize digital projects, additional judgements by archivists as to future research needs should still be taken into account (Ibid., 1536). A follow-up study analyzed the content of the cited collections for geographic, temporal, and subject
coverage (Sinn 2013). All types of coverage were diverse, but some specific subjects did emerge from the analysis including the Holocaust and visual art in articles about Europe, and art, government, and slavery in North American articles (Ibid., 80). Contemporary resources (photo collections, news resources, and user stories) were widely cited, implying that digital preservation decisions should extend beyond “historical materials with high intellectual content but low artifactual value or for materials that are unique and rare” (Ibid.).

There are unique challenges to finding citations to digital library objects. Guidelines established by the Digital Library Federation Assessment Interest Group, Citations Subgroup, pinpoint shortcomings in commonly-used citation styles that rarely differentiate between digital and physical archival resources. The guidelines thus recommend that, regardless of the citation style used, citations include persistent identifiers, or if unavailable, citable URLs, in addition to the name of the digital repository and the name of the creating institution (Kelly 2015, 4-5). Link rot, or the phenomena of moved or deleted web resources so that URLs and hyperlinks become obsolete, means that digital objects without persistent identifiers can quickly become difficult or impossible to locate online. The more thorough the digital object citation, the more likely users will be able to locate the original digital object, and the more likely digital library administrators will be able to track the use of their digital assets. Similarly, in “The Future of Web Citation Practices,” Robin Camille Davis recommends creating a publicly accessible archival copy (including a snapshot of the site and metadata about the access date and time) of cited web resources at the time of citation to combat both link rot and content drift (or changing content) (2016, 5).
Research Questions and Methodology

Utilizing existing research and gaps in the professional literature, I developed a series of research questions related to the use of digital cultural heritage on Wikipedia. Wikipedia is one of the most popular resources online for a variety of users and use types. CHI, particularly archives and libraries at large research universities, have had success marketing their digital assets on Wikipedia, and citation analysis may be a relevant method for assessing the use and reuse of digital assets in both popular and scholarly work. Little to no published research exists focusing on citation analyses of CHI resources on Wikipedia, and existing research is unclear on the efficacy of non-research based universities marketing their digital assets through the online encyclopedia. In the only example found of a digital library locating citations to its collections on Wikipedia, staff from the California Digital Library (CDL) began adding Wikipedia citations to items in Calisphere, the K-12 educational arm of the CDL, and were surprised to find that some references to CDL items were already on Wikipedia, Wikimedia Commons, and Wikisource. In finding citations that they believed had been created by users unaffiliated with their organization, they felt that they had been given insight into what resources the Wikipedia community finds most useful (Zentall and Cloutier 2008, 28). The use of a consortial digital library as the starting point for identifying Wikipedia citations bears more investigation. Therefore, this case study addresses the little-researched area of what CHI content from a variety of institution types is being cited on Wikipedia using the Louisiana Digital Library (LDL) as its subject.

In analyzing Wikipedia citations to Louisiana’s resources, this case study seeks to find answers to the following questions:

1. Is Louisiana’s digital cultural heritage being cited on Wikipedia? If so, what types of resources are being cited?
2. What is the content of Wikipedia articles that cite Louisiana’s digital cultural heritage?

3. What are the implications of this research for Louisiana’s digital cultural heritage?

While the examples detailed in the “Marketing Digital Collections Through Wikipedia” section of the literature review primarily used web analytics to show the success of their efforts, this case study instead can be seen as a first step in a proposed workflow in which decisions about where to place citations to CHI digital content on Wikipedia are made based on a thorough analysis of existing CHI citations on Wikipedia. Following the addition of CHI citations to Wikipedia, web analytics would then be used to assess the benefits of doing so. In this case study, Louisiana’s CHI may serve as representatives for similarly-sized institutions in other states, and citations to Louisiana’s CHI as a whole may provide examples for other statewide consortia. Thus, in order to understand how best to cite digital cultural heritage on Wikipedia, this case study seeks to discover where such resources might best be cited based both on current areas of emphasis and areas for improvement, using Louisiana as a sample.

Data Collection

In order to assess a wide variety of institutions based on mission, size, and funding model, CHI were selected for inclusion from the list of institutions with digital library collections in the Louisiana Digital Library. The Louisiana Digital Library (LDL) is an online digital library containing over 100,000 resources from CHI across the state of Louisiana. Institutions contribute materials from their unique collections to the open access digital library. As of this writing, the LDL is hosted on CONTENTdm; however, it is being migrated to an Islandora repository being developed by Louisiana State University. This transitional period makes evaluation of links to the LDL on Wikipedia particularly timely, as URLs for existing LDL items will be different once
the migration is complete in the fall of 2017 and will need to be updated anywhere they are linked or bookmarked, including on Wikipedia.

Wikipedia’s “External links search”\(^3\) was used to search base URLs for the LDL site. Over the course of its history, the LDL has had four base URLs: louisdl.louislibraries.org, Cdm16313.contentdm.oclc.org, louisianadigitallibrary.org, and louisianadigitallibrary.com (see Figure 1). The Wikipedia external link search automatically adds a wildcard after a URL, so any LDL page, search results list, browse list, or item record linked on any English-language Wikipedia page will be returned in the link search along with the name and hyperlinked URL of the Wikipedia page where the LDL link appears. These results were transferred to a spreadsheet for analysis.

**Figure 1: Screenshot of Wikipedia external link search for**

http://www.louisianadigitallibrary.com

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\(^3\) [https://en.wikipedia.org/wiki/Special:LinkSearch](https://en.wikipedia.org/wiki/Special:LinkSearch)
At the time of this writing, the LDL’s website listed 18 institutions with collections in the LDL. Louisiana’s CHI also have a myriad of other web-based content outside of the LDL, including on their own websites or in finding aid repositories. In order to be as comprehensive as possible in evaluating Louisiana CHI citations on Wikipedia, searches were also generated for the websites and finding aid repositories (when applicable) of institutions listed on the LDL’s site. Some institutions with multiple archival repositories had multiple base URLs for their websites or finding aids; all of these URLs were searched. If an institution’s website did not have dedicated pages for their archives, it was skipped. A full list of URLs searched is available in Appendix A. These results were also added to the spreadsheet for analysis.

Coding

This study used a combination of qualitative and quantitative measures for analysis. Simple descriptive statistics were developed for the entire dataset and for small subsets based on whether the Wikipedia result was from the LDL or another CHI web resource. The content of the Wikipedia articles and of the resources cited on Wikipedia was analyzed using open coding, a qualitative research method where general categories are determined based on the content of the data. Open coding, a qualitative method from the Grounded Theory methodology, involves the initial breakdown of raw data and formation of general concepts (Price 2010). Based on “a high degree of researcher intuition and theoretical sensitivity” and “a constant process of questioning and comparing that serves to limit researcher subjectivity” (Ibid.), it is still a method that does include at least some subjectivity, particularly when performed by a single researcher.

4 List formerly at http://www.louisianadigitallibrary.com/index.php?browseby=institution. Not all listed institutions are actually members of the Louisiana Digital Consortium (LDC), the governing body of the LDL. Some institutions have joined the LDC but not published any collections in the LDL, while other non-member institutions have partnered with members to publish collections.
Ultimately four LDL URLs and thirty-two Louisiana CHI URLs were searched across two days in July 2017. Results were immediately recorded in the spreadsheet and then analyzed within two weeks of the original search. Results were tagged as either being from LDL links or “web resources” (aka websites and/or finding aids). The holding institution for the Louisiana CHI digital library or web resource linked on Wikipedia was recorded, and the Louisiana CHI link cited on Wikipedia was evaluated for what type of resource the link went to (see Table 1).

Table 1: Type of Resource

| Page/Resource Type       | Definition                                                                 |
|-------------------------|---------------------------------------------------------------------------|
| Blog                    | Timestamped informal posts on institution website                         |
| Collection browse       | The “browse all” page/s in an LDL collection                              |
| Collection landing page | Descriptive page for a single collection in the LDL                       |
| Collection search page  | Search results for a term or terms in a single collection in the LDL      |
| Collection descriptions | Pages on institution websites listing or describing physical and/or digital collections |
| Collections lists       | Lists of collections in the LDL by institution, media format, geographic focus, or time period |
| Digital object/s        | Digitized or born-digital objects on institution websites (not in the LDL) |
| Event                   | Pages about events on institution websites                                |
| Exhibit                 | Pages about exhibits on institution websites                              |
| Finding aid             | Full archival collection or records descriptions on institution websites or in finding aid repositories |
| Homepage                | Start-up page on institution website                                       |
| Institution info        | Hours, location, and other “about” information on an institution website   |
| Item record             | Catalog or database record on an institution website                      |
| LDL search              | Search results lists for the LDL, not specific to a collection            |
| Page not found          | Missing or moved pages in the LDL or on institution websites              |
| Publications            | Magazines, journals, eBooks, and other content created by an institution and hosted on their website |
| Ready reference         | Facts, histories, and other quick information resources on institution websites |
| Single item record      | Individual digital objects in the LDL. For “single item records,” the type of digital object (audiovisual, document, or image) was also recorded. |
| Subject guide           | Guides to archival holdings based on general topics found on institution websites |
Broad topics were assigned to LDL objects and collections. The Wikipedia pages with links to Louisiana CHI content were also coded broadly using Wikipedia’s “list” content categories. The location of the citation on the Wikipedia page was noted, including the locations found in Table 2.

Table 2: Wikipedia link locations

| Location                | Definition                                                                 |
|-------------------------|---------------------------------------------------------------------------|
| Embedded citation       | Links embedded in the Wikipedia page that aren’t also included in end-of-article reference lists (Wikipedia, “Embedded Citations” 2016). |
| External links          | Links in a dedicated section at the end of a Wikipedia article for further research; external links are not included in inline citations or ref tags. May also appear as “further reading” or “bibliography.” “Further reading” and “external links” may be used interchangeably, or “external links” may refer to online sources while “Further reading” refers to print works (Wikipedia, “External Links” 2017). |
| File source             | For files uploaded to Wikimedia Commons where a link to the original source is included (Wikipedia, “Reusing Content Outside Wikimedia” 2017). |
| Inline citation and ref tags | Citations within the text of the article with linked footnotes at the end of the article (Wikipedia, “Inline Citation” 2017). |

Finally, the content of the Wikipedia articles with links to Louisiana CHI content was tagged as having subject matter relevant to Louisiana in order to show what percentage of Wikipedia articles with links to LDL CHI are related to Louisiana-specific topics.

Limitations

As previously mentioned, it should be noted that this method of data analysis, particularly as performed by a single researcher without the opportunity to norm with other researchers, is somewhat subjective. In addition, absent similar studies, no existing coding rubrics could be

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5 https://en.wikipedia.org/wiki/Portal:Contents/Lists
consulted to align categorizations and provide benchmarking metrics. To mitigate any inherent subjectivity or bias, the methodology for this study is shared in as much detail as is feasible to promote the reproducibility of findings.

A further limitation involves the migration of the Louisiana Digital Library. At the time of this writing, the LDL was hosted using CONTENTdm. On August 31, 2017, however, the LDL’s contract with OCLC expired and the digital library formally launched on its new Islandora platform at louisianadigitallibrary.org. All URLs to LDL items, collection pages, and other webpages or records on the site are different on the new platform. Knowing that this might obscure future research or follow-up analysis, for the sake of transparency and further analysis, all Louisiana CHI resources found cited on Wikipedia were captured and saved using the Internet Archive’s Wayback Machine when possible, as recommended by Davis (2016, 5). The URL to the web-archived copy of each resource cited on Wikipedia is available, along with the entire dataset used for analysis, in the author’s Figshare repository (Kelly 2017).

Findings

General

Using Wikipedia’s “External links search” to search for four LDL base URLs and thirty-two web resource URLs returned 774 results. As the goal of this study was to evaluate how Louisiana CHI are cited on Wikipedia, several results were discarded for not fitting this scope. The external links search returns not only published Wikipedia articles but also drafts, discussion pages, and other community resources. After initial review, results were discarded for Wikipedia

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6 https://archive.org/web
7 https://doi.org/10.6084/m9.figshare.5445241.v1
article drafts, articles flagged for deletion or copyright violations, user sandbox pages, discussion pages, meetup pages, “to do” lists, and reference desk pages. This culminated in 128 results being discarded and 646 being left for analysis.

Links to Louisiana CHI web resources and to the LDL were comparable, though slightly more of the Wikipedia pages evaluated had links to Louisiana CHI web resources. An overwhelming majority of the Wikipedia pages evaluated included content related to the state of Louisiana.

The 646 results accounted for 499 distinct URLs found across 469 Wikipedia pages for an average of 1.3 Louisiana CHI citations per Wikipedia page analyzed. The most cited resources and the Wikipedia pages with the most Louisiana CHI citations appear in Tables 3 and 4.

**Table 3: Wikipedia articles with the most Louisiana CHI citations**

| Wikipedia Article                                    | Louisiana CHI citations |
|------------------------------------------------------|-------------------------|
| Crescent City Radio                                  | 13                      |
| Timeline of New Orleans                              | 12                      |
| Louisiana State University Tiger Marching Band       | 10                      |
| Louisiana State Museum                               | 9                       |
| List of museums in Louisiana                         | 8                       |
| 1929 Tulane Green Wave football team                 | 7                       |
| The Historic New Orleans Collection                  | 6                       |
| Cypress Lake (Lafayette, Louisiana)                  | 5                       |
| State Library of Louisiana                           | 4                       |
| Sidonie de la Houssaye                               | 4                       |
| Photographers of the American Civil War              | 4                       |
| Amistad Research Center                              | 4                       |
| 1931 Tulane Green Wave football team                 | 4                       |
| 1925 Tulane Green Wave football team                 | 4                       |
Table 4: Most cited Louisiana CHI resources on Wikipedia

| Louisiana CHI resource                                                                                                                                                                                                 | Number of citations on Wikipedia |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Tulane University, Football Program-The Greenie; Georgia vs. Tulane, single item record                                                                                                                                | 12                               |
| Tulane University, Southeastern Architectural Archive homepage                                                                                                                                                         | 11                               |
| Louisiana State Museum, New Orleans Chamber of Commerce Photographs, collection landing page                                                                                                                           | 8                                |
| Louisiana State Museum, New Orleans Chamber of Commerce Photographs collection search                                                                                                                            | 8                                |
| Tulane University, Football Program-The Greenie; Auburn vs. Tulane, single item record                                                                                                                                  | 7                                |
| LSU Health Sciences Center Shreveport, Newspaper Clippings, “Legislators Support Med Bonds,” single item record                                                                                                  | 7                                |
| Tulane University Football Program-The Greenie; L.S.U. vs. Tulane, single item record                                                                                                                                  | 6                                |
| Tulane University, Louisiana Research Collection (LaRC), subject guide                                                                                                                                                | 6                                |
| Louisiana State University, Special Collections, Harrison G. Bagwell Collection, finding aid                                                                                                                           | 5                                |
| Tulane University, Louisiana Research Collection (LaRC), Andre Brown Moore papers, finding aid                                                                                                                       | 5                                |
| McNeese State University, Archives and Special Collections Department, Harry Hollins Papers, finding aid                                                                                                          | 4                                |

Of the Louisiana institutions used in this study, only two did not turn up citations on Wikipedia. Twelve citations went straight to LDL home or information pages or were for search results containing multiple institutions. Disregarding these citations, the remaining citations by institution appear in Table 5.
Table 5: Wikipedia citations by institution

| Institution                                                        | LDL citation | % of LDL citations | web resource citation | % of web resource citations | Total citations | Percentage of total citations |
|--------------------------------------------------------------------|-------------|--------------------|-----------------------|-----------------------------|-----------------|-------------------------------|
| Amistad Research Center                                            | 1           | 0%                 | 45                    | 12%                         | 46              | 7%                            |
| Historic New Orleans Collection                                    | 2           | 1%                 | 45                    | 12%                         | 47              | 7%                            |
| Louisiana State Archives                                           | 0           | 0%                 | 30                    | 8%                          | 30              | 5%                            |
| Louisiana State Museum                                             | 19          | 8%                 | 21                    | 5%                          | 40              | 6%                            |
| Louisiana State University                                         | 44          | 17%                | 87                    | 23%                         | 131             | 20%                           |
| Louisiana State University at Shreveport (LSUS)                   | 0           | 0%                 | 4                     | 1%                          | 4               | 1%                            |
| Louisiana State University Health Sciences Center Shreveport       | 11          | 4%                 | 0                     | 0%                          | 11              | 2%                            |
| Louisiana Tech University                                          | 1           | 0%                 | 1                     | 0%                          | 2               | 0%                            |
| Loyola University New Orleans                                      | 15          | 6%                 | 2                     | 1%                          | 17              | 3%                            |
| LSU Health Sciences Center New Orleans                             | 5           | 2%                 | 0                     | 0%                          | 5               | 1%                            |
| McNeese State University                                           | 5           | 2%                 | 9                     | 2%                          | 14              | 2%                            |
| New Orleans City Archives                                          | 3           | 1%                 | 42                    | 11%                         | 45              | 7%                            |
Louisiana CHI citations could be found most frequently on Wikipedia pages about topics within society and the social sciences, and culture and the arts, as detailed in Table 6. These percentages and the order of most prevalent categories of Wikipedia pages changed based on the resource analyzed though. LDL links were most cited on Wikipedia articles about culture and the arts, while web resources were most likely to be found cited on Wikipedia articles about society and the social sciences.
Table 6: Louisiana CHI citations by Wikipedia article type

| Wikipedia article type               | LDL citations | Web resource citations | Total |
|-------------------------------------|---------------|------------------------|-------|
| culture and the arts                | 115           | 60                     | 175   |
| general reference                   | 2             | 62                     | 64    |
| geography and places                | 17            | 17                     | 34    |
| health and fitness                  | 4             | 3                      | 7     |
| history and events                  | 11            | 36                     | 47    |
| natural and physical sciences       | 3             | 4                      | 7     |
| people and self                     | 2             | 10                     | 12    |
| religion and belief systems         | 0             | 9                      | 9     |
| society and social sciences         | 46            | 141                    | 187   |
| technology and applied sciences     | 24            | 37                     | 61    |
| **Grand Total**                     | **224**       | **379**                | **603**|

Most Louisiana CHI were cited using inline citations and ref tags. A little less than a quarter of citations were found at the end of the Wikipedia article in external links sections (see Table 7).

Table 7: Wikipedia citations by citation location

| Wikipedia link location              | Number of links | % of total |
|-------------------------------------|-----------------|------------|
| inline citation and ref tags        | 422             | 65%        |
| external links                      | 146             | 23%        |
| embedded citation                   | 55              | 9%         |
| file source                         | 23              | 4%         |
LDL results

LDL citations on Wikipedia primarily led to single item records in the LDL containing a digital object and its descriptive metadata. About a third of LDL citations were for collection-specific landing pages or searches, and the remainder of LDL link types only accounted for a small percentage of results. Most of the single item records were documents and around a third were for images. Only one result was for an audiovisual resource (see Table 8).

Table 8: LDL citation types

| LDL page type        | AV | Document | Image | Total |
|----------------------|----|----------|-------|-------|
| single item record   | 1  | 114      | 56    | 171   |
| collection landing page | 39 |          |       |       |
| page not found       | 18 |          |       |       |
| collection search    | 18 |          |       |       |
| collection browse    | 6  |          |       |       |
| LDL full-site search | 5  |          |       |       |
| homepage             | 4  |          |       |       |
| collection lists     | 2  |          |       |       |

Single item records and collection-specific links were analyzed for general subject matter. Sports-related content, especially pertaining to college sports, was the most prevalent, accounting for over a third of results. Digitized newspapers and resources related to the government (such as portraits of local government officials, federal documents, and WPA (Works Progress Administration) reports) were also common; a breakdown of LDL link content is in Table 9.
The temporal coverage of cited LDL content showed widespread disparity except for the mid-20th century, as 73 percent of citations to the LDL were for items created between 1920 and 1970 (see Figure 2).

| LDL link content             | Number of results | % of results |
|------------------------------|-------------------|--------------|
| sports                       | 79                | 33%          |
| newspaper                    | 25                | 11%          |
| government                   | 23                | 10%          |
| commercial business          | 20                | 8%           |
| outdoor photography          | 19                | 8%           |
| education                    | 16                | 7%           |
| music and musicians          | 12                | 5%           |
| writing and publishing       | 8                 | 3%           |
| technical drawing            | 7                 | 3%           |
| art and design               | 6                 | 3%           |
| location                     | 5                 | 2%           |
| diaries and personal letters | 5                 | 2%           |
| military                     | 4                 | 2%           |
| justice system               | 4                 | 2%           |
| finance                      | 3                 | 1%           |
Web Resource Results

Over a quarter of non-LDL content cited on Wikipedia is no longer located at the cited link. However, of these missing pages, 15 percent also included links to archived copies of the page on the Internet Archive Wayback Machine. Most of the working Louisiana CHI web resource citations on Wikipedia are for archival finding aids, with the remaining citations leading to informational pages on CHI websites (see Table 10).

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8 [https://archive.org/web](https://archive.org/web)
Table 10: Web resources cited on Wikipedia

| Web resource type       | Number of results | % of results |
|-------------------------|-------------------|--------------|
| finding aid             | 114               | 41%          |
| institution info        | 47                | 17%          |
| homepage                | 24                | 9%           |
| publications            | 18                | 6%           |
| digital object/s        | 18                | 6%           |
| ready reference         | 16                | 6%           |
| subject guide           | 15                | 5%           |
| collection descriptions | 10                | 4%           |
| exhibit                 | 9                 | 3%           |
| blog                    | 4                 | 1%           |
| item record             | 3                 | 1%           |
| event                   | 2                 | 1%           |

Discussion

The findings of this research show that Louisiana’s digital cultural heritage is being cited on Wikipedia. Digitized and born-digital objects in the LDL as well as finding aids for archival collections are the most cited Louisiana CHI resources on Wikipedia. LDL items cited on Wikipedia are primarily documents (manuscripts, newspapers, and other text-based resources). There are also a significant number of LDL citations on Wikipedia that are not item-specific, such as links to entire digital collections or to searches for specific terminology within the entire digital library. A very large percentage of these materials, over ⅓, relate to athletes and sports events from Louisiana’s history, especially college sports. The majority of single items from the
LDL that are cited on Wikipedia were created between 1920 and 1970. General information about Louisiana CHI’s collections and services as found on institution websites is also being cited on Wikipedia. For all categories of Louisiana CHI content cited on Wikipedia, citations are primarily found in inline citations and ref tags. This is the preferred and recommended method for citing sources within the body of a Wikipedia article, showing that Louisiana CHI sources are principally being used to prove the reliability of the information within these articles.

As previous studies involving the intentional citation of CHI resources in Wikipedia articles have involved primarily large research universities, it is interesting to note that the Louisiana institutions with the most citations on Wikipedia are also large research institutions (Tulane University and Louisiana State University (LSU)). Among the remainder of the institution types represented in the LDL, the number of Wikipedia citations had little variance in number. It is possible that Tulane and LSU have the most citations because of the high number of links to college athletics collections on Wikipedia. Further research could determine if Tulane and LSU have the largest number of digital objects in the LDL (and the largest number of athletics-related objects, specifically), or if they engage in more outreach activities than some other LDL institutions, in order to determine what makes a particular institution’s collections more likely to be cited.

The content of Wikipedia articles citing Louisiana digital cultural heritage institutions and collections varies slightly based on the type of resource being cited. Web resources are largely being cited on Wikipedia articles that fall under the category of “society and social sciences,” such as articles about politicians and political activists, educational institutions, and commercial businesses. LDL citations are primarily in articles about “culture and the arts,” including college athletics, music and musicians, literature and writers, and artists. The vast
majority of articles citing both web resources and LDL content are related to people, organizations, places, or events with a connection to the state of Louisiana, so it is unsurprising that Louisiana’s memory institutions are being looked to for information about these topics.

Based on the analysis of the Louisiana CHI cited on Wikipedia, there seems to be an existing niche for Louisiana CHI with collections related to sports, especially university archives with athletic programs and images of athletes and sports events, to promote these collections on Wikipedia. Institutions may also want to prioritize digitization of holdings related to athletics for future LDL collections to see if this increases web traffic for their collections.

Similarly, Louisiana CHI with archival collections relating to social science topics in the state, like politics, education, and commercial businesses based in Louisiana, may find success linking to information about these collections on Wikipedia. Finding aids seem to be popular resources for citations on Wikipedia, particularly in identifying where relevant archival collections are located, and in providing biographical and administrative information. It would be interesting for CHI to interview users of their physical holdings to find out how the user located them to see if Wikipedia drives physical traffic to archives as well as web traffic to digital resources.

In contrast, Louisiana CHI may find implications for what is not being cited on Wikipedia as much as for what is. For example, the author’s institution, Loyola University New Orleans, has prioritized the digitization and dissemination of university records—newspapers, yearbooks, course catalogs, and images, to name a few. Of the eighteen citations to Loyola’s digital resources on Wikipedia, 72 percent come from the university’s newspaper, The Maroon. Of the over 10,000 digitized images in the Loyola University Photographs Collection, only one is included in Wikimedia Commons. This small example shows that, thus far, textual primary
sources are favored as reference sources when citing Loyola’s digitized archival resources. The
digitization of further textual primary sources from the University Archive may lead to an
increase in citations to Loyola’s collections on Wikipedia. However, another strategy for Loyola
to employ might be to begin adding more images to Wikimedia Commons in an attempt to boost
traffic to the University Photographs Collection. Analysis of web traffic to digital collections
from Wikipedia following a dedicated endeavor to enrich citations would be recommended to
institutions seeking to gauge the success of such efforts.

Louisiana CHI may also wish to pay particular attention to how the administrative or
biographical history of their finding aids can improve historical content in Wikipedia articles and
target Wikipedia edits based on this information. A robust 2016 discussion on Twitter, which
was captured in a Storify, about minimizing or removing biographical histories from finding aids
altogether may be relevant to this idea. Instead of including biographical information for
collection creators in finding aids, archivists would create or improve relevant Wikipedia articles
at the time of finding aid authorship under the assumption that users would then consult
Wikipedia directly for biographical information (Donahue 2017). This idea is also promoted in
an earlier blog post by Mark Matienzo, “Must Contextual Description Be Bound to Records
Description?” (2009). There are regulatory applications to be considered for this method; for
example, Wikipedia editors may not deem the creator of an archival collection to be notable
enough to warrant an article. But archivists and digital collection administrators at CHI who wish
to take advantage of Wikipedia’s popularity should contemplate working with Wikipedia
simultaneous to creating finding aids and then assess the value of doing so.

Surprisingly few Louisiana CHI resources--just four percent--are being uploaded to
Wikimedia Commons. In the context of the LDL, that may relate to suggested copyright
terminology and Wikipedia’s restrictions for content uploads. Wikipedia requires that items uploaded to the Commons be freely licensed, either under the public domain or using copyleft licenses such as Creative Commons (Wikipedia, “Free Content” 2017). The LDL’s metadata guidelines, found on the LDL website, include “Copyright is retained in accordance with U.S. Copyright laws” in example rights statements for items uploaded to the LDL (Louisiana Digital Consortium Metadata and Scanning Guidelines Working Group 2015). This generic copyright statement, while not used for all items in the LDL, is used by many, and obscures the true copyright protection of an item. Many resources found in the LDL are in the public domain, but users may be hesitant to upload LDL items to Wikimedia Commons without a direct statement in the item metadata that the item is free for reuse. Institutions that would like to encourage sharing and reuse of their collections in media repositories like Wikimedia Commons should therefore consider revising their rights statements to clarify copyright status.

  Linkrot is a real and immediate threat to CHI with online resources linked on Wikipedia. At the time of this writing, 19 percent of Louisiana CHI links found on Wikipedia were already obsolete. When the LDL migrates to its new platform, this number will become much higher. While some Wikipedians had the foresight to capture cited sources using the Internet Archive’s Wayback Machine and include that link as well as the original in their citations, this practice is still relatively infrequent. Digital libraries should consider adopting persistent identifiers, like digital object identifiers (DOIs) and archival resources keys (ARK), to ensure that digital objects are discoverable in an enduring way. Instituting this practice would improve both the user experience as well as digital collection administrators’ ability to track reuse of collection items.

  The open and collaborative nature of Wikipedia creates distinct opportunities for CHI. As noted in the previously referenced Twitter-based discussion on Wikipedia and finding aid
biographies, Wikipedia edits are “transparent, version controlled, and easily updatable” (Drake 2016). Many digital CHI resources, including finding aids and digital library resources, are not. Wikipedia can be a powerful tool for crowdsourcing additional information about subjects relevant to CHI resources, and connecting these resources directly to the Wikipedia community may increase CHI audiences. In addition, CHI can monitor the changing nature of Wikipedia articles that cite their content to gauge public interest and discourse on these topics. Because edits to Wikipedia pages are publicly viewable, CHI can see when citations to their resources are added or deleted and who is doing so. In terms of relating finding aids to Wikipedia articles, articles may also be updated much more frequently than finding aids (Donahue 2016). The Remixing Archival Metadata Project, or RAMP, extracts biographical and historical data from EAD finding aids and then enables the publishing of authority records to Wikipedia to facilitate this process.9

However, Wikipedia’s limitations should not be disregarded. Its open nature also means that citations to CHI may very well be removed. Wikipedia has been criticized for gender disparity among content and editors, hostility towards women, and a lack of coverage of people of color due to the overwhelming whiteness of its editorial community (Boboltz 2015; Paling 2015; Wagner et al. 2015). These criticisms, in fact, mirror criticisms of CHI hiring practices and collection development (Bourg 2014; Galvan 2015; Hathcock 2015; Ramirez 2015; Society of American Archivists Issues & Advocacy Section 2016). The adoption of any new platform or tool by a CHI should only be undertaken after careful deliberation of its faults and merits, and the use of Wikipedia either to promote or evaluate the use of collections is no different. In addition, CHI who seek to promote their collections on Wikipedia should acknowledge both formal and informal best practices and respect the changes that others make to articles they have

9 https://tools.wmflabs.org/ramp/index.php
created or edited. As Hillel Arnold noted on Twitter, archivists working with Wikipedia “...have to be okay with not controlling things though, which is hard for archivists” (2016). In engaging with publicly authored and edited resources, CHI staff must find balance between the benefits of crowdsourcing knowledge and the perception of loss of authority.

Future Research

This study focused on how Louisiana’s CHI are being cited on Wikipedia without known intervention from Louisiana CHI staff. Future studies may choose to compare how user-generated citations on Wikipedia differ from content that CHI administrators add to Wikipedia and if there is a difference between how much web traffic comes from user-generated citations versus CHI administrator citations. This may be easier to do at smaller institutions where all library staff are known and can be interviewed about their experience adding CHI citations to Wikipedia.

While existing research focuses on how Wikipedia can drive web traffic to digital resources, it would also be beneficial to monitor if visitors to CHI physical spaces are driven by content found on Wikipedia.

The vast majority of Wikipedia articles with links to Louisiana digital resources were articles whose content related directly to the history of Louisiana. The evaluation of citations to CHI from other repositories through the context of their geographical location would provide interesting context for the importance of CHI resources in validating the historical analysis of regional topics. Future research should broaden the scope of this study and include a much wider variety of CHI (and geographical locations) for analysis.
Conclusion

Assessment of how resources are used and reused is an essential activity for CHI to evaluate their ability to meet user needs. By evaluating citations to CHI digital resources on Wikipedia, we can see patterns in what content the Wikipedia community finds most relevant and derive recommendations for collection development and digitization priorities. While Wikipedia users are just one potential audience for CHI collections, research shows that effectively connecting with these users may significantly drive web traffic to CHI resources and enable CHI to show the value of their digital assets to stakeholders. Focusing not on how CHI have marketed their collections on Wikipedia but instead on how Wikipedians have used and reused CHI resources without direct intervention from CHI allows for a different approach to resource use than has been conducted and shared previously in scholarly literature. This research study shows that Wikipedia editors are finding and using digital library items and archival finding aids in certain domains of Wikipedia articles, and that these resources are being cited as essential evidence for proving the validity of claims made. The presence of a significant number of defunct URLs for CHI resources in Wikipedia articles, contrasted with the CHI pursuit of long-term access and preservation, also indicates a need for CHI to develop more persistent online signifiers for digital resources. While assessment of Wikipedia links to CHI resources is only one possible method for evaluating the impact of digital resources, this research proves that concrete conclusions may be derived from such analysis and used in conjunction with other assessment methods to inform CHI how their resources are being utilized online.
## Appendix A:

### Institutional URLs searched in Wikipedia

| Institution                          | Website                        | Finding Aid                                         |
|--------------------------------------|-------------------------------|-----------------------------------------------------|
| Amistad Research Center              | [http://www.amistadresearchcenter.org](http://www.amistadresearchcenter.org) | [http://amistadresearchcenter.tulane.edu/archon/](http://amistadresearchcenter.tulane.edu/archon/) |
| Louisiana State Archives             | [http://www.sos.la.gov/HistoricalResources](http://www.sos.la.gov/HistoricalResources) | n/a                                                  |
| Louisiana State Museum               | [http://louisianastatemuseum.org](http://louisianastatemuseum.org) | [http://www.crt.state.la.us/Assets/Museum/collections/historiccenter/manuscripts](http://www.crt.state.la.us/Assets/Museum/collections/historiccenter/manuscripts) |
| Louisiana State University (LSU)     | [http://www.lib.lsu.edu/special](http://www.lib.lsu.edu/special) | [http://www.lib.lsu.edu/sites/default/files/specialcollections](http://www.lib.lsu.edu/sites/default/files/specialcollections) |
| Louisiana State University at Shreveport (LSUS) | [http://www.latech.edu/library/scma](http://www.latech.edu/library/scma) | n/a                                                  |
| Louisiana State University Health Sciences Center New Orleans | n/a | n/a |
| Louisiana State University Health Sciences Center Shreveport | [https://lib.sh.lsuhscl.edu/node/18](https://lib.sh.lsuhscl.edu/node/18) | [http://lib.sh.lsuhscl.edu/images/archives](http://lib.sh.lsuhscl.edu/images/archives) |
| Louisiana Tech University            | [http://www.latech.edu/library/scma](http://www.latech.edu/library/scma) | [http://www.latech.edu/library/scma/collections](http://www.latech.edu/library/scma/collections) |
| Loyola University New Orleans        | [http://library.loyno.edu/research/speccoll](http://library.loyno.edu/research/speccoll) | [http://library.loyno.edu/assets/handouts/archives](http://library.loyno.edu/assets/handouts/archives) |
| Institution                                      | LibGuides/Archives  | Special Collections  |
|-------------------------------------------------|----------------------|----------------------|
| McNeese State University                        | http://libguides.mcneese.edu/archives | http://ereserves.mcneese.edu/depts/archives |
| New Orleans City Archives                       | http://archives.nolalibrary.org/~nopl/spec/speclist.htm | http://archives.nolalibrary.org/~nopl; http://nutrias.org/~nopl |
| Nicholls State University                       | http://nicholls.libguides.com/archives | https://www.nicholls.edu/apps/library/archives_collections |
| Northwestern State University                   | https://library.nsula.edu | n/a |
| Ogden Museum of Southern Art                     | n/a | n/a |
| Southern University and A and M College (SUBR)  | http://www.lib.subr.edu/archives.html | http://docushare.subr.edu/sudocs |
| State Library of Louisiana                      | http://www.state.lib.la.us | n/a |
| The Historic New Orleans Collection             | http://www.hnoc.org | http://hnoc.minisisinc.com |
| Tulane University                               | https://tuarchives.tulane.edu; http://larc.tulane.edu/; http://jazz.tulane.edu | http://specialcollections.tulane.edu/archon |
| University of Louisiana at Lafayette            | https://library.louisiana.edu/collections; http://ernestgaines.louisiana.edu | n/a |
| University of Louisiana at Monroe               | http://www.ulm.edu/library/archives | n/a |
| University of New Orleans                       | http://library.uno.edu/specialcollections | n/a |
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