A Data-Driven Approach to Reparative Description at the University of Chicago

Ashley Gosselar
Hanna Holborn Gray Special Collections Research Center
University of Chicago Library
Chicago, USA
agosselar@uchicago.edu

***Abstract*—Reparative description of collections is a growing element of diversity, equity, and inclusion efforts at cultural heritage institutions. However, the scale and complexity of the work can be overwhelming in practice. I demonstrate that computational methodologies and data analytics can be used to kickstart the planning stage for reparative description of archival finding aids. I discuss auditing and analyzing finding aids at the University of Chicago Library's Hanna Holborn Gray Special Collections Research Center for potentially problematic language utilizing Python, Trifacta, Tableau, and Neo4j. I describe insights gained by treating finding aids as data, and I share recommendations for structuring reparative description work in a logical and attainable way.**

Keywords—Computational Thinking, Data Analysis, Reparative Description, Inclusive Description, Archives, Archival Description, Archival Metadata, Finding Aids

I. INTRODUCTION

Reparative description of collections is a burgeoning element of diversity, equity, and inclusion efforts at cultural heritage institutions. As modern libraries, archives, and museums strive to be welcoming to all people, they are confronting not only collecting gaps, but inadequate, inaccurate, outdated, or outright harmful metadata about people and communities in their collections. Collections metadata, discovery systems, and description workflows are based on "generations of changing practice" and reflect the societal power structures and biases of their creators [1]. While some information professionals have been discussing the ethics of labeling people in knowledge organization systems for nearly a century, the last five years have seen an explosion of interest in reparative description across sectors [2]. For an in-depth discussion of the underlying concepts, values, and tensions of the field's shift toward reparative and inclusive description practice, see the OCLC report *Reimagine Descriptive Workflows: A Community-informed Agenda for Reparative and Inclusive Description* [3].

Broadly speaking, reparative description aims to remediate or contextualize metadata about collections that exclude, silence, harm, or mischaracterize people. Reparative description practices strive to be accurate, inclusive, culturally competent, and respectful. It is just one component of advancing equitable cultural heritage institutions.

Reparative description work can take several forms. Many institutions are adding warnings about potentially harmful content to their discovery systems. Examples of 55 statements from libraries and archives on harmful or offensive language in collection descriptions are available online at The Cataloging Lab [4]. Reparative description also entails removing overtly harmful language, replacing or contextualizing outdated terms, adding preferred terms to describe people, and ensuring that all persons and communities represented in a collection are described. The work of staff at Princeton University Library Special Collections over the last six years is a good model for addressing these issues in archival finding aids at a programmatic level [5]. Revising and codifying policies to support inclusive description practices is another form of repair. See, for instance, the University of Michigan Library's published policy "Remediation of Harmful Language in Library Metadata." [6]. Finally, reparative description can and should entail building reciprocal relationships with communities whose lives and cultures are documented in collections. For example, the Field Museum in Chicago recently overhauled its Native North American Hall to create a new permanent exhibition titled *Native Truths: Our Voices, Our Stories*, created with the guidance of an advisory council of 11 Native American scholars and museum professionals and in partnership with 130 collaborators representing over 105 Tribes [7].

For many years, archivists at the University of Chicago Library's Hanna Holborn Gray Special Collections Research Center have made a concerted effort to thoughtfully process and make accessible collections that represent diverse groups of people and organizations. However, the Center has not invested significant time and resources in other forms of reparative description discussed above. This is due, in part, to severe staffing shortages, competing priorities, and the scale of the problem. The Center maintains over 1600 online finding aids – a daunting amount of legacy metadata to review and remediate. We are not alone in this challenge. A 2017 survey on equity, diversity, and inclusion efforts at more than 100 institutions in the OCLC Research Library Partnership revealed that 70% or more of respondents planned to change metadata descriptions in library catalogs, but hadn't yet [8].

In 2022, with the hope of moving the ball forward at the University of Chicago, I embarked on a project to audit the Center's finding aids for potentially problematic language. I proposed a data-driven approach to identify and prioritize

978-1-6654-8045-1/22/$31.00 ©2022 IEEE

finding aids for reparative description. The work of editing a finding aid through a reparative description lens is not something that can be automated or sensitively done without careful, time-intensive attention by a human being [9]. However, this project demonstrates that computational thinking can be applied to the planning stage of reparative description work. I tackled the question of "where do we begin?" by treating the Center's 1600+ finding aids as data that can be harvested, transformed, and analyzed with computational methodologies.

I am not the first archivist to try this. By searching the Internet, archival literature, and GitHub, and by informally surveying 75 members of a reparative description Slack channel for processing archivists, I arrived at the following list of archival institutions and archivists who are using computer script to audit their finding aids for potentially biased and harmful language:

- Duke University Rubenstein Library [10]. Code by Miriam Shams-Rainey [11].
- Getty Research Institute's Anti-Racist Description Working Group [12]. Code by Laura Schroffel [13].
- Harvard University Houghton Library [14]. Code by Vernica Downey.
- Princeton University Library, Special Collections [15]. Code by Kelly Bolding [16].
- University of California, Riverside [17]. Code by Noah Geraci.
- University of Pittsburgh Library, Archives and Special Collections. Code by Kayla Heslin [18].
- Yale University Library [19]. Code by Alicia Detelich Boersig.

Factoring in limitations on time, a lack of technical support, and my rudimentary coding skills, I decided to not reinvent the wheel and write my own script. From the above list, I chose Laura Schroffel's Python script, "XML-Term-Detective" as my tool for scraping data from UChicago's finding aids. I then used a suite of data curation tools to clean, enhance, visualize, and analyze my data. In so doing, I was able to learn not just where biased or harmful language may occur in UChicago's finding aids, but the scale and scope of the problem and which finding aids require the most remediation.

The following is an explication of my methodology and inferences I drew from the data. A longer, step-by-step report is available online as a Jupyter Notebook for those wishing to reproduce or repurpose my work [20]. I conclude by positioning the finding aid audit and analysis as one step within a larger reparative description program. I share a general framework for said program with examples and suggested resources.

II. Methodology

A. Gathering the Data

1) The Lexicon

XML-Term-Detective finds and counts terms from a csv list across a directory of xml files. (UChicago's finding aids are encoded in an xml standard called Encoded Archival Description, or EAD.) Laura Schroffel helpfully shared the Getty Research Institute's csv list of terms, which they call "the lexicon."

I used the Getty's lexicon of terms as my starting point. I came to think of the words in the lexicon as "red flag terms." A word might be outright offensive (such as a racial slur), or it might indicate that the subject matter of a finding aid merits review to ensure that we are describing a collection in an inclusive and culturally competent way.

There are several categories of terms in the lexicon:

- Terms of aggrandizement, which we especially want to root out of Biographical and Historical notes. While some people were, indeed, influential or groundbreaking thinkers, a line should be drawn between language that acknowledges accomplishments that are documented in a collection ("Person X was the first to do XYZ," or "Person X won multiple awards in their field") and valorizing language about already privileged people that has no bearing on the records in the collection ("Person X was the greatest __ of their age").
- Ableist language
- Terms about race and ethnicity
- Language about citizenship (e.g. "alien" to refer to noncitizens or undocumented immigrants)
- Words related to class
- Words about incarceration or forced removal of people from a place
- Terms that might tip us off to documentation of colonialism, genocide, or slavery. These finding aids could be reviewed for erasure or misrepresentation of indigenous or enslaved people, for euphemistic language describing racial violence, or for description that glosses over relationships of power (for instance, if a white person is described as a planter or plantation owner with no allusion to the fact that they enslaved people on said plantation).
- Sexist language (e.g. women described as girls or only as "Mrs. Husband's Name," rather than their full names)

I edited the Getty lexicon in several ways. I removed some terms that I knew would create "noise" in the data. For instance, I removed the word "great" because the University of Chicago archives holds records of its "Great Books" program that would clutter my dataset. I also removed words that had zero results in a search of our online finding aids database.

I also added many words. XML-Term-Detective does not automatically look for variations of a word such as the pluralization, so I added those. I included additional terms of aggrandizement found in Kelly Bolding's list for Princeton University. I added words that occurred to me as I read the University of North Carolina, Chapel Hill's *Guide to Conscious Editing* [21]. I selected additional words from Kayla Heslin's

Legacy Description Audit script for the University of Pittsburgh, which pulls from hatebase.org, a repository of multilingual hate speech. I added terms suggested by colleagues based on their knowledge of our collections.

a) Imperfections in the Lexicon

The lexicon is imperfect. XML-Term-Detective does not search for phrases. Therefore, some language will be overlooked; for instance, aggrandizing language such as "father of," "man of letters," and "leading role."

Many slurs and derogatory language are missing. There is some hate speech in the list, but it is not comprehensive. The slurs that I did include are listed because I found examples in UChicago's finding aids database. A lot of the slurs I included in the lexicon appear in old titles (for instance, in published song titles held in our jazz collections).

LGBTQ terms do not appear in the lexicon. The original Getty lexicon does not include any LGBTQ terms, and lexicons at other institutions also exhibit a dearth of LGBTQ terms. Through discussion with UChicago colleagues, I decided that a review of LGBTQ collections merited a different approach to reparative description planning. LGBTQ vocabulary is vast and evolving, and a lot of derogatory terms have been reclaimed by some members of the LGBTQ community. Therefore, flagging LGBTQ terms via XML-Term-Detective may not be a useful activity. Additionally, words like "dyke" result in a lot of noise in the data because it is fairly common as part of a surname. Metadata creators need to be careful to not mis-gender or mis-identify someone's sexuality when the historic record does not clearly spell out how a person identified themselves. (Similarly, one should tread lightly around descriptions of a person's race.) In this context, XML-Term-Detective feels like the adage "if your only tool is a hammer then every problem looks like a nail." A better approach to reparative description of LGBTQ-related collections would be to follow models such as the *Metadata Best Practices for Trans and Gender Diverse Resources* by the Trans Metadata Collective, and the Digital Transgender Archive which uses the Homosaurus, an international LGBTQ+ linked data vocabulary [22, 23, 24]. We also need to ensure that LGBTQ collections in our care have finding aids, and that they are not under-described. This is important work, and a job that can't easily be jump-started with a tool like XML-Term-Detective.

Finally, I acknowledge that any lexicon, including my own, may be fraught with unconscious bias. Any time we describe or categorize human beings we risk the pitfalls of our own narrow worldview and understanding of the human experience. Computer programs are made by humans and subject to bias [25]. Tools like XML-Term-Detective are not magic bullets for reparative description. I used XML-Term-Detective as a starting point only. Reparative description is complex, iterative work that cannot be accomplished with "Find and Replace." Rather, it necessitates slowing down, listening carefully, and thinking critically [26]. My hope for this project is that it helps UChicago and other institutions to *begin* this work in an efficient way and to chart a logical path through a complex landscape.

2) Using XML-Term-Detective

To use XML-Term-Detective, I downloaded the script from GitHub, installed Python on my computer, and followed Laura Schroffel's instructions in her ReadMe file on GitHub to run the script [27]. After installation, XML-Term-Detective has a graphical user interface and does not require knowledge of Python to operate.

XML-Term-Detective produces two output files (csv format). One output lists the xml files in which red flag terms were located, the particular term that was located, the line number in the xml in which the term was located, and the text of that line. The other output shows how many times each red flag term was found in an xml file (including zero).

B. Cleaning and Enhancing the Data

I first looked at the data in Microsoft Excel. If a term had zero hits in the "count" output, I removed it from the lexicon and ran it back through XML-Term-Detective. Nine terms from my lexicon were removed.

I then uploaded the full output csv into a cloud-based data wrangling tool called Trifacta. I used Trifacta to delete "noise" in the data. For example, XML-Term-Detective found many innocent words that include "psycho" such as "psychology," "psychiatrist," and "psychoanalyst." I wanted to remove these results from my data. Certain terms of aggrandizement, such as "notable" and "popular" also created noise in the data. I was most concerned about terms of aggrandizement appearing in the Biographical Note, Historical Note, or Scope Note. I therefore deleted any results containing EAD tags used primarily in folder headings, related resource notes, or subject headings, rather than tags found in Biographical/Historical Notes or Scope Notes. Finally, I eliminated any collections creating noise in the data. For instance, I knew that "Indian" in the Subrahmanyan Chandrasekhar Papers referred to people from South Asia, not Native Americans. So, I deleted that collection from the data when it was flagged for that term.

This was a time-intensive step, but worthwhile because it reduced my dataset from nearly 33,000 rows to a little over 11,000 rows. (Approximately two-thirds of my output was "noise.")

Before feeding my data into visualization software for analysis, I categorized my red flag terms and broke the large dataset down into smaller datasets by category. This anticipated the need to do reparative description in phases utilizing different remediation techniques. Categorizing some of the terms felt fraught with subjectivity. However, breaking the data apart in this way resulted in clearer visualizations and made analysis easier. I then added category columns to my dataset (some words might fit in more than one category) so that I could see which types of red flag terms occur the most in our finding aids.

1) Categories in alphabetical order

- Ableism
- Aggrandizement
- Class

- Colonialism
- Incarceration and Forced Removal
- Race, Ethnicity, and Citizenship
- Sexism
- Slavery

III. Analysis

A. *Overview*

Visualizing the data in Tableau and Neo4j helped me to see trends in the data.

Tableau is a visual data analytics platform. I created visualizations for the full dataset, and I created visualizations for the smaller sets of categorized data. I created Dashboards for each category, and then strung the Dashboards together into a Tableau Story in order to present the data analysis in a logical sequence [28].

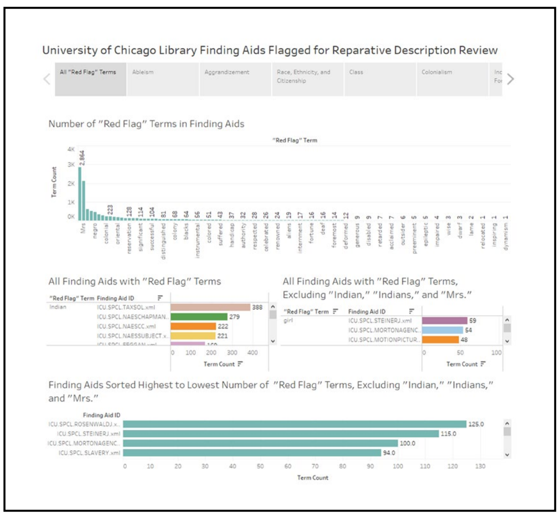

Fig. 1. Screenshot of Tableau Story, "University of Chicago Library Finding Aids Flagged for Reparative Description."

Neo4j is a graph database platform. A graph database stores nodes and relationships instead of tables, or documents. I used Neo4j to visualize finding aids with the highest red flag term counts. Fig. 2 is an example of a Neo4j graph for the Sol Tax Papers. This finding aid accounted for the highest overall red flag term count and the highest term count within the race, ethnicity, and citizenship category.

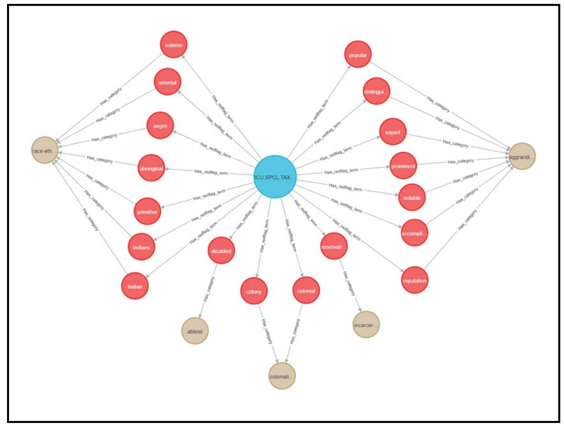

Fig. 2. Neo4j graph of red flag terms and categories in Sol Tax Papers. See an enlarged graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#race

Tableau visualizations of the entire dataset indicated that UChicago has the most review work to do for finding aids with language pertaining to race, ethnicity, and citizenship. Terms "Indian" and "Indians" make up 71% of the race, ethnicity, and citizenship category. Finding aids containing terms about women are the next highest category, with the term "Mrs." accounting for 80% of that category. Terms of aggrandizement are the third-highest category.

If "Indian," "Indians," and "Mrs." are excluded, the top three categories remain the same, but terms of aggrandizement take the lead, followed by race, ethnicity, and citizenship terms, then sexist language.

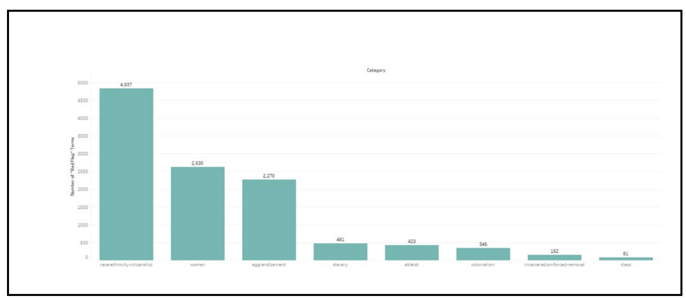

Fig. 3. Number of "red flag" terms per category. See the enlarged graph in Tableau: https://public.tableau.com/app/profile/ashley.gosslear/viz/CategoriesofRedFlagTermsinFindingAids/CategoriesofRedFlagTerms

The following analyses are arranged by category from those with the highest red flag term count to those with the lowest term count.

B. Race, Ethnicity, Citizenship

The terms “Indian,” “Indians,” “negro,” “negroes,” “oriental,” and “primitive” account for 90% of the terms in this category.

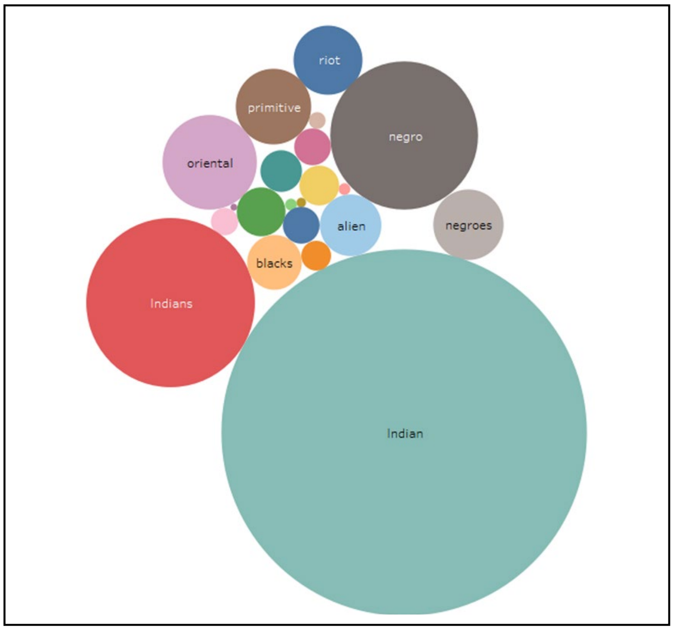

Fig. 4. Bubble graph of top race, ethnicity, and citizenship red flag terms in UChicago finding aids. Explore all race, ethnicity, and citizenship graphs in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#race

The Sol Tax Papers finding aid contains the highest counts of “Indian” and “Indians,” and the most terms in this category overall. Many finding aids from our Native American Educational Services collections account for some of the highest instances of “Indian” and “Indians,” which is unsurprising.

My analysis of the data indicates that the University of Chicago has a lot of collections to review related to Native Americans. This suggests that UChicago could have a lengthy reparative description project devoted solely to Native American and other Indigenous collections, separately from other finding aids in the “Race, Ethnicity, and Citizenship” category.

C. Sexism

The red flag term “Mrs.” far outweighs “girl” in this category. Anticipating that review and possible remediation of “Mrs.” and “girl” will require different approaches, I graphed the worst offending finding aids for those terms separately. Three finding aids account for 76% of occurrences of “Mrs.” 13 finding aids have double-digit occurrences of “girl” and account for 58% of this term.

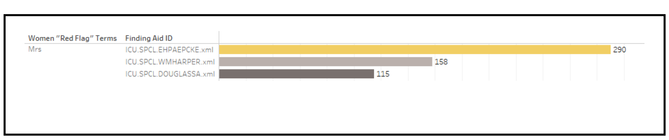

Fig. 5. Detail of bar graph showing top 3 finding aids containing the term "Mrs."

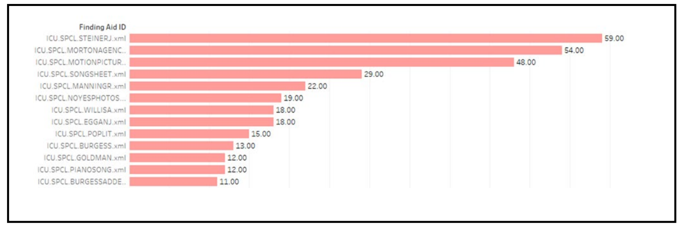

Fig. 6. Detail of bar graph showing finding aids with double-digit occurrences of the term "girl." See the full graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#sexism

The finding aid for the John Steiner Collection has the highest occurrence of the term “girl.” The collection contains a large series of printed music for jazz, dance, boogie woogie, and other popular music genres of the 20th century. “Girl” appears in many of these published song titles and is a useful example of the need to acknowledge and contextualize language in a finding aid, rather than remove.

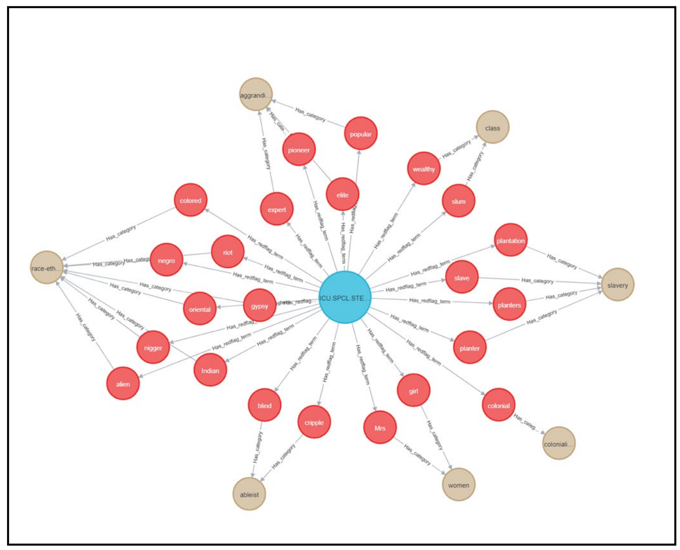

Fig. 7. Neo4j graph of red flag terms and categories in the John Steiner Collection. See an enlarged graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#sexism

D. Aggrandizement

The terms “important,” “pioneer,” “prominent,” “popular,” and “notable” account for 44% of the aggrandizement category.

There are 33 finding aids with double-digit terms of aggrandizement, and together these account for 25% of aggrandizing language across all UChicago finding aids.

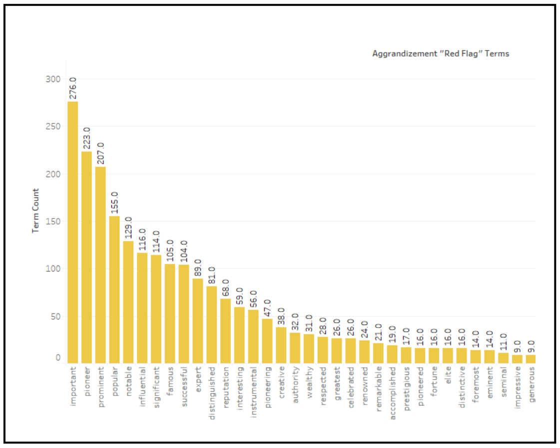

Fig. 8. Detail of bar graph showing number of terms of aggrandizement in UChicago finding aids. Explore the full graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#aggrandizement

E. Slavery

The terms "slave" and "slaves" account for 78% of red flag terms in this category. Unsurprisingly, these terms occur most often in the finding aid for our Slavery in North America Collection. Excluding that collection (which was recently reprocessed using reparative description practices), the finding aid with the highest number of red flag terms in this category is the Stephen A. Douglas Papers.

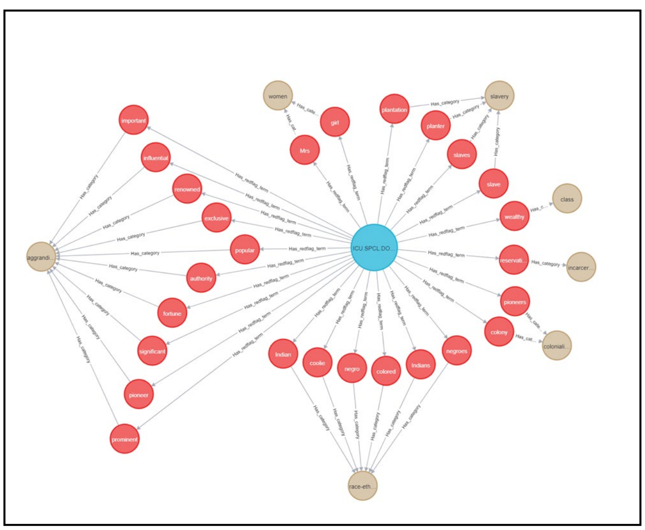

Fig. 9. Neo4j graph of red flag terms and categories in Stephen A. Douglas Papers. See an enlarged graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#slavery

F. Ableism

The terms "blind," "cripple," "elderly," "suffered," and "handicap" account for 63% of the ableism category.

There are five finding aids with double-digit ableist terms, and together these account for 21% of ableist language across all UChicago finding aids.

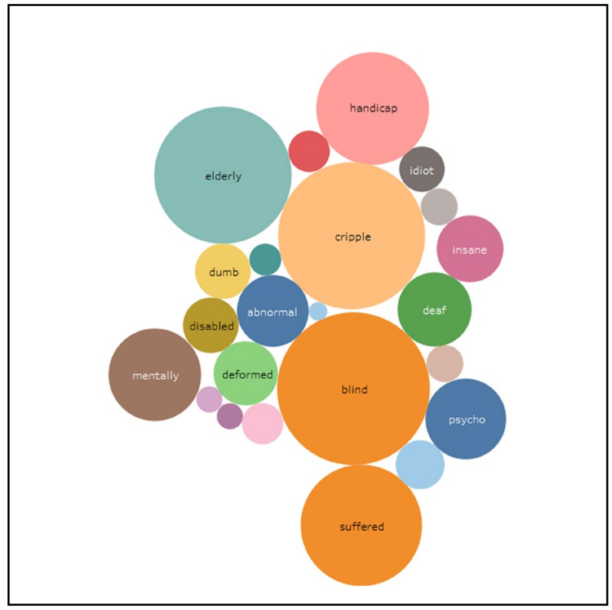

Fig. 10. Bubble graph of top ableist terms in UChicago finding aids. Explore all ableism graphs in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#ableism

G. Colonialsim

Terms in this category appear 346 times across all UChicago finding aids. Nine finding aids have double-digit counts of terms in this category, and account for 49% of the total term count in this category.

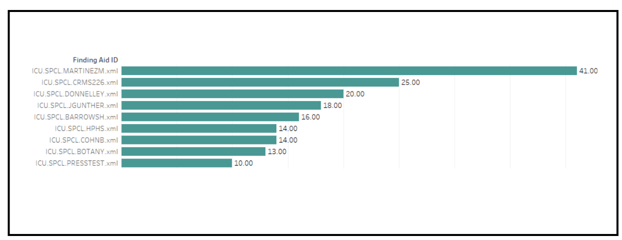

Fig. 11. Detail of bar graph showing finding aids with double-digit occurrences of terms related to colonialism. See the full graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#colonialism

H. Incarceration and Forced Removal

The term "reservation" far outweighs other terms in this category, accounting for 84% of red flag terms in this category. Nearly one-third of red flag terms in this category occur in three finding aids, all of which contain records about Native Americans.

Fig. 12. Detail of bar graph showing top three finding aids containing terms related to incarceration and forced removal. See the full graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#incarceration

I. Class

"Slum" occurs the most often across all UChicago finding aids and accounts for 54% of this category. The Hyde Park Historical Society Collection finding aid has the most terms (6) in this category, and the most instances of the word "slum" (5).

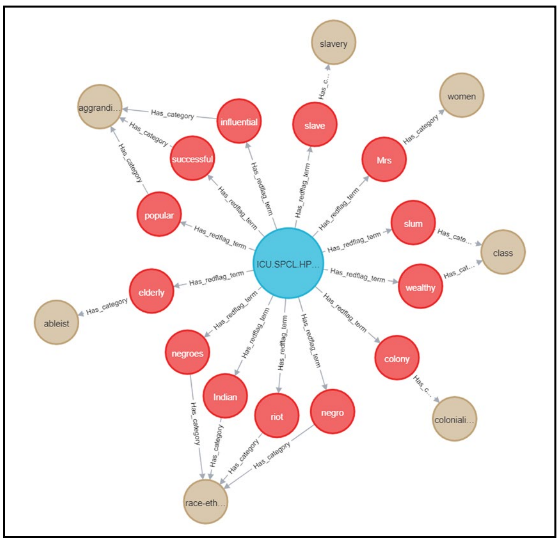

Fig. 13. Neo4j graph showing red flag terms and categories in the Hyde Park Historical Society Collection. See an enlarged graph in my Jupyter Notebook: https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb#class

IV. Recommendations

Once legacy metadata has been audited and analyzed, the real work of reparative description begins. There is no one-size-fits-all approach to reparative description. Remediation of legacy metadata will take time, and a careful case-by-case analysis. As Frick and Proffitt state in *Reimagine Descriptive Workflows,* "Every country and region has a specific history of oppression and exclusion that has shaped today's descriptive landscape, which means the needs for repairing and reimagining descriptive practice is determined locally" [29]. Additionally, each collection will have its own set of unique challenges and treatment of the finding aid will depend upon a collection's particular issues. The following recommendations are therefore not meant to be prescriptive but are rather a general framework for reparative description.

First, reasons for when and why to remove or keep harmful language from metadata should be clearly spelled out in a documented policy at the department or institutional level. The University of Pittsburgh Library System's *Notice on Harmful, Offensive, or Misrepresentative Archival Description and Language* is a good model for a public-facing policy that details reasons why harmful language will or will not be removed from archival description [30].

Next, a prioritized list of finding aids should be developed. Utilizing data from the finding aid audit, one could start with finding aids with the highest number of red flag terms and work down the list, finding aid by finding aid. If an institution has the time and resources, a triage system could be developed to prioritize finding aids for reparative description. Criteria could be developed that sift finding aids into levels from most to least urgent. This is the tactic taken by the Getty Research Institute's Anti-Racist Description Working Group [31]. It is a time-intensive, subjective approach that requires a person to review each finding aid one by one.

For institutions with low staffing levels like the University of Chicago, I recommend approaching the work in phases, and structuring it by red flag term category. Work can progress from categories with the highest term counts to categories with the lowest term counts. This is an imperfect, but simple and quick way to prioritize finding aids for reparative description. The final dataset is far from perfect, and it is very possible that some of the finding aids with a high number of red flag terms will prove to be noise in the data. I also acknowledge that offense caused by a single red flag term (such as a slur) in a finding aid could be greater than offense caused by a finding aid with multiple red flag terms. This is more likely to be true in the "race, ethnicity, and citizenship" category. For this particular category, I recommend reviewing finding aids containing slurs first.

There will likely be a learning curve for each category, and productivity may increase if focused attention is given to finding aids one category at a time. As evidenced by the Neo4j graphs, there will be an overlap between categories (race, ethnicity, citizenship, colonialism, slavery, incarceration and forced removal are all intertwined), so knowledge gained in one category will likely influence another with strong potential for iteration.

Following prioritization, a project manual should be developed for each category that includes style guides and controlled vocabularies relevant to that category. The project manuals could be appended to the repository's general processing manual to support inclusive description practices for new processing projects, too. The University of North Carolina at Chapel Hill University Libraries' *Guide to Conscious Editing at Wilson Special Collections Library* is a helpful model of a reparative description manual that is organized by category [20]. DEI Metadata Consultant, Sharon Mizota, maintains a long online list of free resources about bias and metadata that could also be used to shape a project manual [32].

Ideally, the project manuals should be developed in consultation with subject experts and with living individuals or communities whose records are described. All consultants should be compensated for their time and labor. Community-generated guides and vocabularies for describing marginalized communities are growing in number. Samples include the *Homosaurus*, the *Densho Terminology Guide*, and the National Center on Disability and Journalism's *Disability Language Style Guide* [24, 33, 34]. Guides to respecting cultural protocols are also available, such as the First Archivist Circle's *Protocols for Native American Archival Materials* or the *Aboriginal and Torres Strait Islander Protocols for Libraries, Archives and Information Services* [35, 36].

Once policies are documented, finding aids are prioritized, and project manuals written, the work of editing finding aids can begin. The following editorial recommendations are based upon emerging best practices in the field.

Reparative description of finding aids should take several forms:

1. Removing and updating language OR

2. Keeping language in place, but adding contextualization and additional keywords for discoverability AND

3. Adding a collection-level content warning about the presence of harmful, biased, or culturally sensitive metadata.

4. Adding additional description to improve discoverability, including access terms for "hidden figures" and bilingual description for collections containing significant amounts of non-English-language materials. An example of the former would be adding names to a finding aid of people who were "informants" - itself a controversial term - for anthropological field research. An example of the latter is Princeton University's effort to generate Spanish-language finding aids for collections that consist primarily of materials in Spanish [37].

5. Adding an obvious and easy feedback mechanism for finding aid users so that future corrections can be made.

Removal of offensive or outdated language in sections of the finding aid written by archivists (such as the biographical and scope notes) is a straightforward proposition. However, red flag terms may appear in organization names, in original folder headings, or in titles of works. An individual may have identified themselves with a term that would now be considered outdated. In the majority of cases such as this, I recommend keeping the language in place within quotation marks, adding a content warning to the finding aid, and any additional contextualizing metadata and up-to-date keywords deemed necessary. Words can have different meanings in different historical contexts. Language that comes from the original source material can provide information about the creator and the time in which they lived, even if problematic in modern eyes. The archivist's job in such cases is to acknowledge and reframe the metadata as historical evidence, rather than censor or whitewash. When red flag terms are left in place, readers should be given advance warning that they may encounter harmful words. Archivists for Black Lives in Philadelphia offer further guidance on handling racist folder titles and creator-sourced description in their *Anti-Racist Description Resources* [38].

V. Conclusion

Data science and computational thinking are swiftly becoming an integral part of doing business in a modern economy, and libraries and archives are no exception. Librarians and archivists can not only support the use of data and computational methodologies in other disciplines, but we can also turn these tools inward to solve problems and enhance operations within our own institutions.

The work of reparative description in particular can be stymied by the enormity and complexity of the problem. Many institutions feel the urgency of fixing harmful metadata, few have allocated proper resources to addressing it. I have demonstrated that treating archival finding aids as data and applying computational thinking and data analytics to the problem of reparative description planning, can help to propel a key piece of this work – auditing and prioritizing finding aids - forward. An individual can use the methods outlined in this paper to make meaningful progress and advocate for change.

My use of computational thinking and data analytics helped me to simultaneously see the forest and the trees of legacy metadata at the University of Chicago's Hanna Holborn Gray Special Collections Research Center. We now know just how big the problem is, and we know where the major pain points are. The insights I gained yielded a logical path forward, a reassuring sense of what is possible, and data to make the case for more resources for reparative description work. Automation did not create a perfect solution, but it did provide a decent start. I hope that the project will create a ripple effect at my institution and inspire others in the field to begin this important and challenging work.

References

[1] R. L. Frick and M. Proffitt, Reimagine Descriptive Workflows: A Community-informed Agenda for Reparative and Inclusive Descriptive Practice. Dublin, OH: OCLC Research, 2022, p. 10, https://doi.org/10.25333/wd4b-bs51.

[2] B. M. Watson, 2021. "Advancing Equitable Cataloging," Proceedings from North American Symposium on Knowledge Organization (NASKO), vol. 8, pp. 1-28, 2021, https://doi.org/10.7152/nasko.v8i1.15887.

[3] Frick and Proffitt, Reimagine Descriptive Workflows.

[4] Cataloging Lab, List of Statements on Bias in Library and Archives Description, https://cataloginglab.org/list-of-statements-on-bias-in-library-and-archives-description/.

[5] A. Suárez, "Language Matters: Writing Inclusive Finding Aids and Description," Archival Outlook, July/August 2020, pp. 10-11, 20, https://mydigitalpublication.com/publication/?m=30305&i=667849&p=12&ver=html5.

[6] University of Michigan Library, Remediation of Harmful Language in Library Metadata, https://lib.umich.edu/about-us/policies/remediation-harmful-language-library-metadata.

[7] Field Museum, Native Truths: Our Voices, Our Stories, https://www.fieldmuseum.org/exhibitions/native-truths-our-voices-our-stories.

[8] K. Smith-Yoshimura, "Equity, Diversity, and Inclusion (EDI)," Hanging Together: The OCLC Research Blog, November 27, 2017, https://hangingtogether.org/equity-diversity-and -inclusion-edi/.

[9] K. Heslin, "Description as an art and a craft," *Kayla Heslin* (blog), November 30, 2020, https://kaylaheslin.com/description-as-an-art-and-a-craft/.

[10] M. Shams-Rainey, "Auditing archival description for harmful language: a computer and community effort," *Bitstreams* (blog), August 26, 2021, https://blogs.library.duke.edu/bitstreams/2021/08/26/auditing-archival-description-for-harmful-language/.

[11] Duke University Libraries, "description-audit" code on GitHub, https://github.com/duke-libraries/description-audit.

[12] S. Ceja, H. Kim, and S. McGillivray, “How Getty archivists support racial justice,” *Descriptive Notes* (blog), November 15, 2021, https://saadescription.wordpress.com/2021/11/15/how-getty-archivists-support-racial-justice/.

[13] “XML-Term-Detective” code on GitHub, https://github.com/jerkmuffin/XML-Term-Detective.

[14] Houghton Library Technical Services “reparative-description” code on GitHub, https://github.com/houghton-ts/reparative-description.

[15] A. Suárez, “Inclusive Description Working Group,” *This Side of Metadata* (blog), February 28, 2020, https://blogs.princeton.edu/techsvs/2020/02/28/inclusive-description-working-group/.

[16] K. Bolding, “description_audit_survey.xquery” and “terms_of_aggrandizement.xquery” code on GitHub, https://github.com/kellybolding/scripts.

[17] N. Geraci, “Programmatic approaches to bias in descriptive metadata,” OSF, May 20, 2022, osf.io/tyk6q.

[18] K. Heslin, “Legacy_Description_Audit” code on GitHub, https://github.com/kheslin0420/kheslin0420.github.io/tree/master/Legacy_Description_Audit.

[19] Yale ArchivesSpace Committee “rad_scripts” code on GitHub, https://github.com/YaleArchivesSpace/rad_scripts.

[20] A. Gosselar, “A data-driven approach to reparative description at the University of Chicago,” CASES, 2022, https://cases.umd.edu/github/cases-umd/data-driven-reparative-description/blob/main/index.ipynb.

[21] The University of North Carolina at Chapel Hill University Libraries, A Guide to Conscious Editing at Wilson Special Collections Library, 2022, cdr.lib.unc.edu/downloads/5q47rz05z?locale=en.

[22] Trans Metadata Collective, Metadata Best Practices for Trans and Gender Diverse Resources, 2022, 10.5281/zenodo.6686840.

[23] Digital Transgender Archives, digitaltransgenderarchive.net.

[24] Homosaurus, https://homosaurus.org/.

[25] S. Noble, Alogrithms of Oppression: How Search Engines Reinforce Racism. NYU Press, 2018.

[26] K. Christen and J. Anderson, “Toward slow archives,” Archival Science, vol. 19, pp. 87-116, 2019, https://doi.org/10.1007/s10502-019-09307-x.

[27] “XML-Term-Detective” README file on GitHub: https://github.com/jerkmuffin/XML-Term-Detective/blob/main/README.md.

[28] A. Gosselar, “University of Chicago Library finding aids flagged for reparative description,” Tableau Public, August 9, 2022, https://public.tableau.com/app/profile/ashley.gosslear/viz/Red_Flag_Visualizations/UniversityofChicagoLibraryFindingAidsFlaggedforReparativeDescriptionReview.

[29] Frick and Proffitt, 1.

[30] University of Pittsburgh Library System, A Notice on Harmful, Offensive, or Misrepresentative Archival Description and Language, https://library.pitt.edu/potentially-harmful-archival-language.

[31] Getty Research Institute Anti-Racist Description Working Group, “Rubric for legacy description review,” https://docs.google.com/document/d/1JMiGWfCoCv0CQr3GoCQEhqC7gN33c3o-0pIdzEl6IE4/edit.

[32] S. Mizota, Free Resources About Bias and Metadta, https://www.sharonmizota.com/resources/.

[33] “Terminology,” Densho: The Japanese Legacy Project, https://densho.org/terminology/.

[34] National Center on Disability and Journalism, Disability Language Style Guide, https://ncdj.org/style-guide/.

[35] First Archivist Circle, Protocols for Native American Archival Materials, https://www2.nau.edu/libnap-p/.

[36] Aboriginal and Torres Strait Islander Library, Information and Resource Network Inc., Aboriginal and Torres Strait Islander Protocols for Libraries, Archives and Information Services, https://atsilirn.aiatsis.gov.au/protocols.php.

[37] A. Suárez, “Spanish-language finding aids at Princeton University Library,” Descriptive Notes (blog), December 2, 2021, https://saadescription.wordpress.com/2021/12/02/spanish-language-finding-aids-at-princeton/.

[38] Archivists for Black Lives in Philadelphia, Anti-Racist Description Resources, October 2019, https://archivesforblacklives.files.wordpress.com/2019/10/ardr_final.pdf