TITLE PAGE

Accessible Services in Academic Libraries: A Content Analysis of Library Accessibility Webpages in the United States

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Abstract

Purpose - This paper aims to contribute to an understanding of current accessibility efforts and practice in librarianship by providing a broad overview of the information about services, resources, and facilities on academic library accessibility pages. By compiling and analyzing data from 85 libraries, this study seeks to facilitate comparisons between current and past accessibility practice, and to provide perspective on how libraries communicate to users about accessibility efforts across libraries.

Design/methodology/approach - The authors conducted a content analysis of 85 library accessibility pages from a sample population of 98 institutions, consisting of all member institutions of four U.S. academic library consortia. Pages were coded for content elements regarding services, facilities, collections, staffing, assistive technologies, and general information. Webpage features, architecture, and accessibility / functionality were also assessed.

Findings - Libraries have broadened and strengthened efforts to publicize / provide services and resources to users with disabilities in the past 10 years. Pages most commonly prioritize information about assistive technologies, services, and facilities. Pages varied greatly in size, complexity, and detail, but public institutions' pages were more prevalent and informative than their private counterparts. Libraries can work to foreground accessibility pages and increase transparency and evidence of currency to improve communication to their users.

Originality/value - This study provides a large-scale content analysis of library accessibility webpages. It allows for comparison of the features and information most commonly featured on these important online points of service.

Keywords accessibility, consortia, library websites, content analysis, policy, disability, ADA

Paper type Research paper

Introduction

Academic libraries in the United States have worked for decades to provide access and support for users with disabilities. From the base-level needs outlined for simple legal compliance, libraries and their parent institutions have been responsible for managing the requirements outlined in major federal legislation, with the Americans with Disabilities Act of 1990 (ADA) and the Rehabilitation Act of 1973 serving as landmark documents. As highlighted by Kimura (2018), libraries have a nearly century-long legacy of providing accessible services to meet the needs of users with disabilities even prior to federal legal requirements to do so (pp. 425-426).

The Library Accessibility Alliance (LAA) was formed as consortia, principally, the Big Ten Academic Alliance (BTAA) and the Association for Southeastern Research Libraries (ASERL), came together in 2019 to improve accessibility of academic library resources and services by pooling resources, information, and expertise.. This nascent parent organization was joined by the Greater Western Library Alliance (GWLA) and the Washington Research Library Consortium (WRLC) in 2020 and 2021, respectively, and at the present writing represents nearly 100 academic institutions across these four consortia (Library Accessibility Alliance, 2021). A key component of the LAA's mission is to assess and evaluate the current state of accessibility within librarianship, with an emphasis on accountability and transparency. To that end, this article describes and reports the results of a content analysis of 85 accessibility pages from academic libraries within the LAA's four consortia, recorded during summer 2021.

Literature Review

The approach to accessibility in the context of libraries has been guided by a conceptualization of disability outlined via the Americans with Disabilities Act (ADA), in other

words as an activity-limiting physical or mental impairment of some kind. This focus on impairment, which implies some sort of defect, disease, or deviance at the individual level, has come to be commonly referred to as a medical model of disability (e.g., Kimura, 2018; Pionke, 2017). Disability activists and theorists have identified, critiqued, and deconstructed this understanding of disability since the 1970s as an individualized and atomistic approach to what is, fundamentally, a social phenomenon. Rather, they argue that disability is better conceptualized as rooted in a socio-contextual understanding of barriers that allow a given impairment to become disabling (for a thorough and concise discussion of the theoretical context of this apparent dichotomy, see Shakespeare, 2006, pp. 9 – 28). For example, if a person is temporarily or permanently unable to browse narrowly arranged stacks, a socio-contextual understanding problematizes the design of the structure, rather than the persons whom the shelving arrangement excludes. By extension, this approach interrogates a dominant and implicit perspective that focuses on catering to an idealized "able-body," which in turn perpetuates exclusion and marginalization. Furthermore, social conceptualizations of disability and disability justice suggest that, in addition to solving an immediate, granular problem (via policies and action), a sustained commitment to recognizing larger social and structural barriers is needed to foster effective and transformative cultures of inclusion for all users (e.g., Kumbier and Starkey, 2016).

However, as the ADA provides legal definitions and therefore a framework by which to encourage and enforce compliance, it is unsurprising that library practice and policies follow, primarily, a model that addresses barriers to access by retrofits—even to new online content or physical structures—and other adjustments and solutions as the primary means to achieving—or at least approaching—accessibility.

The Association for Research Libraries (ARL) has published several SPEC kit reports dedicated to accessible services, resources, and facilities at member libraries (e.g., DeCandido, 1999; Spina and Cohen, 2018). (For information on SPEC kits, see https://publications.arl.org/SPEC_Kits). These publications provide temporal snapshots of how leading academic library systems have worked to address the imperatives for accessibility. Of interest to the present study is the ways that libraries' efforts and resources dedicated to the goal of universal accessibility are communicated and marketed via online presences. For example, anecdotal observations from the 1999 ARL *SPEC Kit 243, Service to Users with Disabilities* (DeCandido, 1999) occasionally mention library websites, portraying them as marketing tools that can function alongside print brochures (p. 14), or as innovative means to provide staff contact information for accessibility concerns (pp. 17-18). In contrast, more recent survey data reported in the 2018 ARL *Spec Kit 358*, *Accessibility and Universal Design* indicated that libraries' websites are the primary platform on which 94 percent of the respondent libraries make their available services and resources known (Spina and Cohen, 2018, p. 3).

Clearly and comprehensively communicating the existence and availability of library services and resources is an aspirational function of user-oriented design for libraries' websites generally and for accessibility pages more specifically, as these are important access points and information hubs for users with disabilities. A small number of studies have analyzed the content of U.S. libraries' accessibility pages at the national (Cassner *et al*., 2011; Power and LeBeau, 2009) and state levels (Vaughan and Warlick, 2020).

Power and LeBeau (2009) investigated database-related services and accommodations for users with visual disabilities by analyzing library accessibility and database pages (e.g. A-Z lists) from a sample of 33 academic library websites. The sample of this study was designed so that

institutions of small (fewer than 5000 FTE students), medium (between 5000 and 10000 FTE students) and large (more than 10000 FTE students) were represented in roughly equal numbers. The authors proposed a 5-point rating scale for evaluating library accessibility pages, based primarily on the ease of locating them from the libraries' homepage, the quality of the information they contained, and their design attributes from the perspective of primary and secondary users (Power and LeBeau, 2009). Of the 33 library websites, only 17 were found to follow best or acceptable practices (Power and LeBeau, 2009). Although an exact value is not reported in the article, many of the remainder appeared to have no accessibility page whatsoever (Power and LeBeau, 2009).

A 2011 content analysis of accessibility services and resources of 99 ARL member libraries based in the U.S. surveyed information available on these libraries' websites to assess the degree to which ARL libraries were meeting recommendations from the 2001 ALA Library Services for People with Disabilities Policy (Cassner *et al.*, 2011). The policy, while 20 years old, has not been updated and is still in effect. The policy broadly outlines nine areas of concern, four of which directly relate to patron use of libraries (library services, facilities, collections, and assistive technology) (American Library Association, 2001). Of the 99 library websites surveyed by Cassner *et al.* (2011), 87 had dedicated webpages for publicizing services and resources for people with disabilities. In cases where libraries' websites did not have a readily findable, dedicated accessibility page, the researchers used search functions and reference services to find, verify, and analyze the information available on the libraries' websites (Cassner *et al.*, 2011).

Vaughan and Warlick (2020) performed a content analysis of the accessibility pages for 40 four-year Virginia colleges and universities within the Virtual Library of Virginia (VIVA) consortium, consisting of a mix of public doctorate-granting institutions, public four-year

comprehensive institutions, and private institutions. This study, which investigated the content relating to services, as well as accessibility statements, language, and page architecture, proposed several best practices (Vaughan and Warlick, 2020). A particularly surprising finding of this state-level study is that only 11 of 40 institutions (27.5 percent) were observed to have a library accessibility page (Vaughan and Warlick, 2020). This is in stark contrast to Cassner *et al*.'s (2011) investigation of ARL libraries websites in the U.S., which identified accessibility pages on approximately 88 percent of institutions in their sample, reported nearly a decade prior.

The content analyses described differ in the characteristics of their respective samples, but they share a commonality in seeking to define specific best practices for academic library accessibility pages. However, studies which actually involved input from users with disabilities regarding page architecture and content of library accessibility pages are nearly non-existent, with Brunskill (2020) recently engaging a small but diverse group of users with disabilities to explore preferences, expectations, and concerns.

This present study draws extensively from the methodology and coding categories reported in Cassner *et al*. (2011) to allow comparison between their sample of 99 ARL libraries and a large sample of academic library systems in the U.S. more than a decade later. As a study primarily intending to provide a survey of how libraries' accessibility services and resources are communicated and publicized, it also focuses on aspects of page accessibility, findability, and identifying certain commonalities regarding page design and organization within libraries' larger websites. Finally, it seeks to provide a snapshot of what services and resources are being offered across a wide range of academic libraries.

In compiling and analyzing these data, we seek to answer the following research questions:

- RQ 1: What information regarding accessibility services, accessible facilities, human resources, accessible collections, and assistive technology are most frequently communicated via libraries' accessibility pages?

- RQ 2: Based on categorical differences in enrollment size, consortial membership, public/private status, or ARL membership status, can any significant differences between institutions regarding the information, services, or resources communicated via libraries' accessibility pages be determined?

- RQ 3: How does the observed information from libraries' accessibility pages in 2021 relate to or differ from findings by Cassner *et al*. (2011)? Are certain features more or less prominent? What seems to have changed?

- RQ 4: How accessible, current, and well-maintained are libraries' accessibility pages, based on various observable indicators?

- RQ5: What are some emergent trends and noteworthy qualitative observations that can be made about accessibility pages in the sample population?

Methods

The sample population consisted of 98 member institutions from the four library member consortia of the Library Accessibility Alliance—ASERL (n = 37), BTAA (n = 15), GWLA (n = 39), and WRLC (n = 7). Of these institutions, content analysis was limited to those with dedicated, public-facing library accessibility pages that could be located via direct links, menus, or subpages directly from the libraries' homepages. These criteria reduced the sample population under investigation to 85 accessibility pages for most questions that were explored.

The 98 institutions represented in the sample offer a cross-section of primarily larger academic library systems. Of the 98 institutions: 75 are public, 23 are private; 67 are ARL

member institutions while 31 are not. Enrollment statistics ranged from approximately 2000 full-time students to nearly 90000 (median enrollment = 30017), and most (n = 89) of the 98 institutions are classified as "large" according to Carnegie Size and Setting classification (10000 or more students; Carnegie Foundation for the Advancement of Teaching). Enrollment statistics were therefore broken into quartiles for purposes of comparison.

The unit of analysis was defined as the primary webpage or group of webpages which list information related to accessible facilities, services, and resources provided by an institution's libraries. Compared to traditional units in content analyses (e.g., news articles, 30 second political ads, etc.), unitization of these webpages is less obvious. This study is concerned with comparative functionality and messaging, and therefore defines "the libraries' accessibility page" as a webpage or small set of webpages that can be clearly identified and navigated to from the libraries' homepage. The webpage(s) function to organize and present information, for which librarians are responsible, that communicates organizational and institutional values, as well as specific resources and services dedicated to removing barriers to access for users. For most of the institutions within our sample, this will take the form of a single webpage that intends to compile and clarify what the organization can do or provide for users.

Campus-level offices for accessibility and ADA compliance are a universal fixture of the institutions within the studied population, and they frequently partner with libraries in physical and digital spaces. Such offices maintain central, campus-level pages that serve as a clearinghouse for information about accessibility services at the institution. When such pages are referred to in this article, they will be identified specifically as "institutional pages" or "campus-level pages" in order to disambiguate these from accessibility pages maintained and published by

libraries. The term "accessibility page" will be used to refer to the accessibility page or pages within libraries' websites.

A cloud-based spreadsheet was used as the primary means of recording information during the coding process. The coding document contained questions asking for binary judgments (e.g., "Is a list of assistive software available via the accessibility page?"; 0 = not observed; 1 = observed) as well as more open-ended, qualitative fields for questions requiring more subjective or interpretive judgments ("Does page contain roughly equivalent information about library services in the main library and branch libraries?") and other observations relevant to the categories under investigation ("Please list any other noteworthy information regarding the facilities and their use, such as reservable spaces, lactation rooms, etc."). Elements for six categories of page information were adapted from those investigated by Cassner *et al.* (2011); Assistive Technology (5 variables), Collections (4 variables), Facilities (6 variables), General Information (13 variables), Services (9 variables), and Staffing (3 variables).

Average index values for each category (Services, Facilities, Staffing, Assistive Technology, Collections, and General Information) were calculated to provide some indication of the amount of information in each category based on observation of component variables' presence or absence. These scores are additive, and because the number of variables differed between categories, they are presented as a percentage of 1 to simplify comparison. For example, if 4 of the 5 variables within the Assistive Technology category were observed to be present on an accessibility page, it would receive an index value of 0.8 for information about Assistive Technology; if 2 of the 4 variables within the Collections category were observed, an index value of 0.5 would be assigned for Collections, and so forth. An additive, global information index value for the overall amount of information communicated was also calculated by combining the

individual categorical index values. These values are intended as a means of descriptively representing the degree to which the phenomena of information (either subdivided into categories or in a summative and holistic sense) was indicated in this analysis, and therefore to be useful as a means to more easily discuss and compare what would otherwise be an unwieldy collection of discrete variables. These values were not compiled to be predictive of or generalizable to a larger population outside of the sample (for a concise discussion of methodological uses and limitations of indices in content analyses, see Krippendorff, 2004, pp. 58-62).

Aspects of page accessibility, findability, and maintenance were also investigated. Automated accessibility tests using the WebAIM WAVE browser plugin were performed on library accessibility page(s), to allow for a quantitative approximation of their page content and design for purposes of comparison. As noted by Kimura (2018), automatic accessibility checkers can overcount repeated errors (e.g., insufficient contrast in font color for hyperlinks). An automatic test may also fail to distinguish between website-level errors (such as a navigation bar that appears on every page) and content specific to the page. For the accessibility analysis, the number of errors, contrast ratio errors, and potential issues of concern were recorded for each accessibility page, and notes were made to differentiate between errors in the body of page content and errors that were part of the larger organizational website theme. Webpages were checked for information regarding most recent updates, as well as for any updates related to COVID-19 policy modifications on the accessibility page. The library website section names and headings were recorded to identify common locations across institutions.

Because some users rely on screen-reading software, and because lengthy blocks of text may cause problems for users with attentional or reading impairments, the degree to which page

authors balanced the need to present comprehensive information with economy of language was considered of interest (e.g., Brunskill, 2020, pp. 776-777). The word count for the body text of each page was therefore recorded by pasting the text into a word processing program and running a word count tool. In addition to providing some indication of general trends across institutions (e.g. median word count for accessibility pages) it can also be considered alongside categorical and aggregate information indices to infer the efficiency of a given page's communication.

Additional information such as page structure—simple (all information on a single page) or complex (information chunked into subpages)—and the functionality of included links was also included in the coding sheet.

All webpages included in this analysis were accessed by coders during the months of July - August 2021. All authors participated in the coding process for the content analysis. Once the coding process was completed, data was checked for formatting and cleaned using Microsoft Excel, and analyzed using IBM SPSS Statistics 27.

Intercoder Reliability

After developing a tentative coding document and testing the coding process on several example pages, the authors held a norming session to clarify question language, review relevance of the items being studied, and identify criteria for determining how to judge each item on the coding sheet.

For each accessibility page, 40 variables called for a nominal, binary coding (0 = not observed / 1 = observed). To verify consistency of categories and definitions from the code sheet, six webpages were selected at random and coded by all three authors independently. Intercoder reliability was then estimated via SPSS using the KALPHA macro to calculate

Krippendorff's α (Hayes and Krippendorff, 2007). Intercoder agreement for nominal data was found to be relatively high (α = 0.8245), indicating an acceptable degree of agreement between coders (Krippendorff, 2004).

Results

Of the 98 institutional libraries' websites that were surveyed, the authors were able to locate a page (or organized collection of pages) dedicated to libraries' accessibility policies and services for 87 percent (n = 85) of them. These 85 pages formed the sample population identified for inclusion into the dataset. Unless otherwise noted, all reported percentages are derived from the 85 pages included in the analysis.

The presence of library accessibility pages was found to considerably differ between public (n = 75) and private (n = 23) institutions. Of the 13 institutions without an observable accessibility page, 6 were private. A comparison using a cross-tabs analysis to calculate chi-square was unable to report a definitive, statistically significant difference between public and private institutions because the number of observations in some cells (i.e., private institutions that did not have an accessibility page) were too low to satisfy the required assumptions of a chi-square test. However, this difference is certainly a notable discrepancy between these two categories—nearly half of the institutions lacking an accessibility page were private, despite private institutions accounting for less than a quarter of the sample. Put another way, the comparative percentages of institutions without library accessibility pages were much higher for the subset of private (26 percent) compared to public (9 percent) institutions.

Crosstab calculations testing for significant categorical differences using chi-square indicated that the presence or absence of library accessibility pages did not differ significantly or

notably between other categories that were considered, including academic consortia affiliation (ASERL, BTAA, GWLA, WRLC), ARL membership status, or institutional enrollment size.

General Page Features

Of the institutions with accessibility pages, 74 percent (n = 63) provided a statement of values and intent to provide appropriate accommodations and services for users with disabilities. This statement was most frequently observed at or near the top of the main accessibility page as an introductory paragraph or block of text. A high majority (87 percent) linked to an institution-wide office for disability services (n = 74), and a partnership between the libraries and such offices was frequently described on libraries' accessibility pages, usually about assistive technology or specialized spaces intended for its use.

Most pages were simple in structure (n = 53; 64 percent), meaning they did not utilize multiple internal tabs or links to multiple separate pages to describe the various aspects of their services, resources, facilities, or policies. Word counts for accessibility pages ranged from about 150 words to nearly 6000 words; however, the median word count for the sample was 784 words, with a standard deviation of 940 words.

Accessibility pages were linked directly from the libraries' homepage (rather than, or in addition to, a link contained in a drop-down menu) in 48 cases (57 percent), and more than 80 percent (n = 72) of pages surveyed were reached in 2 or fewer clicks. Names of pages varied a great deal but most fell into one of three categories: Access language (Accessibility / Accessibility and the Libraries / Accessibility Services / Accessibility at _____ / Libraries Accessibility; n = 41), person-first language (Services/Information/Resources for Users/Patrons/People/Persons with Disabilities; n = 23), or Disability language (Disability Resources / Disability Services / Disability Support; n = 10).

Services

The majority of accessibility pages contained information on services that included item retrieval (88 percent; n = 75), assistance with copying or scanning services (66 percent; n = 56), or other forms of circulation and access assistance, such as holding retrieved items, reading or interpreting charts, or navigating search interfaces (79 percent; n = 67). Most institutions also mentioned services related to research or reference help (55 percent; n = 47), although only about a third of these indicated willingness or ability to provide these services remotely, whether by phone, chat, email, or video conferencing (35 percent; n = 30). A minority of libraries surveyed included information about proxy services (29 percent; n = 25), specialized interlibrary loan services, such as extended loan periods, alternative formats, or using interlibrary loan systems for document delivery services (42 percent; n = 36), and/or whether any of the services mentioned were explicitly available in other branch libraries vis-à-vis the main library (where applicable; 40 percent; n = 34). It was also notable that content relating to accessible instruction (in terms of spaces, technologies, hybrid instruction, instructional/universal design, or instructional practice) was absent from 92 percent of accessibility pages surveyed (n = 78) (Table I).

[INSERT TABLE I HERE]

It should be noted that the population analyzed by Cassner *et al.* (2011) consisted of ARL member institutions in the United States, whereas the current study is surveying webpages from all ASERL, BTAA, GWLA, and WRLC member institutions—many of which are not ARL members. Therefore, in addition to including data for the entire sample, comparison tables (Tables I and II) compare observed percentages of ARL institutions in the present sample to percentages reported by Cassner *et al.* (2011). This may arguably provide a more appropriate means of direct comparison between past and present practices.

Facilities

Most library accessibility pages provided information for people with mobility-related disabilities regarding how to navigate to and enter library buildings, including accessible campus or street maps, written directions, designated parking, transit services, and ADA-compliant entrances (67 percent; n = 57). Accessible structural features internal to the library buildings—e.g., ramps, automatic doors, and building maps—were mentioned in a smaller majority of the surveyed sample (54 percent; n = 46), and a comparable percentage of the accessibility pages analyzed indicated the presence and/or location of accessible facilities such as restrooms, elevators, and water fountains (n = 45). Approximately one third of pages indicated the presence of accessible communications devices (e.g., wheelchair-height phones, phones for the hearing-impaired, videophones) (34 percent; n = 29). Very few accessibility pages included any information about emergency evacuation procedures or accessible emergency notification systems in the buildings (19 percent; n = 16). The inclusion of policies allowing service animals was noted on 20 percent (n = 17) of accessibility pages, with all indicating that service animals were allowed, although most required campus-level documentation or registration for service animals, and a small number of pages explicitly stated that no species other than dogs could be considered service animals (as distinct from emotional support animals or pets) (Table II).

[INSERT TABLE II HERE]

Other accessible features of facilities often observed during this analysis—but not explicitly coded for—were the presence of personal lockers, reservable quiet rooms, quiet study areas, private and semi-private seating, and areas with adjustable or non-fluorescent lighting.

Assistive Technologies

Nearly three-quarters of the pages surveyed listed assistive hardware and equipment, such as screen-magnifiers, braillers, braille printers, and noise-cancelling headphones (74 percent; n = 63) and a comparable number of pages provided a list of assistive software, most commonly JAWS, Kurzweil 3000, and options for using the built-in accessibility features of current Windows and Mac operating systems (69 percent; n = 59). Most pages included information about both assistive hardware and software (60 percent; n= 51).

Assistive technologies, particularly software, appeared to be in publicly available spaces and on workstations that could be accessed by all users in nearly half of the accessibility pages analyzed (47 percent; n = 40), with a good degree of variance between institutions regarding priority or specialized access for users with disabilities (e.g., priority use of accessible desks, laptop lending). Many institutions noted that accessible technologies were available only in specialized spaces or on specific workstations, and access to these resources was restricted to users registered with campus-level disability offices (22 percent; n = 19). Many of the pages surveyed were unclear as to what restrictions on usage of assistive technologies were in place, if any (30 percent; n = 26). The availability of roughly equivalent assistive technologies across library branches was unspecified on a similar portion of the sample (33 percent; n = 28); this equivalence could be tentatively affirmed in only about 29 percent (n = 25) of observed pages. Information regarding the organization of information about assistive technologies was not explicitly recorded as part of the data recording protocol, but various schema were observed, including alphabetic (by vendor), by disability category, and by branch / location availability.

Staffing

Only 21 of the pages (25 percent) identified faculty or staff dedicated primarily to accessibility (as indicated by job title, liaison designation, or inference of core job responsibilities). However, more than half (58 percent; n = 49) listed a specific point person to contact for accessibility-related questions or suggestions, with a few libraries listing multiple people for specific categories of services and resources (e.g., assistive technology, circulation, e-resources). Very few accessibility pages included information about staff training, professional development, or content regarding best practices for services and content accessibility (18 percent; n = 15).

Collections and Subscriptions

A minority of pages addressed accessibility, or lack thereof, in library collections and subscriptions, with databases being the most frequently referenced resource type (37 percent; n = 31). Information on accessible formats or conversion services for library collections was observed in 24 percent of pages reviewed (n = 20), and information on closed captioning for multimedia—including captioning or transcripts in streaming video databases, captioned video collections, hardware for viewing closed captioned media, or services for providing captions on request—were observed in 17 percent of reviewed pages (n = 14). Very few accessibility pages contained information regarding collections or subscriptions related to the subject area of Disability Studies (5 percent; n = 4).

Aggregate Information Presented

To summarize the degree to which each category of information was being represented on accessibility pages, index values were calculated by combining all observations within a category and dividing this sum by the number of items in the category (Table III). Overall,

Assistive Technology was the category that was most complete in terms of coverage, with a median index value of 0.75. In other words, half of the sample population provided information on at least 3 of the 4 items in the Assistive Technology category. Assistive Technology was also the most frequently observed category, being referenced on a remarkable 84 of the 85 accessibility pages in the sample (99 percent). Services for library patrons was the second most common category, with 91 percent (n = 78) of pages including information on this topic, for which a median information index value of 0.56 was calculated. Information about accessible Collections (e.g. collections, databases, closed captioning media services, disability studies collections) was the least frequently observed; information on this topic was absent on nearly half (46 percent; n = 54) of the accessibility pages analyzed.

[INSERT TABLE III HERE]

Of the 85 pages surveyed, 26 contained at least some information from all information categories that were coded. Combining the categorical information index values into an aggregate overall information score provides an abstract way of approximating to what extent all the categories were covered on a given page and allows some means of simple comparison between units of analysis that varied considerably. As an indicator of breadth of coverage across categories and depth within them, this index value can help to identify accessibility pages that provide exhaustive coverage of their services, resources, and facilities (Table IV). When considered along with a measure of content quantity, such as approximate word counts for the included content, it is also possible to identify pages that present information with an economy of words and space. Interview data reported by Brunskill (2020) indicated that many respondents with various "invisible" disabilities (autism, ADHD, dyslexia, anxiety, etc.) preferred manageable amounts of clearly organized text presentation for library accessibility pages. In this

sense, there is an implied impetus on page administrators to work toward balancing concision and thoroughness.

[INSERT TABLE IV HERE]

Page Accessibility and Maintenance

Page code and contrast errors identified by WebAIM's WAVE browser plugin were observed frequently and appeared on approximately 55 percent and 65 percent of all pages, respectively. However, almost all these errors were located on headers, menus, and footers of the libraries' websites—aspects of the site theme that would be repeated on other pages of the website. Notably, many of the contrast errors appeared to be the result of official university branding requiring specific colors that may or may not provide sufficient contrast to white or black. Isolating the automated accessibility audit to the body text of the accessibility pages, however, indicated that 70 webpages (82 percent) returned zero code errors, and only 5 accessibility pages had more than a single body text error detected by WAVE. Contrast errors in the pages' body sections were similarly rare, with problems detected in 25 percent of the sample (n = 21). In the case of both types of errors, it was noted that none appeared to cause functional inaccessibility, except for a single observed example with very severe and distracting contrast issues affecting its main body text.

The most frequently noted functional issue encountered on accessibility webpages was outdated, dead, or inaccurate links to external content. About 40 percent of the pages surveyed had at least one observed link that was broken.

Most pages contained no visible indication of when the page was last updated (n =77; 91 percent), with only 9 percent listing when the page was most recently revised. Only 9 percent of pages (n = 8) surveyed during the summer of 2021 included any information relating to how

policy changes in response to COVID-19 affected resources, services, or policies for persons with disabilities in the libraries.

Most accessibility pages (n = 53; 62 percent) did not contain information or links for reporting accessibility issues with the libraries' website, although links to more general website feedback forms were frequently observed.

Discussion

The use of accessibility pages as a service touchpoint, and the amount of information they contain, has generally increased in the decade between the present analysis and the content analysis reported by Cassner *et al*. (2011). A higher percentage of webpages from the present sample population contained information for almost all categories of services, facilities, and resources. The general increase for most categories of publicized services, resources, and facilities holds true for the subset of the present sample representing ARL member institutions. The percentage of ARL institutions in the present sample population that did *not* have library accessibility pages (13 percent; n = 9) is comparable to the 12 percent of institutions without accessibility pages as reported by Cassner *et al*. (2011). In addition to the general trend of institutions providing more informative accessibility pages, there was a considerable increase in the presence of service animal policy language (from 2 percent of pages in 2011 to 20 percent in 2021), and a notable decrease in information regarding accessible communications devices in library facilities (e.g., wheelchair accessible phones, TTY devices, video phones; from 82 percent of pages in 2011 to 34 percent in 2021). An aspect of facilities information that has increased slightly, but not nearly sufficiently, is information regarding emergency procedures, egress routes, and notification devices (17 percent in 2011, 19 percent in 2021).

The ubiquity of information regarding assistive technologies (99 percent of pages), services (91 percent of pages), and facilities (82 percent of pages) can be interpreted as an indication of how academic library administrators conceptualize and prioritize resources and services for users with disabilities. As Brunskill (2020) found via interviews with users, facilities information (in particular, sensory features of spaces and accessible building navigation) remains salient information for a wide swath of users with divergent needs.

This analysis also highlighted several informational areas where libraries' accessibility pages could improve. Information regarding accessibility for library instruction—e.g., physical classroom accessibility, how to request accommodations for accessible instruction, evidence of universal design principles in instructional design and delivery, assistive or adaptive instructional technology, individualized tours or instruction services—was notably absent from more than 90 percent of the pages in the present sample population. It is unlikely that this information gap is evidence of decreased awareness or effort on the part of instruction units in libraries—it is more likely a result of organizational siloing. Information about accessible instruction raises awareness of available services, which in turn facilitates and encourages accommodation requests. It also communicates a commitment to values of universal accessibility and inclusion to internal and external audiences. Considering that Cassner *et al*.'s (2011) study found information on instruction from 32 percent of surveyed library websites, this is a conspicuous difference. Because Cassner *et al*. (2011) included relevant information both on accessibility pages and on other areas of library websites, this difference is less likely an indication of decline than it is of the status quo. The percentage of library pages that reference library instruction reported by Graves and German (2018)—17 percent—is more in line with observations from the present dataset. Bridging this gap and including instruction units in centralized accessibility messaging is

a change that may involve minor coordination but would go a long way toward improving service to all users and providing evidence of the work within organizations to meet their needs.

Of the categories that were coded, information on accessible collections and subscriptions was featured on the fewest pages (54 percent). Database accessibility was the most frequently observed element from this category, and information on the topic ranged from featuring VPAT documentation for specific databases, directions on using assistive technology with certain database resources, and disclaimers indicating that libraries were not responsible for vendor-supplied content but were willing to work with users to solve accessibility barriers when encountered.

According to at least a cursory examination via the WebAIM WAVE plugin for checking accessibility of webpages, libraries can be commended for creating accessibility pages that were, in terms of body content of the page, free of accessibility or contrast errors. In terms of page functionality, the most potentially problematic issues were the high number of dead or abandoned links to external pages. In several cases, these links were directing users to key information, such as campus accessibility maps, ADA parking information, or other campus and community resources potentially relevant to users. There is no easy, "set it and forget it" solution to this problem. If libraries reproduce this type of information on their own sites, someone must be responsible for updating it when changes inevitably occur. If libraries rely on linked information from external offices—which may not be aware which sites are linking to delisted pages, and which may or may not have the same professional or legal obligations to ensure accessibility for all—someone must regularly curate and verify the accuracy and integrity of all essential information. Determining a workflow for addressing the problem is worth the effort, as

dead links, beyond causing inconvenience, implicitly call into question the reliability and recency of other information on the page.

Although some aspects of accessibility, particularly physical accessibility of spaces, are relatively static and rarely changing, others, such as external links, can be much more transient and dynamic. Cassner *et al*. (2011) observed that "most" accessibility pages provided some sort of information on when they were last updated, even if many of the sites indicated no revisions in several years (p. 38). Far fewer pages (9 percent) in the present sample were observed to contain any indication of currency, via listed specific revision dates or more general semester updates. Similarly, a lack of information on COVID-19-related operational changes (e.g. closed spaces or entrances, modified services, adjusted hours, relevant policies) on most accessibility pages provides further indirect evidence that these are frequently areas of the libraries' web presence that are treated as an afterthought rather than a dynamic resource in need of regular updating and maintenance.

Conclusions

Assuming that more information about a wider number of services and resources is a net positive, there has been a measured degree of improvement in what academic libraries publicize about the services, resources, and facilities they offer to improve accessibility for all users, compared to ten years ago (Cassner, *et al.*, 2011). Almost all public institutions surveyed provided a readily findable, centralized accessibility page or pages (more than 90 percent); private institutions were less likely to provide library accessibility information on their websites (accessibility pages were absent from one quarter of private institutions in the sample). Almost all categories of information (services, facilities, assistive technology, staffing, collections, and

general information) saw some degree of nominal increase in observed presence, as compared to the content analysis published in 2011 (Cassner, *et al.*, 2011).

Information about assistive technology and accommodating services (e.g., item retrieval, photocopying assistance, etc.) was observed on more than 90 percent of accessibility pages, and information about physical facilities featured on more than 80 percent of pages. The high degree of representation of these categories of information indicates that libraries' respective administrations interpret and problematize accessibility as primarily a series of policies to implement and technological solutions to circumvent or eliminate access barriers to users. These also appeared to be two of the most frequently observed categories in the 2011 analysis (Cassner, *et al*., 2011).

The accessibility (or lack thereof) for collections, subscriptions, other resources was notably absent from nearly half of the accessibility pages that were surveyed, which was somewhat surprising considering the degree to which libraries and the resources they provide are online and centrally available via libraries' websites. This is even more remarkable considering the recent pivot to even more online provision of services and resources necessitated by the COVID-19 pandemic beginning in March 2020.

The currency of accessibility pages was impossible to determine in almost all cases, either by posted revision dates or by revision regarding current responses to COVID-19. When taken in conjunction with frequently observed broken or dead links, it appears that many libraries rarely update or revisit these sections of the website. The static nature of the communication may reflect a reactive approach to addressing accessibility issues, which, in the absence of new reported barriers to access, assumes that accessibility has been achieved once the known problems have been remediated.

A notable difference between the findings of the present content analysis and Cassner *et al.*'s (2011) observations has to do with the prevalence of libraries' staff dedicated to coordinating accessibility efforts and communication. Although the 2011 content analysis did not report exact numbers, a designated point person and contact for accessibility issues seemed to be very rare at the time (Cassner, *et al.*, 2011), whereas the current study observed contact information for one or more staff members on more than half of the accessibility pages in the sample, and about one in four pages listed staff that appeared to deal with accessibility as a key responsibility. The authors of the present study believe that such developments indicate a growing commitment on the part of library and university administrations to provide tangible support to efforts to improve access for all. If accessibility work, advocacy, and activism are conceived as dynamic processes requiring continual, coordinated efforts at the organizational level to address systemic discrimination and exclusion, (rather than a reactive process of discrete solutions to individual problems), the creation of positions partially or wholly dedicated to coordinating these efforts can be considered a step in the right direction. Providing more information on topics such as professional development, best practices for developing online content, or explicitly publicized inclusive pedagogical practices—all of which were categories of information that were nearly universally absent from observed accessibility pages—would also presumably communicate to internal and external publics the values of the organization and the proactive approach to improving access for all users.

Limitations and Directions for Future Research

The present analysis is limited for several reasons. Because the unit of analysis was restricted to information available on forward-facing library accessibility pages which could be navigated to from main library websites, it—by design—does not document the actual

availability or quality of services or existence of resources. Therefore, the results represent observations of library communication practices rather than services or resources in the traditional sense, even if these can be reasonably inferred from the information available online.

Although the functionality and accessibility of these webpages were tested via accessibility testing software, evaluating "real-world" accessibility for existing pages should not rely solely on automated checking software, and any attempts to define best practices would greatly benefit from usability testing, focus group data, and direct design participation from users with disabilities.

The coding process accounted for many items, so for many information categories examined, data recorded was limited to coding for only presence or absence of information. For example, lists of assistive hardware technologies were not coded for length, the individual products were not systematically recorded, and no data was systematically gathered regarding organizational scheme (e.g., alphabetic, by disability category, etc.), or for presence or absence of technical support documentation. Similarly, although qualitative notes were recorded during the coding process, there was little in the way of a formalized qualitative analysis. Such methodologies would be more effective for analyzing and understanding several important aspects of presentation that do not readily lend themselves to quantitative comparison, such as the overall tone (welcoming, friendly, bureaucratic, impersonal), visual presentation, or the depth, quality, currency, and accuracy of information provided (e.g., easily understandable floor maps or written directions). In conjunction with inclusive usability testing and user experience research, such insights could help to develop a more holistic picture of best practices and would logically represent future avenues of inquiry worth pursuing.

All but three of the libraries analyzed for this study are part of R1 or R2 doctoral research universities, and most institutions in the sample had enrollments above 10000. A comparative analysis of the services and resources that are available and publicized at non-research institutions and at institutions with lower enrollment sizes would provide a more generalizable representation of current practice in academic librarianship overall. A representative sampling methodology such as the one used by Power and LeBeau (2009) would allow for such categorical comparisons while keeping the dataset manageable.

Finally, the content of accessibility pages is irrelevant if users never visit them in the first place. Interview data reported by Pionke (2017b) indicated that there can be a remarkable gap between what libraries offer in pursuit of accessibility and what users know about. Therefore, investigations and case studies of how accessible services and resources have been or could be effectively communicated to the users who need them (e.g. via marketing, outreach, campus partnerships, staff training, signage) would be welcome additions to the literature.

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Table I. Percentage of Libraries Offering Accessibility Services via Accessibility Pages

Service Category	2021 All (n = 85)	2021 ARL Members (n = 58)	2009* ARL Members (n = 99)
Retrieving Materials	88	90	74
Copying / Scanning	66	71	59
Circulation or Access Assistance	79	79	55
Reference Assistance	55	52	54
Research Consultation	55	52	53
Remote Reference or Research Assistance	35	31	--
Information about Services in Branches	40	40	47
Interlibrary Loan	42	45	33
Instruction	8	7	32
Proxy Services	29	26	32

*reported in Cassner *et al.*, 2011

Table II. Percentage of Libraries' Accessibility Sites Containing Facilities Information

Facilities Information	2021 All (n = 85)	2021 ARL Members (n = 58)	2009* ARL Members (n = 99)
Communication Devices	34	33	82
Parking and Exterior Paths	67	71	55
Interior Structural Modifications	54	57	52
Interior Facilities (Bathrooms, Elevators)	53	57	45
Emergency Procedures Information	19	24	17
Service Animal Policy	17	10	2

*reported in Cassner *et al.*, 2011

Table III. Categorical Information—Breadth and Depth of Inclusion on Accessibility Pages

Information Category	Number of Pages	Percentage of Pages	Median Information Index Value
Assistive Technologies	84	99	0.75
Services	77	91	0.56
Facilities	70	82	0.4
Staffing	50	59	0.33
Collections	46	54	0
General Information	83	98	0.5

Table IV. Accessibility Page Information Index Scores—Highest 10 Institutions

Institution	Information Index Score	Approximate Word Count
Iowa State University	0.86	5850
Michigan State University	0.78	3320
University of Michigan	0.77	700
Florida International University	0.77	1300
University of Mississippi	0.74	1290
Florida State University	0.69	1880
University of Georgia	0.68	2510
University of North Carolina - Charlotte	0.67	1330
University of Alabama	0.66	1310
University of Oregon	0.63	1110
Median Value	0.44	784