Digital Library Design Guidelines to Support Blind and Visually Impaired Users

INTRODUCTION

Background
An estimated 253 million people in the world live with significant vision loss (World Health Organization, 2018). Blind and visually impaired (BVI) individuals comprise an atypical group of users who rely on screen readers to interact with digital libraries (DLs). BVI users face unique needs, challenges, strategies, and preferences in their interactions with DLs. To design DLs that meet the needs of BVI users, DL developers must first understand these special needs.

BVI users exhibit unique help-seeking situations in Web interactions. A help-seeking situation is characterized by a problem that arises during a user’s interaction with a DL, which motivates them to seek some form of assistance in order to complete an information retrieval task. Prior literature reveals that these users face multiple cognitive and physical constraints during online information retrieval, including: 1) avoidance of pages due to dynamic content; 2) browsing difficulty due to structural problems and the linear nature of screen reading; 3) sequential interaction and loss of contextual information; 4) lack of important navigational and interpretive cues; 5) cognitive overload; and 6) improper labeling of interface objects (Babu, 2011; Bigham, Cavender, Brudvik, Wobbrock, & Ladner, 2007; Craven, 2003; Lazar, Allen, Kleinman, & Malarkey, 2007; Leuthold, Bargas-Avila, & Opwis, 2008; Salampasis, Kouropetrou, & Manitsaris, 2005; Theofanos & Redish, 2003). Although a few studies investigate BVI users’ problems and coping strategies (Vigo & Harper, 2013), a systematic examination of their help-seeking situations and associated factors in diverse DL environments has not yet been conducted. This creates a gap in research on BVI users’ help needs for effective DL interactions. Addressing this gap is the first step toward building a BVI user-friendly DL.

DL research has primarily paid attention to accessibility and usability (Carlo Bertot, Snead, Jaeger, & McClure, 2006; Isfandyari-Moghaddam & Bayat, 2008), with the most commonly used guidelines focusing on Web accessibility (Lazar, Allen, Kleinman, & Malarkey, 2007). The problem is that these guidelines do not address many of the interaction problems and help-seeking situations that BVI users face in their use of DLs (Power, Freire, Petrie, & Swallow, 2012; Southwell & Slater, 2012; Vigo & Harper, 2013).

Stages of the Creation of the Guidelines
The intent of the project is to develop guidelines based on BVI users’ special needs. It consists of four stages. At each stage, feedback from consultants was incorporated into the project. At Stage 1, a thorough and comprehensive search and review of literature from the past 20 years were conducted along with related document analysis to identify a list of help-seeking situations that BVI users encounter in their Internet interactions. Two document analyses were provided to: 1) address help-seeking situations and needs of BVI users in DLs; and, 2) identify existing
design guidelines on accessibility, usability, and utility in digital environments, and their limitations. Simultaneously, two types of analyses were conducted to identify the current status and problems with the existing guidelines as they relate to accessibility and usability.

At Stage 2, sixty-four participants were recruited representing BVI users across the U.S. with a variety of characteristics. Thirty-two of these participants completed the onsite study, while another 32 participants finished the diary study. All participants searched multiple DLs representing different types of content and design. Data, derived from a series of user studies, including previous BVI user studies conducted by the research team (Xie, Babu, Castillo, & Han, 2018; Xie, Babu, Joo, & Fuller, 2015), were used to identify the help-seeking situations that BVI users encounter in DLs and their associated help needs, and to develop the draft of the guidelines.

At Stage 3, the in-depth survey was administered to 150 participants who represented three groups of stakeholders (DL developers, accessibility and usability scholars/experts, and end users) to assess the importance, clarity, relevance, usefulness, and feasibility of guidelines. The findings of the survey further refined the guidelines.

At Stage 4, thirty DL developers will use the guidelines to assess six of the leading DLs and test the feasibility of the guidelines. In addition, the outcomes of the assessment will also be used to assess the current status and conformance levels of these DLs in terms of whether they meet conformance criteria for accessibility and usability for BVI users. Four focus groups, comprised of 7-8 participants each, will then be formed to discuss the problems of the guidelines they find in the assessment process. Based on suggestions and feedback, the DL design guidelines will be enhanced. Moreover, feedback from advisory board members will also be solicited before finalizing the guidelines.

Focus
These Guidelines were created based on the types of help-seeking situations identified by several BVI user studies that investigate BVI users’ interactions with existing DLs. The inclusion criteria are: 1) Design guidelines are developed for each individual type of help-seeking situation encountered in DLs by BVI users during user studies; and 2) These Guidelines only focus on supporting BVI users who rely on screen readers to interact with DLs.

Audiences
These Guidelines’ primary audiences are DL designers, facilitating increased accessibility and usability for BVI users. At the same time, these Guidelines are also for DL researchers, teachers, and graduate students who are interested in digitization, DL development, DL management, DL evaluation, and accessibility issues in the DL environment. The secondary audience could also include researchers and practitioners who work on the accessibility and usability of electronic information retrieval systems.

Glossary
In order to prepare the audiences to better understand and use the guidelines, a glossary was created to present the definitions of the key terms used in the guidelines. It consists of terms that relate to the situations, factors, guidelines, techniques, recommended features, and elements of DLs. The glossary is organized alphabetically and can be found in Appendix A.
Guidelines structure
Multiple access points are provided for the Guidelines. These Guidelines are organized by categories and types of help-seeking situations, including:

- Difficulty accessing information
- Difficulty identifying current status, path, or cursor mode
- Difficulty locating specific information, items, or features
- Confusion about multiple programs or DL structures
- Difficulty constructing or refining searches
- Difficulty with help
- Avoidance tendency
- Difficulty evaluating information
- Difficulty with compatibility issues

The Guidelines can also be accessed based on their nature: perceivable, operable, understandable, and robust. The third index approach is created according to types of DL functions.

Under each type of help-seeking situation, the following components are presented:

- **Definition** of the type of help-seeking situation
- **Factors** that lead to the situation
- **Guideline or Design Recommendations**
- **Rationale and Objective**
- **Techniques and Methods**
- **Recommended Features**
- **Examples**
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Table1. Types of Help seeking situations

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<th>Main level Help-seeking situations (32, unique 27)</th>
<th>Definitions</th>
<th>Sub level Help-seeking situations</th>
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</table>
| Difficulty accessing information (5) | Problems related to detecting or recognizing an item(s) or receiving information. | • Difficulty accessing a clickable element  
http://sites.uwm.edu/guidelines/accessing/difficulty-accessing-a-clickable-element/  
• Difficulty accessing content of a scanned document  
• Difficulty locating or accessing information related to visual items  
http://sites.uwm.edu/guidelines/accessing/difficulty-locating-or-accessing-information-related-to-visual-items/  
• Difficulty locating or accessing multimedia controls  
http://sites.uwm.edu/guidelines/accessing/difficulty-locating-or-accessing-multimedia-controls/  
• Difficulty locating or accessing search features  
http://sites.uwm.edu/guidelines/accessing/difficulty-locating-or-accessing-search-features/ |
| Difficulty evaluating information (2) | Difficulty making sense of search results, collections, or subject organization criteria; difficulty understanding the relevance of search results or identifying relevant collections or subjects. | • Difficulty assessing relevance of an item  
http://sites.uwm.edu/guidelines/evaluating/difficulty-assessing-relevance-of-an-item/  
• Difficulty assessing format of an item  
http://sites.uwm.edu/guidelines/evaluating/difficulty-assessing-format-of-an-item/ |
| Difficulty with help (5) | Difficulty understanding labels; problems understanding how to use a specific function; inability to understand help information. | • Difficulty recognizing or interpreting a label  
http://sites.uwm.edu/guidelines/difficulty-with-help/difficulty-recognizing-or-interpreting-a-label/  
• Difficulty understanding how to use a DL  
http://sites.uwm.edu/guidelines/difficulty-with-help/difficulty-understanding-how-to-use-a-DL/  
• Difficulty locating or understanding help information  
http://sites.uwm.edu/guidelines/difficulty-with-help/difficulty-locating-or-understanding-help-information/  
• Difficulty understanding or using a specific feature  
http://sites.uwm.edu/guidelines/difficulty-with-help/difficulty-understanding-or-using-a-specific-feature/  
• Difficulty detecting or using dynamic features and content  
http://sites.uwm.edu/guidelines/difficulty-with-help/difficulty-detecting-or-using-a-dynamic-features-and-content/ |
| Difficulty locating specific information, items or features (7) | Difficulty finding specific information or type of an item or format of an item or features | • Difficulty detecting or locating search results  http://sites.uwm.edu/guidelines/identifying/difficulty-detecting-or-locating-search-results/  
• Difficulty locating a specific word, phrase, or related term  http://sites.uwm.edu/guidelines/locating/difficulty-locating-a-specific-word-or-phrase-or-related-term/  
• Difficulty locating metadata  http://sites.uwm.edu/guidelines/locating/difficulty-locating-metadata/  
• Difficulty locating or accessing information related to visual items  http://sites.uwm.edu/guidelines/accessing/difficulty-locating-visual-items/  
• Difficulty locating or accessing multimedia controls  http://sites.uwm.edu/guidelines/accessing/difficulty-locating-multimedia-controls/  
• Difficulty locating or accessing search features  http://sites.uwm.edu/guidelines/accessing/difficulty-locating-search-features/  
• Difficulty locating or accessing help information  http://sites.uwm.edu/guidelines/help/difficulty-locating-help-information/ |
| Difficulty identifying current status, path, or cursor mode (6) | Problems identifying the current location, returning to home or a previous page, getting started or proceeding, recognizing page loading status, or monitoring searches. | • Difficulty detecting or locating search results  http://sites.uwm.edu/guidelines/identifying/difficulty-detecting-or-locating-search-results/  
• Difficulty identifying current location or tracking paths  http://sites.uwm.edu/guidelines/identifying/difficulty-locating-current-location-or-tracking-paths/  
• Difficulty identifying items that require downloading before viewing  http://sites.uwm.edu/guidelines/identifying/difficulty-identifying-items-that-require-downloading-before-viewing/  
• Difficulty navigating through a DL  http://sites.uwm.edu/guidelines/accessing/difficulty-navigating-through-a-dl/  
• Difficulty recognizing current status of a DL  http://sites.uwm.edu/guidelines/identifying/difficulty-recognizing-current-status-of-a-dl/  
• Difficulty recognizing pre-existing text in an input box  http://sites.uwm.edu/guidelines/identifying/difficulty-recognizing-pre-existing-text-in-an-input-box/ |
| Confusion about multiple programs, DL structures, or search results structure (2) | Confusion resulting from complex DL structures or difficulties distinguishing the | • Confusion about digital library structure or browse categories  http://sites.uwm.edu/guidelines/confusion/confusion-about-digital-library-structure-or-browse-categories/  
• Difficulty understanding results structure or layout  http://sites.uwm.edu/guidelines/confusion/difficulty-understanding-results-structure-or-layout/ |
<table>
<thead>
<tr>
<th>Avoidance tendency (1)</th>
<th>Avoidance of visual items, browsing approaches, in-depth exploration, or search input fields.</th>
<th>• Avoidance of format, approach, or features <a href="http://sites.uwm.edu/guidelines/avoidance/avoidance-of-format-approach-or-features/">http://sites.uwm.edu/guidelines/avoidance/avoidance-of-format-approach-or-features/</a></th>
</tr>
</thead>
</table>
| Difficulty constructing or refining searches (3) | Difficulty formulating and reformulating searches | • Difficulty to construct search queries [http://sites.uwm.edu/guidelines/constructing/difficulty-to-construct-search-queries/](http://sites.uwm.edu/guidelines/constructing/difficulty-to-construct-search-queries/)  
• Difficulty refining search queries [http://sites.uwm.edu/guidelines/constructing/difficulty-refining-search-queries/](http://sites.uwm.edu/guidelines/constructing/difficulty-refining-search-queries/)  
• Difficulty tracking searches [http://sites.uwm.edu/guidelines/constructing/difficulty-tracking-searches/](http://sites.uwm.edu/guidelines/constructing/difficulty-tracking-searches/) |
| Difficulty with compatibility issues (1) | Problems related to compatibility issues such as incompatible browser or keyboard | • Situations related to compatibility issues [http://sites.uwm.edu/guidelines/compatability/situations-related-to-compatibility-issues/](http://sites.uwm.edu/guidelines/compatability/situations-related-to-compatibility-issues/) |

REFERENCES


Difficulty Accessing Information

Difficulty accessing a clickable element

**Definition:**
A situation that arises from the difficulty in accessing an active element, such as a link, push-button, or widget that activates with a mouse click but not with a keystroke.

**Factor(s):**
- Lack of labels
- Unclear labels
- Lack of keyboard support
- Broken links

**Guideline or Design Recommendation:**
1. Ensure the labels for all clickable elements are understandable
2. Ensure active elements are able to be activated via keyboard
3. Provide instruction on how to access items using a keyboard
4. Provide a mapping of primary DL functions and designated screen controls to corresponding screen reader commands

**Rationale and Objective:**
BVI users rely on keyboard functions rather than using a visual pointing device such as a mouse. This situation involves accessing interface design elements without using a mouse as well as the availability of links (broken or not.) Some visual/multimedia content or application programs that include widgets only work with mouse operations. ARIA features can be helpful for BVI users to recognize the changes of applications/content and access them. All links must be operable from the keyboard based on WCAG requirements. It is recommended not to use inaccessible apps, such as JavaScript frameworks.

**Techniques and Methods:**
1.1. Provide meaningful labels for all clickable elements specifying their functions
2.1. Use standard HTML controls to build active elements
2.2. Set up a schedule to verify, update, or remove missing or broken links
2.3. Provide a feedback form to enable users to report a broken link
3.1. Provide tips and/or instruction about how to activate elements by keyboard operations
4.1. Create web applications and interfaces using ARIA so they will be compatible with screen readers
Recommended Features:
1.1 Meaningful labels
2.1.A Live links
2.1.B Keyboard accessible active elements
2.3 Feedback form
3.1 Help function
4.1 ARIA-compliant interface and features

Examples:
2.1.B1 Add CSS “a:focus” to selectors with “a:hover” to ensure keyboard access.
2.1.B2 Use a simple image-based checkbox widget using tab index to allow keyboard access.

Related Resources:


Difficulty accessing content of a scanned document

**Definition:**
A situation that arises from the difficulty reading a scanned document that is improperly scanned or formatted.

**Factor(s):**
- Lack of legible transcript because of low quality
- Inability to detect the content of a transcript by screen readers because of improper formatting

**Guideline or Design Recommendation:**
1. Ensure the full text of a scanned document is readable
2. Provide essential information for a scanned document with readability issues

**Rationale and Objective:**
A transcript is a convenient information source for BVI users. One issue results from poor content quality, which makes the transcript difficult to read by screen reader software. The cause of this difficulty is different than most in that it arises not because of the DL interface but rather because of the quality of the items within the DL. The guidelines and techniques presented here must largely be implemented at the time that an item is digitized. If rescanning
of poorly digitized items with better OCR methods is not possible, then manual editing and correction of transcripts can be helpful.

**Techniques and Methods:**
1.1. Choose the most appropriate and effective software to scan documents based on their content (e.g. OCR for printed or typed text, HRT for handwritten text, missing letter prediction, or natural language)
1.2. Set the OCR or HRT software and/or hardware for the highest quality recognition possible
1.3. Scan the material at high resolution (More than 600 dpi).
1.4. Establish quality control procedures for the digitization process
1.5. Use Text-to-speech function (e.g. read loud function in PDF) to test the readability of the scanned document
1.6. Manually review and correct poor quality items generated through OCR or HTR
1.7. Transcribe original sources manually if character recognition software is not available or effective

2.1. Provide summaries and keywords for documents with poor quality transcripts generated by OCR or HTR

**Recommended Features:**
1.1. Appropriate document scanning and transcript generation software (e.g. OCR software for print or typed text, HRT software for handwritten text)
1.3. High-resolution scanning
1.4. Quality control procedures
1.5. Text- to- speech function
1.6. Manual evaluation of scanned documents
1.7. Manual creation of a document transcript
2.1. Summaries and keywords

**Examples**
Jan. 18/74

Boos,
Berks.

By the post

I am very thankful for your kind

wish; and before receiving your letter

from London, I thought you had

sunk from sight. I was indeed so

surprised to hear from you at

London. I was very glad to

hear from you at London. We had good

fun on Sunday; Mr. George

lived in London, and very
To J. D. Hooker  18 January [1874]

My dear Hooker,

Very many thanks for Coral Reefs Book, but before receiving It I got a copy from Lyell, so I return yours by this post, & am not the less obliged.— I feared that it was too good luck to see you at luncheon in London. — We had grand fun one afternoon; for George hired a medium, who made the chairs, a flute, a bell & candlestick & fiery points jump about in my Brother's Dining Room in a manner that astounded everyone & took away all their breaths. It was in the dark, but George & Hensleigh Wedgwood held the mediums hands & feet on both sides all the time. I found it so hot & tiring that I went away before all these astounding miracles or juggling took place. How the man could possibly do what was done, passes my understanding. I came down stairs & saw all the chairs &c &c on the Table which had been lifted over the heads of those sitting round it.—

The Lord have mercy on us all, if we have to believe in such rubbish. F. Galton was there & says it was a good séance.—

Now will you make a memorandum, or what w² be better as more trustworthy ask Mr Hooker, kindly to make one & remind you. It is, if you ever attend the Balloting meetings of Athenæum Club, to attend the first one early in February & vote for my nephew, Henry Parker, & ask anyone whom you can influence. He is a fellow of Oriel College Oxford, & a most able & accomplished man, & I assure you in every way fitted to be a Member.

Yours affectionately | Ch. Darwin

1.2. OCR Fast mode option (disabling this feature recommended for poor quality material) (OCLC, 2017)
Related Resources:


See Also:
Help-seeking Situations > Difficulty accessing information
Difficulty locating or accessing information related to visual items

Definition:
A situation that arises from the difficulty to find and gain access to alternative text, transcripts or description for visual items in a digital library.

Factor(s):
- Unavailability or lack of transcripts for visual items
- Unclear labeling of controls for media players
- Complex information presentation
- Too many clicks required to access a transcript
- Lack of a shortcut to a transcript (e.g. heading or invisible links)

Guideline or Design Recommendation
1. Provide concise and meaningful alternative text for all visual items
2. Provide transcripts for images of text documents
3. Provide audio descriptions for video materials
4. Provide descriptive metadata for each image or video item
5. Ensure alternative text, transcripts and descriptions for visual items can be easily located
6. Ensure alternative text, transcripts and descriptions for visual items can be easily accessed
7. Provide help information regarding alternative text, transcript, or description access

Rationale and Objective:
Providing a text transcript for an image or a video item is helpful for BVI users to search for a keyword or scan overall content. Specifically, since DLs include a range of heterogeneous content, including illustrated books, photos, maps, manuscripts, etc., it is necessary to include a text transcript in a document form that is accessible. Preferably, the transcript should be in markup language for web pages, such as HTML/XML document format, as it is considered to be most easily accessible by screen readers. Regarding downloadable formats, because PDF format typically requires up-to-date assistive technology and a plug-in for accessing the PDF files, Microsoft Word format might be more appropriate. A caption and metadata should also be provided to offer additional information along with the transcript. Also, providing a clear label for the transcript is important because “text” metadata refers to text type, but BVI users may mistake this term to mean “transcript.” It might be beneficial to add invisible headings for BVI users to support ease of navigation.

Techniques and Methods:
1.1. Provide a supplementary description for a visual item next to the item with a clear label
2.1. Provide an option to download a transcript of a visual item
2.2. Provide partial transcripts if full transcripts are unavailable, and clearly indicate a partial transcript is available for a visual item
3.1. Offer audio description for scenes of videos between dialogues
4.1. Provide a clear and concise description of a visual items in metadata
5.1. Provide an option for transcript display next to a visual item
5.2. Add “Transcript” as invisible part of the title for a heading
5.1./6.1. Add an invisible “Skip to transcript” link
7.1. Provide a context-sensitive description for information embedded in a visual item. For example, if the image portrays protestors holding a sign for their protest, BVI audiences should be provided with contextual information on the broader meaning of the sign in addition to the text or the visual image.

**Recommended Features:**
1.1.A. Alt text
1.1.B. Meaningful labels
2.1. Downloadable transcript feature
2.2. Transcript display feature
3.1. Invisible audio description controls
4.1. Description element in metadata
5.1./6.1. Skip-to-transcript links
5.2. Invisible headings
7.1. Context-sensitive description

**Examples:**
1.1.A. Enabled transcript feature that provides a text-based representation of the visual content

1.1.B. Use “access interview”, “view movie”, or “listen to audio recording.” In the media example, links to the media opened in a new browser tab, but this behavior was not indicated with the link. An attribute title = “Opens in new window” would have addressed the issue.

1.1.C. Replace the first image with the second image with the “image” tab selected, so that readers can see both versions of the content
2.1. Make the transcript downloadable in .txt format (e.g. “download transcript here”) similar to the HathiTrust digital library where metadata is downloadable in text format (.txt). (HathiTrust, 2018)
3.1. Audio description (Art Beyond Sight, n.d.)
4.1. Clear labeling for metadata (confusion between transcript and metadata): Object description -> Folder level metadata & Description -> Item level metadata.
5.1.A. Invisible headings – a heading not visible to sighted users but readable by screen readers

**Invisible heading: transcript text**

**Barbee Papers, Box 13, Folder 14, NAACP Leadership Training Conference, ca. 1963 (selections)**

1 Wisconsin Conference

WISCONSIN CONFERENCE OF NAACP BRANCHES

Report of yearly activities, April, 1962, through April, 1963, to Region III at Louisville, Kentucky.

Activities

5.1.B/6.1 Invisible link added: Skip to Transcript link to activate text tab if link to transcript is available
Related Resources:


Hathitrust. (2018). Retrieved from https://babel.hathitrust.org/cgi/mb?a=listis;c=464226859;sort=title_a;pn=1;lmt=ft


Difficult locating or accessing multimedia controls

Definition:
A situation that arises from problems related to locating or activating controls to play audio/video files. Also, difficulty recognizing whether audio or video output is generated, or the length or progress level of the A/V material playing in a DL.

Factor(s):
- Unclear labeling of audio/video files and controls of media players
- Complex information presentation
- Too many controls in media players
- Illogical ordering of media player controls
- Lack of feedback from media players
- Lack of instruction for operating media players

See also:
Help-seeking Situations > Difficulty Accessing Information
Help-seeking Situations > Difficulty locating specific information, items or features
• Use of media players that are incompatible with screen readers

**Guideline or Design Recommendation:**

1. Ensure use multimedia players with minimal player controls
2. Label each multimedia player control in a way that clearly conveys its purpose and function
3. Ensure all multimedia player controls are efficiently accessible and operable, including keyboard control and compatibility with screen readers
4. Provide recognizable information about the length and progress of an A/V file playing in a DL
5. Provide metadata information about multimedia items
6. Provide instructions and help for accessing audio/video files

**Rationale and Objective:**

DLs offer a range of audio/video content. The complexity of the DL structure, excessive graphic content, and unlabeled controls for manipulating multimedia files discourages BVI users from trying to access these files. Clear instructions and keyboard-accessible interface design should be provided to locate the media and the controls to play them. Textual format, such as alt text or ARIA-labels for these controls are required. Progress status is typically indicated visually (e.g. using a progress bar or similar graphic) in a format that is inaccessible to BVI users. Textual equivalents should be provided stating the percentage played or remaining in an accessible textual format, or by an accessible label indicating the name of the object and the level of loading progress. Alternative information, such as audio descriptions can be used if the visual content in web-based audio/video files provides insufficient information to describe the content to BVI users. Any dynamic features, such as Flash, should be accessible by BVI users.

**Techniques and Methods:**

1.1. Utilize media players with the simplest and most standardized controls (play, pause, stop, etc.)
2.1. Provide a meaningful label for multimedia controls that accurately reflect their state (e.g. play/pause)
3.1. Provide basic keyboard accessible multimedia controls with shortcuts (e.g., play, stop, seek, rewind, forward, and speed control)
3.2. Avoid using Flash media or players unless the Flash content provides an accessible alternative that is usable by a screen reader
4.1. Provide sound or text indicators when loading, playing and stopping audio/video file
4.2. Provide sound or text indicators that present the general time estimate and video length
4.3. Make elements such as scripts and applets to present loading status directly accessible or compatible with assistive technologies. Looped-animation indicators should include a text explanation of the process.
5.1. Specify the availability of audio or video components or length of multimedia files
6.1. Provide instructions and general context-sensitive help or tips for accessing audio/video files

**Recommended Features:**
1.1. Simple and standardized controls
2.1. Meaningful Labels on controls
3.1. Keyboard accessible controls
4.1. Sound or text indicators
4.3.A. Accessible loading status using alternative text
4.3.B. Accessible looped-animation indicators
5.1. Metadata
6.1. Context-sensitive help or tips

Examples:
1.1/2.1A. Accessible YouTube (https://www.cs.unc.edu/~gb/Accessible-YouTube/index.html)
2.1.B. Button labels appear as “Play” and “Pause” (e.g., aria-label = “play”)

Library of Congress Digital Collections

The dinosaur and the missing link, a prehistoric

prehistoric tragedy / Dinosaur

3.1.A. A Play button should be read by screen readers (Thompson, 2011)
3.1.B. Use YouTube with a screen reader (https://support.google.com/youtube/answer/189278?hl=en)

3.2. Able Player (https://ableplayer.github.io/ableplayer/)

4.1. Alternative text for loading image or status like “Video is being loaded. 50% of loading.”

<div style="visibility: hidden; display: none; right: 0px;" role="alertdialog" aria-busy="true" aria-live="assertive"><img id="processing" src="PT_LOADING.gif" alt="Processing... please wait" title=""></div>

4.2.A. Audio description. Example: A narrator says, “There are five important points. They are... 20 min video.” (10th and Decimals, 2018)


5.1A. Descriptive metadata about content can be provided if the audio/video is not accessible (e.g., silent film) – DPLA DPLA Video: Miscellaneous Video

5.1B. Descriptions for length of an audio/video file
Related Resources:


Use YouTube with a screen reader (https://support.google.com/youtube/answer/189278?hl=en)


See also:
Help-seeking Situations > Difficulty Accessing Information
Help-seeking Situations > Difficulty locating specific information, items or features
Difficulty locating or accessing search features

Definition:
A situation that arises from a difficulty finding or accessing a search feature in a DL, such as a search filter, search categories, search box, search suggestions, or advanced search.

Factor(s):
- Unclear labeling
- Complex information presentation
- Irrelevant search elements (need examples)
- Complex/unclear search structure
- Lack of the indication that there are auto-suggestions
- Lack of the indication that there is the advanced search

Guideline or Design Recommendation:
1. Offer quick and easy paths to relevant search features from prominent locations within a DL page
2. Offer relevant search functions at logically appropriate locations on a DL page
3. Ensure every category of search features have similar functions and appearance for large scale DLs or integrated DLs
4. Label search features and their components in a meaningful way
5. Ensure search features and their components are accessible to BVI users

Rationale and Objective:
There might be several search features on the DL web page. A search box is one of the primary elements for a user to find relevant information in a DL. This feature allows users to input keywords to execute a search query. Once search results are generated by the search keywords/phrases, those results can often be filtered by additional categories and facets. DL search features are sometimes difficult for BVI users to locate. In some cases, these search features are positioned in a side widget that is not immediately available when BVI users arrow down through the main content region. Therefore, it might be helpful for BVI users to identify search features if they are included in the upper or main content region of the page, and not a side widget. Furthermore, if these search features do not specify that they are searching within select categories rather than the entire DL collection, this may lead to confusion for the user. Although auto-suggestions are a popular feature, some users might not understand that there are auto-suggestions. An indication for the feature can help users to benefit from it without confusion. An advanced search feature may often be used by more experienced users. The
advanced search feature should be placed near the simple search or be available via a link following the simple search.

**Techniques and Methods:**
1.1. Provide skip-to-links to a variety of search features within a DL
2.1. Place search feature or skip-to-links in the top navigation region of the page
3.1. Specify the range of the search (entire site, within a collection, within results, etc.) for every search feature through relevant labels
4.1. Place submit button after all other search features/filters
4.2. Add a meaningful label for each component of each feature
5.1. Use ARIA elements to make the search components easily recognized and accessible (Cifcioglu, 2017)
5.2. Add accessible headings before the search features

**Recommended Features:**
1.1. Skip-to-search feature link
3.1. Search feature with range
4.2. Meaningful labels
5.1. ARIA elements
5.2. Accessible headings

**Examples:**
2.1.A. Simple search box added in the main page of the collection.

![Simple search box added](image_url)

2.1.B. Position advanced search following simple search – CONTENTdm
3.1.A. Specify simple search to differentiate from other types of searches, such as advanced search, global search, etc.

3.1.B. Add instructions as the label for the box.
3.1.C. Add search tips.

4.2.A/5.2.A. <label class="search-label" for="search">Search about March on Milwaukee:</label><input type="text" name="search" id="search"><input type="text" name="search"

4.2.B. Apply labels to unlabeled edit field -> label (Simple Search Edit Search Marck on Milwaukee)
5.1.A. ARIA – combobox, listbox, and announce elements (Cifcioğlu, 2017)

```html
<div id="searchfield">
  <form>
    <label for="search">Suburb or Town Search</label>
    <input id="search" type="text" class="biginput" autocomplete="off" role="combobox"
        aria-autocomplete="both" aria-owns="results" aria-activedescendant="suggestion-1" />
  </form>
</div>
```

5.1.B. role="combobox" in the <input> field (inform to screen reader users): the input field is an auto-suggest;

5.1.C. aria-autocomplete="both" in the <input> field: screen reader users can select from the suggestion list or type their own input;

5.1.D. aria-owns to the <input> field links the suggestion list to the input field;

5.1.E. role="listbox" in the suggestion list <div> contains a list of selectable items; or aria-live regions: 1) Polite = the screen reader will finish what it's saying before announcing the live region content 2) Assertive = the screen reader will interrupt what it's saying to announce the
live region content 3) Off = the screen reader won’t announce the content unless the user focuses on that region

5.1.F. ARIA editable autocomplete dropdown (https://www.w3.org/TR/wai-aria-practices/examples/combobox/aria1.1pattern/listbox-combo.html)

**Related Resources:**


**See also:**
Help-seeking Situations > Difficulty Accessing Information
Help-seeking Situations > Difficulty locating specific information, items or features
Help-seeking Situations > Difficulty constructing or refining searches > Difficulty tracking searches
Difficulty Evaluating Information

Difficulty assessing format of an item

Definition:
A situation that arises from a difficulty determining the file format of an item in a DL

Factor(s):
- Unclear labeling
- No alternative text
- Lack of description
- Lack of instruction related to specific file formats

Guideline or Design Recommendation:
1. Ensure the file format of each item in a DL is clearly specified and provided to the user
2. Provide instruction how to use each file format

Rationale and Objective:
The format of an item (e.g. photo, manuscript, audio, video, etc.) is a primary access point for a BVI user and needs to be immediately recognized by the screen reader. Issues arise when the user is unable to determine what type of resource they are attempting to access in the DL. For example, “Text” as a simple metadata descriptor is ambiguous in that it could refer to a link to alternative text, or it could refer to the format of an item. For BVI users, therefore, there needs to be a clear description for item format to clarify that “Text” refers to the type of document (e.g. scanned image for a manuscript) and not a supplementary transcript; such a distinction would eliminate potential confusion or semantic ambiguity.

Techniques and Methods:
1.1. Define the metadata resource type of a DL item using DCMI type vocabulary designations (e.g. text, sound, image, etc.)
1.2. Define the file format of a DL item using standardized Internet Media Type vocabulary, formerly known as MIME (e.g. pdf, mp4, JPEG, etc.)
1.3. Specify the file format of a DL item through its label
2.1. Provide general help on frequently used file formats to assist users in recognizing resource types
2.2. Provide general help on information related to software or application tools need to access different file formats of items
2.3. Provide context-sensitive help (Help Tips and/or instructions) on how to access the item on focus
**Recommended Features:**

1.1. Metadata resource type
1.2. Metadata file format
1.3. Label with file format
2.1/2.2. General Help
2.3. Help tips and/or instruction

**Examples:**

1.2. Specific metadata description of item formats: e.g. “(scanned) image for hand-written manuscripts (jpg)”, “transcript for an audio interview file (txt)”, “image of newspaper(tiff)”, “transcript for newspaper article photo (pdf)”, “compound object containing two videos, five screen shots, and one article” etc.

**Related Resources:**

IANA.org.(2020). Internet Media Type. Retrieved from https://www.iana.org/assignments/media-types/media-types.xhtml


**See Also:**

Help-seeking Situations > Difficulty evaluating information
Difficulty assessing relevance of an item

Definition:
A situation that arises from a difficulty ascertaining if an item retrieved from a DL contains the information relevant to accomplish the task at hand. This includes a difficulty to efficiently evaluate relevance at both the search results list level and at an individual document level.

Factor(s):
- Complex information presentation
- Unclear labeling
- Lack of contextual information
- Lack of domain knowledge
- Lack of system knowledge
- Inadequate feature
- Lack of descriptive information

Guideline or Design Recommendation:
1. Ensure that the association between query terms/related terms and the search results list/each retrieved item are apparent
2. Provide descriptive information for each item in the search results
3. Provide instruction on how to evaluate the relevance of a retrieved item at the search results list level and at the individual document level
4. Assist users efficiently evaluate search result list and retrieved individual document

Rationale and Objective:
In DLs, it is often difficult for BVI users to determine why certain items are included in the search results, when intuitively they do not appear to be related to the search terms or other results. Snippets might be helpful for understanding the relevance of an item since they usually summarize/describe an item using keywords. Search results can be quickly accessed through skip to links. To make sure that results are relevant in terms of content, it is critical to clearly describe titles and summaries with meaningful terms.

It is often a challenge for BVI users to efficiently determine the relevance of individual DL items returned by a search because the information and/or description of the item are embedded in a complex information presentation. It is important that each item have a clearly designated description or summary about the resource so that BVI users can assess if the item meets their information need. To facilitate locating the information, a textual summary or transcript is preferred. Other helpful techniques include providing user tags that include the search query terms or a viewer/tool or audio description to explain the key features of visual items.
Techniques and Methods:
1.1. Add tags (e.g., adding <strong> or <em> tags) to emphasize the query terms or related terms for both search result list and individual retrieved document
1.2. Add headers to a paragraph that contains query terms or related terms when possible (e.g. html file, Pdf see example) for individual retrieved document
1.3. Suggest groups (e.g. subjects group or collections) related to the search query
2.1. Provide a snippet of every item in the search results list that consists of a summary, including key terms and/or relevant paragraph(s)
2.2. Display user tags and user comments, which can include terms from users' perspectives
2.3. Provide useful and clearly labeled item-level metadata
3.1. Provide general help information (e.g. using browser' find feature to look for query terms) explaining how to determine the relevance of an item being reviewed
3.2. Provide context-sensitive help tips about how to access descriptive information for the search result list
4.1. Provide the options to sort the results (e.g. relevance, publication time, media type)
4.2. Apply heading tags to titles for each of the retrieved documents in the search result list
4.3. Provide a skip link to go directly to subject/collection clusters at the top of the page

Recommended Features:
1.1. Emphasis tag
1.2. Paragraph headers
1.3. Subjects or collections cluster
2.1. Snippets of content provided with each item
2.2. User tags and comments
2.3. Metadata
3.1. General help, including text and/or audio instructions
3.2. Context-sensitive help tips
4.1. Sorting/filtering options
4.2. Heading tags
4.3. Skip to link to subject/collection

Examples:
2.3. Metadata (Library of Congress Digital library, 2018)
Related Resources:


See also:
Help-seeking Situations > Difficulty Evaluating Information
Difficulty with Help

Difficulty detecting or using dynamic features and content

Definition:
A situation that arises from a difficulty identifying or using dynamic features and content.

Factor(s):
- Incompatibility with screen reader
- Lack of feedback

Guideline or Design Recommendation:
1. Ensure dynamic features and content of a DL are accessible
2. Ensure accessibility of notifications for changes or updates in features and content
3. Inform users of the name, function, and state of features
4. Offer assistance in detecting and using dynamic features and content
5. Provide instruction on how to detect and use dynamic features and content

Rationale and Objective:
Compared to static content, dynamic content is content that changes on a page without re-loading and without any interaction with users. Dynamic features may be difficult for BVI users to access if they cannot interpret the changes in content. When content updates dynamically, screen readers may not be aware of changes. Any changes should be reported by screen readers, and the new content should be described for the user each time the content changes.

Techniques and Methods:
1.1. Map dynamic features or content to keyboard commands
1.2. Provide a static version of any dynamic features or content by listing them in the order they appear in the dynamic feature or content
2.1./4.1. Use ARIA roles and alerts to notify the changes of dynamic features and/or content
3.1. Provide an appropriate label reflecting the changes for each of the dynamic features, associated role and current status
5.1. Provide context-sensitive help tips describing how to use dynamic features or content

Recommended Features:
1.1. Keyboard-accessible features and content
1.2. Static version of dynamic content
2.1./4.1. ARIA roles and alerts
3.1. Dynamic labels
5.1. Context-sensitive help tips

Examples:
1.2./2.1.A./4.1.A. CSS code styles to support keyboard focus – add \( a: focus \) with \( a: hover \).

\[
\text{CSS code styles:}
\begin{align*}
\text{a} \{ \text{color: black; background-color: white; text-decoration: underline} \} \\
\text{a:focus, a:hover} \{ \text{color: white; background-color: black; text-decoration: none} \}
\end{align*}
\]

2.1.B/4.1.B. ARIA & keyboard interaction example – expand/collapse [https://www.w3.org/TR/wai-aria-practices-1.2/examples/accordion/accordion.html](https://www.w3.org/TR/wai-aria-practices-1.2/examples/accordion/accordion.html)

Related Resources:


W3C. (2018). WCAG 2.1 Success Criterion 2.4.7 Focus Visible (Level AA). Retrieved from [https://www.w3.org/TR/WCAG21/#navigation-mechanisms-focus-visible](https://www.w3.org/TR/WCAG21/#navigation-mechanisms-focus-visible)

See also:
Help-seeking Situations > Difficulty with help

**Difficulty locating or understanding help information**

Definition:
A situation that arises when a user cannot find the relevant help information; when the available help information is not easy to understand; or when the available help information is not useful for the task at hand.

**Factor(s):**

- Lack of DL system knowledge
- Lack of domain knowledge
- Complex information presentation
- Unclear instruction
- Inadequate help

**Guideline or Design Recommendation:**

1. Offer help information relevant to all tasks supported by the DL
2. Assist users in finding relevant help information
3. Ensure help information is understandable to users of all ability levels
4. Explain how to perform various functions of a DL in a meaningful way

**Rationale and Objective:**

Users accessing DL help information are usually those who are seeking additional information about or instructions on how to use DL features. For BVI users, help should be presented in clear language in textual form. Explanations should use common words rather than jargon, as concise as possible, providing an accurate explanation of the purpose and offerings of the DL. When users need more information about something they don’t understand, it is helpful to provide links to related information. Maintaining consistent structure across help pages helps users to better understand help information on various help pages.

**Techniques and Methods:**

1. Set up a schedule to review and update help pages
2. Map each help section to each of the tasks supported by a DL
3. Include links to context-sensitive help within general help
4. Provide an overview of the help topics
5. Provide a link for general help at the top of every DL page.
6. Divide help information into short sections and subsections, using heading tags such as `<H2>`, `<H4>`, etc.
7. Organize various sections of the help page in a consistent structure and format
8. Use simple language with common terms rather than jargon or professional language
9. Use sight-independent instructions or provide alt text or descriptions for visual instruction to present help information
10. Provide step-by-step directions with examples in completing specific tasks in context-sensitive help or solving common problems (e.g. FAQ)
11. Include specific help tips for screen reader users
**Recommended Features:**

1.2. Comprehensive help coverage  
2.1. Context-sensitive help  
2.1. Links to context-sensitive help  
2.2. Help overview  
2.3. Prominent help link  
2.4. Heading tags  
2.5./3.1. Consistent structure and format  
3.2. Simple language  
3.3. Nonvisual instruction or alt text/description  
4.1.A. A Step by step instruction  
4.1.B. Examples  
4.2. Screen reader tips

**Examples:**

2.2. Search help (Library of Congress, 2018)

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**Search Help**

**Searching for Digitized vs. Non-Digitized content**

Items are considered "digitized" if they are accessible in an online format such as a digital image, a digitized audio or video file, an "e-book" or a web page. Note that not all texts in the Library's Catalog can be read online, nor have all the images in our various collections been converted to digital formats.

Non-Digitized content are physical items, of all formats, from the Library's Catalog and Collections that can only be accessed first hand at Library of Congress facilities.

**Searching for Exact Words or Phrases**

**The Use of Operators**

The operators AND, OR, and NOT are supported. The Boolean phrase should be enclosed in parenthesis.

**The Use of Quotation Marks**

If you are searching for an exact match, enclose your search in quotes. If you enclose your search in quotes you will only get results for the exact terms or phrase you entered in the exact order you entered them.

Example of searching for an exact phrase:

- "Civil War maps"
- "Jackie Robinson"
- "Declaration of Independence"
- "ice cream"

You can also search for an exact phrase and a keyword as in the following examples:

- “civil war” maps
- “Abraham Lincoln” funeral
- farm "dust bowl"

**Capitalization**

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**Related Resources:**

Difficulty recognizing or interpreting a label

Definition:
A situation that arises from the difficulty understanding the meaning of labels associated with various features, elements, or objects within the DL.

Factor(s):
- Unclear labeling
- Lack of system knowledge

Guideline or Design Recommendation:
1. Label features and elements in the DL to indicate their functions
2. Label the items in the DL to indicate the nature of documents
3. Ensure the clarity of the purpose, function, and outcome of using features and elements
4. Offer assistance in interpreting the meaning of labels whenever necessary.

Rationale and Objective:
Labeling is critical in designing a DL webpage. The function of labels vary depending on their role on the web page. Because DLs include a range of terminology related to the system, subject/topic areas, metadata, etc., it is important to provide clear labels that plainly designate the purpose of the label. Labeling for navigation, such as links, should be focused on “where to go,” while labeling for identification of contents should describe “what it is” by using titles, (sub)headings, taglines, or image and video captions. For items denoting additional information, labeling should explain the relationship between items. For words with all upper-case characters, some screen readers’ default setting is to read upper-case text letter-by-letter, thereby reducing readability for BVI users.
Techniques and Methods:
1.1. Describe “what” and “how” for the label of features and elements
1.2. Label links consistently with the title of the destination page
2.1. Describe “what it is” for the label of an object
3.1. Use common terms instead of jargon whenever possible
3.2. Avoid using all upper-case characters in labeling
3.3. Add supplementary text to describe the purpose, function, and outcome of features and elements if needed
4.1. Provide a glossary for the labels used in a DL
4.2. Provide context-sensitive help tips to present the glossary term for a label

Recommended Features:
1.1. “What,” “how” or where descriptions of a feature or element label
2.1. “What it is” description of an item label
3.1. Common terminologies
3.2. Mixed-case labels
3.3. Supplementary text
4.1. Glossary
4.2. Context-sensitive help tips

Examples:
3.2. Do not label with all capitals.

(Source: Babich, 2016)

Related Resources:


See also:
Help-seeking Situations > Difficulty with help

Difficulty understanding how to use a DL

Definition:
A situation that arises from difficulty figuring out how to use a DL, specifically difficulty getting started in a DL or determining how to best approach the DL. This situation typically occurs at the start of using a DL.

Factor(s):
- Unclear instructions
- Lack of DL system knowledge
- Unclear labeling
- Complex information presentation

Guideline or Design Recommendation:
1. Clearly convey the purpose, functions, structure, and coverage of a DL
2. Provide instruction to explain how to use a DL
3. Clearly convey the purpose of each section of a DL
4. Clearly convey the availability of DL features and their functions
5. Ensure DL feedback is accessible

Rationale and Objective:
DLs should include descriptions explaining the purpose of the DL and instructions on how to effectively use the site. These introductory descriptions should be available in a textual format for BVI users and accessible through a link or menu. Overall features should navigable, operable, and usable with a screen reader. Using ARIA features can be effective for a screen reader to access information more easily. Designing a logical web page layout should reduce a BVI user’s need to visit instructions. DLs that offer complex presentation of information or excessive functions, such as a navigation bar with several links, increase a BVI user’s load as the user attempts to get oriented on how to use the DL, making it difficult for the user to get started. Unclear labels make users question the purpose of the DL. Clear descriptions in understandable language are necessary for BVI users to understand how to begin using a DL, which may be a new and unfamiliar system. When a user is not clear on how to use the system, tips should be provided to orient the user. Providing additional information for this orientation, such as what the next step is to use the system, or explaining the purpose of the system, might be helpful for users to recognize the utility of the DL. These instructions should be provided in a help page.

**Techniques and Methods:**

1.1. Provide the purpose, function, structure, and coverage of a DL as part of “About this DL” (or similar label) as one of the menu items
2.1. Provide a specific help page including instructions on how to use the DL, accessibility instructions for screen reader users, and contact information for tech support
2.2. Provide easy access to help and FAQ pages, such as “Help” on main menu, on a navigation bar, or via inline help
3.1./4.1. Provide meaningful labels for section headings, features, page titles, links, menus, tabs, forms, etc.
4.2. Provide context-sensitive help tips for DL features
5.1. Provide text or sound alerts to convey the feedback

**Recommended Features:**

1.1. Menu items (e.g. About this DL or Overview)
2.1. Help page with tutorials
2.2.A. List of shortcuts for screen readers users
2.2.B. Help and FAQ
3.1./4.1. Meaningful labels
4.2. Contextual help tips including : Help tips and /inline help
5.1. Text or sound alerts

**Examples:**

1.1.A. Text description about a collection (Library of Congress, 2018)
1.1.B./2.1. Help (Hathitrust, 2018)
Help - Using the Digital Library

Logging in

What are the benefits of logging in as a member?

Members of partner institutions get access to the largest number of volumes and features by logging in with their institution. Logging in enables members of HathiTrust partner institutions to:

- Download public domain works that have download restrictions (see "Can I download a whole book?" for more information);
- Create, save and share public or private collections;
- Access copyrighted works lawfully in appropriate circumstances (see accessibility and out-of-print and brittle for more information).

Members can't view or download works that are "limited (search-only)". See "Is it possible to view a volume that is limited (search-only)?" for more information.

See "What can I access without logging in?" for information about what all users can do without logging in.

I'm from a partner institution that uses Google Apps. How should I log in?

You should login by selecting your institution's name from the menu. Do not log into HathiTrust with a Google account. Logging in with a Google account will give you limited guest access, not full member access.

Why isn't my institution listed on the login page?

If your university or college isn't listed, they have not joined HathiTrust. Contact a librarian at your institution to request that they become a member. See more information about "Eligibility and Agreements".

Can I log in as a guest? What are the benefits?

Users that do not belong to partner institutions can create a guest account. Log in with an existing account (Facebook, Google, Twitter, etc.). Users can also create a University of Michigan "trend" account. Logged in guests can...
2.2.B. Prominent link to explicit help (e.g. “Help”) in menu

3.1./4.1. Clear labels referencing the DL collection
4.2. Inline help (e.g. Wikipedia)

A library is a curated collection of sources of information and similar resources, selected by experts and made accessible to a defined community for reference or borrowing, often in a quiet environment conducive to study.[1][2]. It provides physical or digital access to material, and may be a physical location or a virtual space, or both. A library’s collection can include books, periodicals, newspapers, microform, CDs, cassettes, audiobooks, databases, and so forth. Some libraries have been set up to serve up to millions of items. Libraries are often represented by the online catalogue. The word mean library in modern usage.

The first libraries consisted of clay tablets in ancient Sumer and Babylonia, and written on papyrus in ancient Egypt. The earliest surviving library is the Library of the Palace of the Kings of Persia at Susa, which was started in 529 BC. Private collections of books were kept in ancient Greece in the Classical period, and those of Constantinople, established around 300 AD.

A book is a medium for recording information in the form of writing or images, typically composed of many pages bound together and protected by a cover. The technical term for this physical arrangement is codex. In the modern period, the history of hand-held physical supports for extended written compositions or records, representing a material object that a person can hold, is also associated with the material library.

In addition to providing materials, libraries also provide services and support. Librarians are experts at finding and organizing information.
**Related Resources:**


**See also:**
Help-seeking Situations > Difficulty with help

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**Difficulty understanding or using a specific feature**

**Definition:**
A situation that arises from a difficulty either understanding or using a feature of a DL.

**Factor(s):**
- Unintuitive features
- Unclear instructions
- Unclear labeling of features
- Lack of experience with features

**Guideline or Design Recommendation:**
1. Label a feature and its components reflecting their functions based on user expectations
2. Explain how to use a feature effectively
3. Offer assistance in interacting with a feature

Rationale and Objective:
For designing general DL features and functions, the first consideration might be whether the website is designed in alignment with the goal or mission of the DL. Within this framework, features or functions should be designed based on the expectation of users. For example, BVI users may need clarification on the purpose of a feature and instruction on how to use it. Instructions for each feature or function should be clearly described. For example, step-by-step tutorials or context-sensitive instruction alongside the feature might be helpful to interpret which commands need to be applied to activate the feature. Instructions for features should be described clearly in common language. Many DLs use images or visual symbols, which might be effective for sighted users but may present a problem for BVI users. Textual descriptions of functions are needed for BVI users. Since displaying too many filter options may confuse a user, some options can be provided as Advanced Search features.

Techniques and Methods:
1.1. Design the label of a feature indicating its function based on user needs derived from a user study or user feedback
1.2. Provide text labels and descriptions (which may incorporate invisible text for sighted users,) rather than images
1.3. Use WAI-ARIA to make DL features accessible to screen readers
1.4. Provide “label” html code to specify the label and/or function of a feature
1.5. Apply measures for reading level (e.g. Flesch-Kincaid grade level) to improve the readability of labels and instructions
2.1. Provide step by step instructions/tutorials for each feature
3.1. Provide context-sensitive help tips to explain how to use a feature
3.2. Provide feedback while a user is interacting with a feature

Recommended Features:
1.1. Intuitive and specific feature labels
1.2. Text label and description
1.3. Accessible features using WAI-ARIA
1.4. “label” HTML code
2.1. Clear instructions, step-by-step tutorials, or demonstrations
3.1. Content-sensitive help tips
3.2. Feedback

Examples
1.1.A. Clear labels
1.1.B. Removed features that are difficult to access.
The March on Milwaukee Civil Rights History Project supports understanding of the struggle for racial equality by helping users discover primary sources and other educational materials from the collections of the University of Wisconsin-Milwaukee Libraries and the Wisconsin Historical Society. The digital collection includes the selected papers of individuals representing a variety of positions on the civil rights issue, photographs, unedited footage from the WTMJ-TV news film archives, and oral history interviews capturing the recollections and perspectives of individuals who participated in the movement. The collection also includes contextual materials, such as brief explanations of relevant people, places, events, and organizations, a timeline, a bibliography of relevant published sources; and maps highlighting important locations.

The materials reproduced in this digital collection are only a selection of the primary sources documenting Milwaukee’s civil rights history held by the University of Wisconsin-Milwaukee Libraries and the Wisconsin Historical Society. Researchers should not assume a one-to-one correspondence between digital folders and their counterparts in physical collections.

Project staff selected the primary sources included in this collection for their completeness, legibility, and historical importance. To the best of our knowledge, we included only materials for which we hold copyright, for which we have secured the permission of other copyright holders, or that we have identified as copyright orphaned works. We welcome additional information concerning the copyright status of sources reproduced in this collection.

Team Members 2010

1.2. Specific description.
1.4. Use “Label” HTML code to features

```html
<label for="French">What is your favorite type of salad dressing?<br>
French</label> <input id="French" type="checkbox" name="dressing1" value="checkbox"><br>
<label for="Italian">Italian</label> <input id="Italian" type="checkbox" name="dressing2" value="checkbox"><br>
<label for="Russian">Russian</label> <input id="Russian" type="checkbox" name="dressing3" value="checkbox">
```

Retrieved from https://www.afb.org/aw/5/2/14763

2.1. Europeana help page (Europeana, 2018)
3.1.A. Invisible text is added to provide an overall description of the structure: “The search results section consists of three areas: sorting options, display options, and a list of search results.”

3.1.B. Invisible description
- By default, your search results are set to search the March on Milwaukee digital collection. To expand the search to include other University of Wisconsin Milwaukee collections, select the checkbox for the collections you wish to add.

- This feature is a collapsible and expandable list to limit the search results. Click one of the options to select one of the sub-categories under that option to narrow your search results. You cannot enter your own terms. Use the tab key to access the options and press B for the "More" button for more terms.

Related Resources:


See also:
Help-seeking Situations > Difficulty with help
Difficulty Locating Specific Information, items, or features

Difficulty detecting or locating search results

Definition:
A situation that arises from one of the following difficulties: detecting the outcome of a search, including whether or not the search results are displayed; finding the search results; and determining whether the results returned reflect a recently modified search or are still the results of a prior search

Factor(s):
- Lack of system feedback
- Lack of appropriate heading information
- Lack of contextual information or cues

Guideline or Design Recommendation:
1. Clearly label the results section for recognizability
2. Provide a shortcut to the DL search result list
3. Notify the user that the query has been processed and results have been generated
4. Provide guidance on how to recognize whether search results were generated or changed

Rationale and Objective:
DLs have complex navigation structures; therefore BVI users need to explore the page to determine whether the results have been displayed. Applying a short sound indicating search results can be helpful for a BVI user to recognize that search results have been generated in a DL. In many cases, when BVI users modify their search terms in the search box, they are unable to determine whether new results have been generated. Providing an audible progress indicator would help BVI users to predict how long they should wait to get the search results and/or whether search results have been displayed. Search instructions or tips can describe this. A description near the top of the page or search box specifying that search results were generated is a significant marker for a BVI user to recognize that the search results have been generated and are accessible. Applying a heading of “search results” at the top of the results list can facilitate ease of navigation.
Techniques and Methods:
1.1. Add a heading tag to search results section title
2.1. Provide skip links and section headers as shortcuts to the search results
3.1. Use text or sound alerts to indicate the status of the search progress
3.2. Add text and/or sound alert to indicate that search results were generated or updated
3.3. Display a notification near the search box indicating the status of the search results
4.1. Provide help in recognizing when search results are generated
4.2. Include search terms and the number of results in the Search Results heading. An ARIA live region might be used to speak short text with number of search results returned, for example: “page loaded, 2 results”

Recommended Features:
1.1. Search Results section heading
2.1A. Slip links
2.1B. Section headers
3.1/3.2. Sound/text indicator
3.3. Status notification
4.1. Tips and help
4.2. Search term(s) displayed in results heading

Examples:
3.1./3.2. Sound indication for a webpage update (pseudo code).

```html
<script> function playSound() { // code for play routine } </script>
<body onload="playSound()">
<h>Play a sound whenever the webpage is updated</h>
</body>

3.3. A description for no result – Smithsonian Institution
4.2. A result header
Related Resources:


See Also:
Help-seeking Situations > Difficulty locating specific information, items or features
Help-seeking Situations > Difficulty identifying current status, path, or cursor mode
Difficulty locating a specific word, phrase, or related term

Definition:
A situation that arises from a difficulty finding a word, phrase, or related term within the text content of a DL.

Factor(s):
- Complex information presentation
- Lack of description
- Lack of indicators for key terms

Guideline or Design Recommendation:
1. Enable text searching within the captioning or transcript of a video item
2. Support text search for related terms
3. Provide instructions how to perform text search (e.g. a specific word, phrase or related term) within a DL
4. Ensure the output of text search is accessible

Rationale and Objective:
Since BVI users cannot quickly skim the content of a page, BVI users often use the designated screen reader Find function, which is the same as “Ctrl+F” for sighted users. Exact matching for a specific word can be extended to recommended related words or suggested spelling revisions. Search tools that use highlighting or bolding of found terms are not necessarily useful for BVI users because they may not be recognized by screen reader software. Instead, other types of non-visual indicators are needed. Sometimes pages have metadata or keywords that are not displayed on the screen but cause a page to appear in the “search” results. When a user performs a “find” in the page, nothing is found. This can be very confusing and frustrating. Audio tracks of audio and video items are difficult or impossible to search, so having the ability to search the caption track of an audio or video item is helpful.

Techniques and Methods:
1.1. Provide the caption/transcript of a video item as a separate searchable document (e.g., PDF)
2.1. Incorporate a dictionary with related terms into a DL
3.1. Provide search tips and instruction on how to perform a text search
4.1. Use heading tags to highlight the results of text search

Recommended Features:
1.1. Caption/transcript as searchable document
2.1. Find related terms
3.1. Search tips and instruction
4.1. Heading tags

**Examples:**
1.1. Caption/transcript as searchable document

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The Internet Archive Wants To Be A Digital Library For Everything | Sunday TODAY

4.1. Heading added for the inputted term
Related Resources:


Difficulty locating metadata

Definition:
A situation that arises from a difficulty in finding the metadata for a DL item

Factor(s):
- Lack of the visibility of metadata
- Lack of labeling for metadata

Guideline or Design Recommendation:
1. Offer a quick and easy way to find each element of the metadata for an item.
2. Offer a quick and easy way to identify each element of the metadata for an item

Rationale and Objective:
Metadata is not the content itself, but rather descriptive information about the content. It may include information about the type, subject, author, place, etc. Sometimes metadata is placed far away from a page title, which makes it difficult for BVI users to locate. The design of DL may inform users that there is metadata by providing a link or by placing the metadata directly below the page title. Providing a header for the metadata section may help BVI users locate it.

Techniques and Methods:
1.1. Present metadata directly below or near the item
1.2. Provide an internal link to a metadata section if metadata cannot be placed close to the item
1.3. Use heading tags for metadata section
2.1. Provide consistent labels for metadata elements throughout a DL
2.2. Provide alt text for the definition of each element of metadata

**Recommended Features:**
1.2. Internal links
1.3. Section headings
2.1. Consistent labels
2.2. Alt text

**Examples:**
1.2. Metadata link.

**Related Resources:**

**See Also:**
Help-seeking Situations > Difficulty locating specific information, items or features

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**Difficulty locating or accessing information related to visual items**

**Definition:**
A situation that arises from the difficulty to find and gain access to alternative text, transcripts or description for visual items in a digital library.

**Factor(s):**
- Unavailability or lack of transcripts for visual items
- Unclear labeling of controls for media players
• Complex information presentation
• Too many clicks required to access a transcript
• Lack of a shortcut to a transcript (e.g. heading or invisible links)

Guideline or Design Recommendation

8. Provide concise and meaningful alternative text for all visual items
9. Provide transcripts for images of text documents
10. Provide audio descriptions for video materials
11. Provide descriptive metadata for each image or video item
12. Ensure alternative text, transcripts and descriptions for visual items can be easily located
13. Ensure alternative text, transcripts and descriptions for visual items can be easily accessed
14. Provide help information regarding alternative text, transcript, or description access

Rationale and Objective:
Providing a text transcript for an image or a video item is helpful for BVI users to search for a keyword or scan overall content. Specifically, since DLs include a range of heterogeneous content, including illustrated books, photos, maps, manuscripts, etc., it is necessary to include a text transcript in a document form that is accessible. Preferably, the transcript should be in markup language for web pages, such as HTML/XML document format, as it is considered to be most easily accessible by screen readers. Regarding downloadable formats, because PDF format typically requires up-to-date assistive technology and a plug-in for accessing the PDF files, Microsoft Word format might be more appropriate. A caption and metadata should also be provided to offer additional information along with the transcript. Also, providing a clear label for the transcript is important because “text” metadata refers to text type, but BVI users may mistake this term to mean “transcript.” It might be beneficial to add invisible headings for BVI users to support ease of navigation.

Techniques and Methods:
1.1. Provide a supplementary description for a visual item next to the item with a clear label
2.1. Provide an option to download a transcript of a visual item
2.2. Provide partial transcripts if full transcripts are unavailable, and clearly indicate a partial transcript is available for a visual item
3.1. Offer audio description for scenes of videos between dialogues
4.1. Provide a clear and concise description of a visual items in metadata
5.1. Provide an option for transcript display next to a visual item
5.2. Add “Transcript” as invisible part of the title for a heading
5.1./6.1. Add an invisible “Skip to transcript” link
7.1. Provide a context-sensitive description for information embedded in a visual item. For example, if the image portrays protestors holding a sign for their protest, BVI audiences should be provided with contextual information on the broader meaning of the sign in addition to the text or the visual image.

Recommended Features:
1.1.A. Alt text
1.1.B. Meaningful labels
2.1. Downloadable transcript feature
2.2. Transcript display feature
3.1. Invisible audio description controls
4.1. Description element in metadata
5.1./6.1. Skip-to-transcript links
5.2. Invisible headings
7.1. Context-sensitive description

Examples:
1.1.A. Enabled transcript feature that provides a text-based representation of the visual content

1.1.B. Use “access interview”, “view movie”, or “listen to audio recording.” In the media example, links to the media opened in a new browser tab, but this behavior was not indicated with the link. An attribute title = “Opens in new window” would have addressed the issue.

1.1.C. Replace the first image with the second image with the “image” tab selected, so that readers can see both versions of the content

2.1. Make the transcript downloadable in .txt format (e.g. “download transcript here”) similar to the HathiTrust digital library where metadata is downloadable in text format (.txt). (HathiTrust, 2018)
3.1. Audio description (Art Beyond Sight, n.d.)
4.1. Clear labeling for metadata (confusion between transcript and metadata): Object description -> Folder level metadata & Description -> Item level metadata.
5.1.A. Invisible headings – a heading not visible to sighted users but readable by screen readers

Invisible heading: transcript text

Barbee Papers, Box 13, Folder 14, NAACP Leadership Training Conference, ca. 1963 (selections)

1 Wisconsin Conference

5.1.B/6.1 Invisible link added: Skip to Transcript link to activate text tab if link to transcript is available
Related Resources:


Hathitrust. (2018). Retrieved from https://babel.hathitrust.org/cgi/mb?a=listis;c=464226859;sort=title_a;pn=1;lmt=ft


Difficult locating or accessing multimedia controls

Definition:
A situation that arises from problems related to locating or activating controls to play audio/video files. Also, difficulty recognizing whether audio or video output is generated, or the length or progress level of the A/V material playing in a DL.

Factor(s):
- Unclear labeling of audio/video files and controls of media players
- Complex information presentation
- Too many controls in media players
- Illogical ordering of media player controls
- Lack of feedback from media players
- Lack of instruction for operating media players
- Use of media players that are incompatible with screen readers
Guideline or Design Recommendation:

7. Ensure use multimedia players with minimal player controls
8. Label each multimedia player control in a way that clearly conveys its purpose and function
9. Ensure all multimedia player controls are efficiently accessible and operable, including keyboard control and compatibility with screen readers
10. Provide recognizable information about the length and progress of an A/V file playing in a DL
11. Provide metadata information about multimedia items
12. Provide instructions and help for accessing audio/video files

Rationale and Objective:
DLs offer a range of audio/video content. The complexity of the DL structure, excessive graphic content, and unlabeled controls for manipulating multimedia files discourages BVI users from trying to access these files. Clear instructions and keyboard-accessible interface design should be provided to locate the media and the controls to play them. Textual format, such as alt text or ARIA-labels for these controls are required. Progress status is typically indicated visually (e.g. using a progress bar or similar graphic) in a format that is inaccessible to BVI users. Textual equivalents should be provided stating the percentage played or remaining in an accessible textual format, or by an accessible label indicating the name of the object and the level of loading progress. Alternative information, such as audio descriptions can be used if the visual content in web-based audio/video files provides insufficient information to describe the content to BVI users. Any dynamic features, such as Flash, should be accessible by BVI users.

Techniques and Methods:
1.1. Utilize media players with the simplest and most standardized controls (play, pause, stop, etc.)
2.1. Provide a meaningful label for multimedia controls that accurately reflect their state (e.g. play/pause)
3.1. Provide basic keyboard accessible multimedia controls with shortcuts (e.g., play, stop, seek, rewind, forward, and speed control)
3.2. Avoid using Flash media or players unless the Flash content provides an accessible alternative that is usable by a screen reader
4.1. Provide sound or text indicators when loading, playing and stopping audio/video file
4.2. Provide sound or text indicators that present the general time estimate and video length
4.3. Make elements such as scripts and applets to present loading status directly accessible or compatible with assistive technologies. Looped-animation indicators should include a text explanation of the process.
5.1. Specify the availability of audio or video components or length of multimedia files
6.1. Provide instructions and general context-sensitive help or tips for accessing audio/video files

Recommended Features:
1.1. Simple and standardized controls
2.1. Meaningful Labels on controls
3.1. Keyboard accessible controls
4.1. Sound or text indicators
4.3.A. Accessible loading status using alternative text
4.3.B. Accessible looped-animation indicators
5.1. Metadata
6.1. Context-sensitive help or tips

Examples:
1.1/2.1A. Accessible YouTube (https://www.cs.unc.edu/~gb/Accessible-YouTube/index.html)
2.1.B. Button labels appear as “Play” and “Pause” (e.g., aria-label=”play”)

Library of Congress Digital Collections

The dinosaur and the missing link, a prehistoric tragedy / Dinotheria

3.1.A. A Play button should be read by screen readers (Thompson, 2011)
3.1.B. Use YouTube with a screen reader (https://support.google.com/youtube/answer/189278?hl=en)
3.2. Able Player (https://ableplayer.github.io/ableplayer/)
4.1. Alternative text for loading image or status like “Video is being loaded. 50% of loading.”

4.2.
4.2.A. Audio description. Example: A narrator says, “There are five important points. They are… 20 min video.” (10th and Decimals, 2018)


5.1A. Descriptive metadata about content can be provided if the audio/video is not accessible (e.g., silent film) – DPLA DPLA Video: Miscellaneous Video

5.1B. Descriptions for length of an audio/video file
Related Resources:


DigitalA11Y. Accessible HTML5 Media Players@Resources Retrieved from https://www.digitala11y.com/accessible-jquery-html5-media-players/


Use YouTube with a screen reader (https://support.google.com/youtube/answer/189278?hl=en)


See also:
Help-seeking Situations > Difficulty Accessing Information
Help-seeking Situations > Difficulty locating specific information, items or features
Difficulty locating or accessing search features

Definition:
A situation that arises from a difficulty finding or accessing a search feature in a DL, such as a search filter, search categories, search box, search suggestions, or advanced search.

Factor(s):
- Unclear labeling
- Complex information presentation
- Irrelevant search elements (need examples)
- Complex/unclear search structure
- Lack of the indication that there are auto-suggestions
- Lack of the indication that there is the advanced search

Guideline or Design Recommendation:
6. Offer quick and easy paths to relevant search features from prominent locations within a DL page
7. Offer relevant search functions at logically appropriate locations on a DL page
8. Ensure every category of search features have similar functions and appearance for large scale DLs or integrated DLs
9. Label search features and their components in a meaningful way
10. Ensure search features and their components are accessible to BVI users

Rationale and Objective:
There might be several search features on the DL web page. A search box is one of the primary elements for a user to find relevant information in a DL. This feature allows users to input keywords to execute a search query. Once search results are generated by the search keywords/phrases, those results can often be filtered by additional categories and facets. DL search features are sometimes difficult for BVI users to locate. In some cases, these search features are positioned in a side widget that is not immediately available when BVI users arrow down through the main content region. Therefore, it might be helpful for BVI users to identify search features if they are included in the upper or main content region of the page, and not a side widget. Furthermore, if these search features do not specify that they are searching within select categories rather than the entire DL collection, this may lead to confusion for the user. Although auto-suggestions are a popular feature, some users might not understand that there are auto-suggestions. An indication for the feature can help users to benefit from it without confusion. An advanced search feature may often be used by more experienced users. The
advanced search feature should be placed near the simple search or be available via a link following the simple search.

**Techniques and Methods:**
1.1. Provide skip-to-links to a variety of search features within a DL
2.1. Place search feature or skip-to-links in the top navigation region of the page
3.1. Specify the range of the search (entire site, within a collection, within results, etc.) for every search feature through relevant labels
4.1. Place submit button after all other search features/filters
4.2. Add a meaningful label for each component of each feature
5.1. Use ARIA elements to make the search components easily recognized and accessible (Cifcioglu, 2017)
5.2. Add accessible headings before the search features

**Recommended Features:**
1.1. Skip-to-search feature link
3.1. Search feature with range
4.2. Meaningful labels
5.1. ARIA elements
5.2. Accessible headings

**Examples:**
2.1.A. Simple search box added in the main page of the collection.

![Simple search box added](image1)

2.1.B. Position advanced search following simple search – CONTENTdm

![Example of advanced search following simple search](image2)
3.1.A. Specify simple search to differentiate from other types of searches, such as advanced search, global search, etc.

3.1.B. Add instructions as the label for the box.
3.1.C. Add search tips.

4.2.A/5.2.A. <label class="search-label" for="search">Search about March on Milwaukee:<label><input type="text" name="search" id="search"><input type="text" name="search">

4.2.B. Apply labels to unlabeled edit field -> label (Simple Search Edit Search Marck on Milwaukee)
5.1.A. ARIA – combobox, listbox, and announce elements (Cifcioglu, 2017)

```html
<div id="searchfield">
  <form>
    <label for="search">Suburb or Town Search</label>
    <input id="search" type="text" class="biginput" autocomplete="off" role="combobox"
           aria-autocomplete="both" aria-owns="results"
           aria-activedescendant="suggestion-1" />
  </form>
</div>

<div class="autocomplete-suggestions"
  id="search-autocomplete">
  <div id="results" role="listbox">
    <div class="autocomplete-suggestion" id="suggestion-1"
         role="option">Melton</div>
  </div>
</div>
```

5.1.B. role="combobox" in the <input> field (inform to screen reader users): the input field is an auto-suggest;

5.1.C. aria-autocomplete="both" in the <input> field: screen reader users can select from the suggestion list or type their own input;

5.1.D. aria-owns to the <input> field links the suggestion list to the input field;

5.1.E. role="listbox" in the suggestion list <div> contains a list of selectable items; or aria-live regions: 1) Polite = the screen reader will finish what it’s saying before announcing the live region content 2) Assertive = the screen reader will interrupt what it’s saying to announce the
live region content 3) Off = the screen reader won't announce the content unless the user focuses on that region

5.1.F. ARIA editable autocomplete dropdown (https://www.w3.org/TR/wai-aria-practices/examples/combobox/aria1.1pattern/listbox-combo.html)

**Related Resources:**


**See also:**
Help-seeking Situations > Difficulty Accessing Information
Help-seeking Situations > Difficulty locating specific information, items or features
Help-seeking Situations > Difficulty constructing or refining searches > Difficulty tracking searches
Difficulty Identifying Current Status, Path, or Cursor Mode

Difficulty detecting or locating search results

Definition:
A situation that arises from one of the following difficulties: detecting the outcome of a search, including whether or not the search results are displayed; finding the search results; and determining whether the results returned reflect a recently modified search or are still the results of a prior search.

Factor(s):
• Lack of system feedback
• Lack of appropriate heading information
• Lack of contextual information or cues

Guideline or Design Recommendation:
5. Clearly label the results section for recognizability
6. Provide a shortcut to the DL search result list
7. Notify the user that the query has been processed and results have been generated
8. Provide guidance on how to recognize whether search results were generated or changed

Rationale and Objective:
DLs have complex navigation structures; therefore BVI users need to explore the page to determine whether the results have been displayed. Applying a short sound indicating search results can be helpful for a BVI user to recognize that search results have been generated in a DL. In many cases, when BVI users modify their search terms in the search box, they are unable to determine whether new results have been generated. Providing an audible progress indicator would help BVI users to predict how long they should wait to get the search results and/or whether search results have been displayed. Search instructions or tips can describe this. A description near the top of the page or search box specifying that search results were generated is a significant marker for a BVI user to recognize that the search results have been generated and are accessible. Applying a heading of “search results” at the top of the results list can facilitate ease of navigation.

Techniques and Methods:
1. Add a heading tag to search results section title
2. Provide skip links and section headers as shortcuts to the search results
3. Use text or sound alerts to indicate the status of the search progress
4. Add text and/or sound alert to indicate that search results were generated or updated
5. Display a notification near the search box indicating the status of the search results
6. Provide help in recognizing when search results are generated
7. Include search terms and the number of results in the Search Results heading. An ARIA live region might be used to speak short text with number of search results returned, for example: “page loaded, 2 results”

**Recommended Features:**
1. Search Results section heading
2. Slip links
3. Section headers
4. Sound/text indicator
5. Status notification
6. Tips and help
7. Search term(s) displayed in results heading

**Examples:**
3. Sound indication for a webpage update (pseudo code).

```html
<script> function playSound() { // code for play routine } </script>
<body onload="playSound()">
<h>Play a sound whenever the webpage is updated</h>
</body>

3. A description for no result – Smithsonian Institution
4.2. A result header
Related Resources:


See Also:
Help-seeking Situations > Difficulty locating specific information, items or features
Help-seeking Situations > Difficulty identifying current status, path, or cursor mode
Difficulty identifying a current location or tracking paths

**Definition:**
A situation that arises from difficulty identifying the current location, monitoring the path to which a user moved, and returning to a previous location within a DL.

**Factor(s):**
- Lack of contextual information
- Complex information presentation
- Unclear labeling of structural elements
- Missing navigation aids
- Broken “back” button

**Guideline or Design Recommendation:**
1. Maintain hierarchical navigation structures consistently across DL pages
2. Articulate the current location and paths through a DL
3. Title each DL page, each section of that page, and landmarks in a meaningful way
4. Allow the user to return to a previously visited locations in a DL
5. Label all navigation elements in a meaningful way

**Rationale and Objective:**
To effectively navigate a DL, users must be able to answer the question “Where am I?” Knowing the current location and other possible navigation paths is critical in information retrieval, and failing to recognize the current location is a common problem in DL navigation. Users should be informed about their current location within a set of related pages. For users of screen readers, a navigation landmark is a quick way to jump to the navigation. A sitemap showing 1) the location of the current page in the DL; 2) the structure of the website (how the pages interconnect; and 3) the path of the navigation, may be helpful. The use of breadcrumbs and/or sitemaps may improve navigability and reduce the number of actions by indicating higher/lower-level pages and the relationship between web pages, as well as the location of the user within the DL’s hierarchy. Breadcrumbs can also show the history of how a user interacted with the DL web page.

**Techniques and Methods:**
1.1. Use consistent navigation aids (navigation menu, sitemap, tabs) on all pages of a DL
1.2. Design navigation aids, such as menu bars and sitemaps, with a hierarchical structure
2.1. Add location indicators such as breadcrumbs on each page
2.2. Provide an accessible sitemap tab on every page, describing the current location within a
DL structure
2.3. Create URLs to match with item titles
3.1./5.1. Provide meaningful labels for page titles, section titles, and landmark titles
4.1. User HTML 5 history API to generate a list of visited pages

**Recommended Features:**
1.1. Consistent navigation aids
1.2.A. Menu bar
1.2.B./2.2. Accessible sitemap
2.1. Breadcrumbs
2.3. Descriptive URLs
3.1./5.1. Page titles, section titles and landmark titles
4.1.A. HTML5 History API (e.g. pushState)
4.1.B. Visited page links

**Examples:**
2.1.A. WAI-ARIA Breadcrumb Example from [https://www.w3.org/TR/wai-aria-practices/examples/breadcrumb/index.html](https://www.w3.org/TR/wai-aria-practices/examples/breadcrumb/index.html)
   <nav aria-label="Breadcrumb" class="breadcrumb">
   
   
   
   
   
   </nav>
2.1.B. Breadcrumbs with Home link in the navigation bar (Europeana, the EU digital platform for cultural heritage, 2018)

![Europeana Collections](image)

2.1.C. Search result link in the breadcrumb (trail)
2.3. Clear URL path structure (e.g. /collection/248/item/31 versus /item?sessionid=9871209387498&token=918123...)
3.1.A./5.1.A. More elaborations added for JAWS’s reading – renaming the link for search results, descriptions added for navigation marks – “Previous/Next Search Result” (invisible, but readable by JAWS), e.g. <span class="secondary_button_icon icon_arrow_w">Previous Search Result</span>

3.1.B./5.1.B. Clear labeling for navigation indicators.

4.1.A. Apply JavaScript HTML5 History APIs, such as history.pushState(), history.back/forward(), and history.go(index), which can be used to move forward and backward, move to a specific page visited.

4.1.B. Avoid 'target="blank"' for links because this can break browser navigation.

Related Resources:


W3C. (2018). WCAG 2.1 2.4.3 Focus Order. Retrieved from https://www.w3.org/TR/WCAG21/#focus-order


**See Also:**
Help-seeking Situations > Difficulty identifying current status, path, or cursor mode
Difficulty identifying items that require downloading before viewing

Definition:
A situation that arises from the difficulty in distinguishing between an item that may be accessed directly in a DL versus an item that is only accessible after downloading.

Factor(s):
- Lack of contextual information
- Unclear labeling

Guideline or Design Recommendation:
1. Indicate which items that must be first downloaded in order to be viewed
2. Provide guidance on how to view items directly from a DL as well as viewing those requiring download
3. Facilitate display of items that require downloading

Rationale and Objective:
Some DL items can be immediately accessed in the browser without downloading, while others need to be downloaded in order to access them. Clear textual descriptions are needed to distinguish which items can be accessed directly. As much as possible, items should be provided in a way that is immediately available, since items that require downloading most often also require additional software to access. Moreover, the time required to download items can be significant, especially if a fast internet connection is not available.

Techniques and Methods:
1.1. Add a clear text indicator if an item needs to be downloaded in order to view it
2.1. Provide the file format designation for each item as part of the metadata
2.2. Provide help tips and instruction regarding how to view/download items in different formats
2.3. Provide information on what software is needed to view items that first require downloading, including links to that software, when available
3.1. Provide filter options to display only items that require downloading before viewing or only items that are directly viewable

Recommended Features:
1.1. Text indicators
2.1. Metadata—file format
2.2. Help tips and instructions
2.3. Software needed
3.1. Filter options

Examples:

3.1. A filter option for online items: DPLA – Smithsonian Institution

Related Resources:


See Also:
Help-seeking Situations > Difficulty identifying current status, path, or cursor mode

**Difficulty navigating through a DL page**

**Definition:**
A situation that arises from difficulty navigating through a DL.

**Factor(s):**
- Lack of the consistent page structure
- Complex Information Presentation

**Guideline or Design Recommendation:**
1. Ensure DL pages have a consistent structure and layout
2. Enable quick and easy ways to navigate from one point to another within a DL
3. Label navigational aids in a meaningful way
4. Provide help regarding how to navigate through a DL

**Rationale and Objective:**
BVI users depend on the text and structural information to understand and navigate a DL page structure. It may be helpful to use meaningful tags — called semantic markup — such as `<blockquote>`, `<p>`, `<em>`, or `<h>` rather than presentation-based HTML such as would be used for sighted users. Also, DL web pages are composed of several regions. Each region should function according to a specific purpose, and the page structure should be designed with a logical flow. HTML 5 and ARIA landmarks for a region can be used for ease of navigation by a screen reader. The page structure should be designed with a logical flow. The main navigation menu should be consistently located in the top area of the page. Each menu category should include specific sections. Some navigations aids, such as breadcrumbs, may help BVI users navigate the site. Links should be named in a meaningful way using labels rather than URLs. Adding internal links to important features, such as search results and metadata for a particular item, may be helpful when those features are far from the top area. Important items and sections should be at the start and/or the end of the web page, which are more recognizable for BVI users. Adding HTML elements, such as skip-to-links that direct the assistive technology to skip over design elements or information not pertinent to the page or the search, might be useful for BVI users.

**Techniques and Methods:**
1.1. Incorporate consistent top menu across a DL, consisting of no more than 10 items and grouping items if there are more than 10
1.2. Position important items at the beginning of a DL page
1.3. Use a single column text layout
2.1. Provide breadcrumbs for navigation
2.2. Provide internal links, headings and landmarks for quick navigation
2.3. Provide a sitemap with hyperlinks to each page
2.4. Use semantic HTML to facilitate navigation
3.1. Provide a label or an alt text for each navigation aid to specify its function
3.2. Use ARIA-labels to provide unique names for screen readers, avoiding the use or ARIA-hidden attributes on an element, which makes elements inaccessible to screen readers and other assistive technologies
3.3. Provide meaningful titles as section headers with heading tags to support navigation
4.1. Provide navigation tips and instruction regarding how to use navigation aids within and across DL pages

**Recommended Features:**
1.1. Navigation bar/menu
1.3. Single column text layout
2.1. Breadcrumbs
2.2.A. Internal links/Skip to Content links
2.2.B. Headings
2.2.C. Landmarks
2.3. Sitemap with hyperlinks
2.4. Named Anchors
3.1./3.3. Meaningful labels
3.2. HTML 5 and ARIA landmarks with names (e.g. `<section>`, role="region" (ARIA role), (e.g `<section>` and ARIA Role role="region")
4.1. Navigation tips and instruction

**Examples:**
2.1.A. Breadcrumb: `<nav aria-label="Breadcrumb" class="breadcrumb"><li><a href="/index.html" aria-current="page">Breadcrumb Example</a></li> </nav>`

For more: https://www.w3.org/TR/wai-aria-practices/
2.1.B. Breadcrumb including results path (Europeana, 2018)
2.2. Invisible links added: “Skip to event details” and “Return to thumbnail” for an item

2.3. Sitemap for BVI users (The Library of Congress, 2018)
3.2. HTML 5 elements and corresponding ARIA roles

<header> – role="banner",
<nav> -role="navigation",
<main> – role="main",
<section>,
<aside> – role="contentinfo", role ="search",
<article>,
<form> – role="form.
e.g. <header role="banner"> <p> logo, etc. here </p> </header>
<nav role="navigation"> <ul> <li> navigation </li> </ul> </nav>
<main role="main"> <p> main content area </p> </main>
<footer role="contentinfo"> <p> copyright, etc. here. </p> </footer>

RELATED RESOURCES


W3C. Supported States and Properties. Retrieved from https://www.w3.org/TR/wai-aria-1.0/states_and_properties#aria-hidden

See Also:
Help-seeking Situations > Difficulty identifying current status, path, or cursor mode

**Difficulty recognizing current status of a DL**

**Definition:**
A situation that arises from the difficulty detecting if a DL page is in the process of loading, or has loaded, or whether a page has refreshed.

**Factor(s):**
- Lack of feedback
- Lack of contextual information
Guideline or Design Recommendation:

1. Ensure that page loading status or page update status is recognizable
2. Reduce page loading time
3. Explain how to detect a change or update in the status of a DL

Rationale and Objective:
Because DLs contain a variety of heterogeneous content and an array of file formats within digital collections, DLs are at risk of presenting content that may extend page-loading time. Applying a short sound to indicate page-loading status allows BVI users to know if the webpage is completely loaded on a real-time basis and alleviates the need for the user to repeatedly check the status bar. Avoiding complex elements and large-size objects in the webpage can be helpful for decreasing the loading time. Audible progress indicators may be helpful when users need to wait until the page load is complete. Alternatively, using a skeleton screen, which includes displaying “mockups” of content elements that utilize minimal textual messages rather than images, allows users to access information more quickly as the items are displayed, even though some contents are not yet completely loaded.

Techniques and Methods:
1.1. Provide clear, unique, and meaningful page title in its title element so it is discernible that the user has activated a new page
1.2. Add an alert role to the title element of each DL page
1.3. Provide sound or text indicators to alert the users the page loading status (in progress, completed, and ready for interaction), possibly an array of sounds, including different pitches related to the different percentages
1.4. Add a sound, preferably including text read aloud, indicating loaded webpage completion
1.5. Alert users about the unavailability of a DL due to network or server connection failures using a simple dialogue box
2.1. Minimize large-size objects (such as embedded video and slideshow widgets) and unoptimized back-end code/sublet/applets that increase page loading time
2.2. Use tools such as PageSpeed Insights to help determine the causes of slow loading time (https://developers.google.com/speed/pagespeed/insights/)
3.1. Offer help tips and instructions to enable/disable auto-refresh of DL pages from web browser settings

Recommended Features:
1.1.A. Unique Page Title
1.1.B. Title element
1.2. Alert role
1.3./1.4.A. Sound/text indicator
1.3./1.4B ARIA-live="assertive” (see example below)
1.5. Simple dialogue box
3.1. Help tips and instruction
Examples:
1.3/1.4. The issue can be eliminated by using ARIA-live="assertive" on the page load/percentage indicator. Note that the “assertive” option is recommended to avoid long recitation of page load percentages. It would be helpful to use ARIA live region to speak “loaded” or similar by reacting to an event that indicates page is loaded.

https://labs.levelaccess.com/index.php/Progress_Bar_with_ARIA_Live_Regions

Related Resources:


See Also:
Help-seeking Situations > Difficulty identifying current status, path, or cursor mode

Difficult recognizing pre-existing text in an input box

Definition:
A situation that arises from the difficulty of recognizing if an input field in the DL is already populated with some data (or text).

Factor(s):
- Lack of Feedback
- Failure to clear search box on focus
- Use of “placeholder” text

Guideline or Design Recommendation:
1. Ensure that presence of pre-existing text in an input field is announced before the user starts interacting with that field
2. Avoid “placeholder” text in form fields
3. Provide instruction related to pre-existing and placeholder text

Rationale and Objective:
Since BVI users are not able to view what is in the input box but rely on auditory cues, they may experience difficulties in recognizing pre-existing text if no cues are provided. This is especially true for “placeholder” text. Many screen readers do not read placeholder text. In situations where there is text remaining from the previous search, BVI users assume that the search box is clear. In addition, DL features that include New Search/Within Search components associated with the search field cause confusion for BVI users who interpret the first as a link to generate a new, empty search field, rather than an associated filtering feature accompanying a prior keyword search. Some users would not assume a text box is empty and would check before typing text; however, it is therefore difficult for BVI users to benefit from text suggestions and/or auto completions.
Techniques and Methods:
1.1. Alert users to the presence of pre-existing text in the input field when the focus is at the start of the input field,
2.1. Provide text suggestions as search tips outside the search box
3.1. Provide search instruction on how to check whether there is pre-existing text in the search box

Recommended Features:
1.1. ARIA live alerts
2.1. Search tips
3.1. Search instruction

Examples:
1.1. When the focus moves on the search box with pre-existing text, a screen-reader will read the pre-existing text.

Related Resources:


SEE ALSO:
Help-seeking Situations > Difficulty identifying current status, path, or cursor mode
Confusion About Multiple Programs, DL Structures, or Search Results Structure

Confusion about digital library structure and browse categories

**Definition:**
A situation that arises from a user's disorientation within the overall structure, layout, or browse categories within a DL.

**Factor(s):**
- System knowledge
- Unclear labeling
- Complex information presentation
- Lack of contextual information
- Unclear instruction

**Guideline or Design Recommendation:**
1. Maintain a logical hierarchical structure for the DL, including page layout, content organization, and browse categories
2. Ensure that structural elements have meaningful labels
3. Explain the structure of the DL and its browse categories and how to interact with its structural elements

**Rationale and Objective:**
For BVI users, a complicated digital library structure may pose a challenge for navigating the DL. They are unable to recognize the structure of the DL, thereby failing to determine the appropriate course of action. Therefore, a simple predictive and hierarchical structure is easily understood. Browse categories are one of the main features for BVI users to interact with a DL, but due to sophisticated information presentation, browse categories may be too complicated for users, and they avoid taking this route.

**Techniques and Methods:**
1.1. Organize a DL from general to specific in its general structure and browsing structure up to a maximum of three nested levels
1.2. Place the most frequently used information at the top of each level of its structure
1.4. Maintain a logical hierarchical heading structure across the DL
1.5. Maintain a consistent and simplified page layout across the DL
1.6. Provide options for facet-based browsing by subjects, creators, etc.
2.1. Assign meaningful and unique titles to individual sections of the DL
2.2. Assign meaningful and unique labels with hyperlinks for each of the browsing categories and subcategories
3.1. Provide instruction (help), which explains the DL structure and browse categories structure

**Recommended Features:**
1.1. General to specific structure
1.2. Frequently used information at the top level
1.3.A. Single-column layout, if possible
1.3.B. Linear structure
1.4. Nested heading structure
1.5. Consistent layout
1.6. Facet-based browsing
2.1. Section titles
2.2. Browse category labels with hyperlinks
3.1. Tutorial/instruction/tips

**Examples:**
1.3.A. Single-column layout can be used in detail pages. Third column layout can be used in: homepage, landing pages, main navigation. Fourth / Tree Fourth column layout can be used in: filters page, detail page with in page navigation. (European Commission, 2018).

1.3.B. A linear structure in the page layout (European Commission, 2018).
As of today roaming charges in the European Union no longer apply. The new EU rules cover data services, voice calls and SMS.

As of today the last roaming charges that citizens were still paying to their mobile operator will disappear when they travel to another EU country. Every existing or new contract that includes roaming services will, by default, become a roam like at home contract.

Eliminating roaming charges is one of the greatest and most tangible successes of the EU. From now on, citizens who travel within the EU will be able to call, text and connect on their mobile devices at the same price as they pay at home.

On this occasion, the President of the European Commission Jean-Claude Juncker, President of the European Parliament Antonio Tajani and Prime Minister of Malta Joseph Muscat, on behalf of the Maltese Presidency of the Council of the European Union underlined in a
March on Milwaukee
Civil Rights History Project

This digital collection presents primary sources from Milwaukee Libraries and the Wisconsin Historical Society that provide a window onto Milwaukee's civil rights history. During the 1960s, community members waged protests, boycotts, and legislative battles against segregation and discriminatory practices in schools, housing, and social clubs. The efforts of these activists and their opponents are vividly documented in the primary sources found here, including photographs, audio-visual film footage, text documents, and oral history interviews. This website also includes educational materials, including a bibliography and timeline, to enhance understanding of the primary sources. The March on Milwaukee Civil Rights History Project seeks to make Milwaukee's place in the national struggle for racial equality more accessible, engaging, and interactive.
2.2.A. Consistency in labeling helps users understand the structure of a DL

Renaming: Search -> Go (consistency)
2.2.B. Section names

About the March on Milwaukee project

The March on Milwaukee Civil Rights History Project supports understanding of the struggle for racial equality by helping users discover primary sources and other educational materials from the collections of the University of Wisconsin-Milwaukee Libraries and the Wisconsin Historical Society. The digital collection includes the selected papers of individuals representing a variety of positions on the civil rights issue, photographs, unedited footage from the WTMJ-TV news film archives, and oral history interviews capturing the recollections and perspectives of individuals who participated in the movement. The collection also includes contextual materials, such as brief explanations of relevant people, places, events, and organizations; a timeline; a bibliography of relevant published sources; and maps highlighting important locations.

The materials reproduced in this digital collection are only a selection of the primary sources documenting Milwaukee's civil rights history held by the University of Wisconsin-Milwaukee Libraries and the Wisconsin Historical Society. Researchers should not assume a one-to-one correspondence between digital folders and their counterparts in physical collections.

Project staff selected the primary sources included in this collection for their completeness, legibility, and historical importance. To the best of our knowledge, we included only materials for which we hold copyright, for which we have secured the permission of other copyright holders, or that we have identified as copyright orphaned works. We welcome additional information concerning the copyright status of sources reproduced in this collection.

About the March on Milwaukee digital library structure

2.2.C. Link and Date added.
3.1.A. Brief instruction added to explain the browse structure and apply section header labels so that the instruction can also be skipped by screen reader.

3.1.B. Description added for Timeline/Key terms
Related Resources:


See also:
Help-seeking Situations > Confusion about multiple programs, DL structures, or search results structure

### Difficulty understanding results structure or layout

**Definition:**
A situation that arises from the difficulty understanding the overall structure or layout of the search results displayed by the DL.

**Factor(s):**
- Lack of DL system knowledge
- Complex information presentation
- Unclear labeling (tabs not properly labeled)
- Lack of contextual information

**Guideline or Design Recommendation:**
1. Maintain a simple and consistent logical structure and layout for presenting search results in the DL
2. Ensure that structural elements of search results have meaningful labels
3. Explain the structure and layout of search results presented, as well as how to interact with the structural elements
4. Enable users to control their search results layouts

**Rationale and Objective:**
Displaying search results in a way that is clear, well-labeled, and consistent is key to helping users understand and navigate them. Results structure and layout may be complicated if the DL web pages include a variety type of structures, such as 1) a visual gallery, 2) mapped results on a map, 3) displaying related or similarly-named items, 4) clustering results, 5) displaying mixed types of results, etc. The results structure should be simplified, including minimal elements and understandable metadata. The results section should be properly labeled to designate the search results region. Each result title should be formatted with the header tag (<h#>) to allow BVI users to quickly navigate through the results list by titles. A summary of results might be helpful for BVI users to recognize the results, such as the number of results, results layout, and/or tips for how to reorganize the results. Clear instruction should be provided to inform on how to use and modify the results layout.

Techniques and Methods:
1.1. Format results in a table/list format
1.2. Display each result item in a concise format for rapid scanning
1.3. Provide an option for result layout display
1.4. Design visual layouts that can be converted into the textual layout for BVI users (e.g. web pages including visual contents that can be converted into webpages including only text)
2.1. Provide clear search results section header
2.2. Label results titles using headers
3.1. Provide instructions regarding the result structure/layout
4.1. Allow users to switch results layouts through detailed/simple layouts, or facets (e.g., content type, date/era, region, genre, etc.).

Recommended Features:
1.1. Simple results structure
1.3. Result layout options (list/grid)
1.4. Text only version.
2.1./2.2. Result title with heading tags. <h2>Search Result # items found</h2>
3.1. Context-sensitive instructions/tips

Examples:
1.4. Textual description – text view (Hathitrust, 2018)
Related Resources:
Hathitrust (2018). Retrieved from https://babel.hathitrust.org/cgi/pt?id=mdp.39015073480538;view=1up;seq=1

See also:
Help-seeking Situations > Confusion about multiple programs, DL structures, or search results structure
Avoidance tendency

Avoidance of format, approach, or features

Definition:
A situation that arises from avoidance of a specific file format (image), a certain approach to retrieve information (e.g., browsing a collection), or a specific DL feature (e.g., advanced/dynamic/embedded feature)

Factor(s):
- Unclear labeling
- Lack of alt text
- Previous experience
- Lack of retrieval knowledge
- Lack of system knowledge

Guideline or Design Recommendation:
1. Offer assistance in using visual items, browsing collections, and interacting with advanced/dynamic/embedded features
2. Provide explanations on using visual items, browsing collections, and interacting with advanced/dynamic/embedded features using keyboard commands

Rationale and Objective:
Image items, browsing approach, advanced search, and dynamic/embedded features are visually oriented by DL design; so BVI users find these features difficult and complex to use. Although advanced search features are relatively popular among sighted users, those features could be harder for blind DL users to use if they do not have any context about them or they find those features to be overly complex. Instructions could help blind DL users understand how to manipulate and activate these features without sight. Purpose and operation of browse categories, advanced search features, and dynamic/embedded DL functions may not be obvious without sight, thereby prompting BVI users to avoid them. Using meaningful labels for such features could aid their detection by listening and clearly convey their purpose/function, thereby helping the users.

Techniques and Methods:
1.1. Provide an invisible link indicating the availability of a transcript, description, or summary for each of the visual items and how to access it
1.2. Provide an overview of how the browse categories are classified at the beginning the browse section
1.3. Provide clear labels to specify browse categories and search/dynamic/embedded features
1.4. Provide tips on what the advanced (utility of the components)/dynamic (the change of features)/embedded feature (availability of the feature) on keyboard focus is and how to use it
2.1. Provide clear information, user tutorials, and demonstrations on how to use visual items, locate and understand browse categories, and advanced/dynamic/embedded features using keyboard commands

**Recommended Features:**
1.1. Invisible links
1.2. Overview of the browse categories
1.3. Clear labels
1.4. Help tips
2.1. Tutorials and demonstrations

**Examples**

2.1.A. Advanced search tutorials (Hathitrust, 2018)
2.1.B. Instruction for choosing auto-completion or not in Chrome.

2.1.C. Supplement search jargon (e.g. Boolean/Proximity search) with simplified definitions

https://lucene.apache.org/core/2_9_4/parsers/syntax.html
https://support.google.com/websearch/answer/2466433?hl=en
Related resources:

See also:
Help-seeking Situations > Difficulty accessing information
Help-seeking Situations > Confusion about multiple programs and DL structures
Help-seeking Situations > Difficulty with help
Difficulty Constructing or Refining Searches

Difficulty constructing search queries

Definition:
A situation that arises from a difficulty formulating a search statement.

Factor(s):
- Unclear Instruction
- Lack of Feedback
- Lack of System Knowledge
- Lack of Domain Knowledge
- Lack of Retrieval Knowledge

Guideline or Design Recommendation:
1. Explain how to construct a search statement and select search terms for effectively formulating a DL search
2. Offer assistance during the process of formulating a search statement
3. Indicate errors as they occur when entering search statements

Rationale and Objective:
Users sometimes have difficulty constructing search queries in DLs and may apply simple keywords or a lengthy query, as they are not certain as to the level of specificity that is most effective when searching a DL. Auto-completion and suggestions are helpful to identify more related or relevant terminology. Spelling errors are another type of mistake in construction of search queries which can be corrected by auto-completion and/or related text suggestions. The presence of auto-suggestions should be recognizable by BVI users, and the user should be able to select the suggested terms using the keyboard. ARIA code, such as “aria-live” can be used to inform BVI users about “list status” changes as BVI users type in the input field. In many DLs, the search engine works based on a Boolean search algorithm where search terms should adhere to a controlled vocabulary; therefore, users may not know which terms are acceptable. Showing popular terms and/or controlled vocabulary terms occurring in the digital collection may be helpful in reducing instances of this problem.

Techniques and Methods:
1.1 Provide general help information in general help page
1.2/2.1. Provide context-sensitive help tips (e.g. search tips, auto suggestion tips) for search
statement construction
2.2. Implement auto-suggestions for related terms derived from a controlled vocabulary in the search box. There are several open source algorithms that can be applied. The performance of the algorithm for auto-suggestions is critical.
2.3. Implement invisible search suggestions
2.4. Use ARIA markup on the input field to enable the selection of suggested terms
3.1. Present spelling suggestions based on a dictionary when spelling errors are detected
3.2. Implement appropriate algorithms to show spelling suggestions directly in the search input field
3.3. Provide text and sound alerts to indicate the presence of errors and suggested terms in the search box

**Recommended Features:**

1.1. General help
1.2/2.1 Context sensitive help
2.2.A. Auto-suggestion for related terms
2.2.B. Search box with related terms
2.3. Invisible search suggestions
2.4. ARIA elements (e.g. aria-live, aria-active descendant attribute, role, aria-autocomplete, aria-owns, aria-label, aria-described by, aria-selected)
3.1.A Auto-suggestion for spelling (e.g. Did you mean...?)
3.1.B Search box spelling suggestions
3.3. Text and sound alerts

**Examples:**

2.2./2.3./2.4. aria-autocomplete="both"

Autocompletion:

```
<input aria-describedby="instruction">
<div id="instruction" aria-live="assertive" style="display:none;">....describe the instruction for autocomplete such as use up and down key to review suggestions</div>
<li role="option" aria-selected="false">apple</li>
role="listbox"
role="combobox"
aria-active descendant="suggestion1"
aria-live="assertive"
```
Related Resources:

WCAG 2.0 Guideline 3.3 Input assistance. Retrieved from https://www.w3.org/TR/WCAG20/#minimize-error


See also:
Help-seeking Situations > Difficulty constructing or refining searches
Difficulty refining search queries

Definition:
A situation that arises from a difficulty modifying a search statement from the prior search, particularly narrowing or broadening a search statement.

Factor(s):
- Lack of Feedback
- Lack of Domain knowledge

Guideline or Design Recommendation:
1. Explain how to refine the most recent search statement, specifically narrowing or broadening a search statement
2. Offer assistance in refining a search, particularly narrowing or broadening a search statement
3. Rationale and Objective:
Because search terms associated with controlled vocabulary might generate more relevant results in a DL search, search queries may require reformulation using controlled vocabulary terms rather than common search terms. Auto-suggestions are a helpful way for users to identify controlled vocabulary terms and construct more effective search queries. The presence of auto-suggestions should be recognized by BVI users and activated through the use of a keyboard. In case of “no results,” auto-suggestions might provide additional related or relevant terms to support users. Narrowing down the search results is a step that follows the display of search results, where the user attempts to reduce the number of available items. There are many approaches for narrowing down results which should be provided by the DL. User tags might be more familiar to some users; such tags can be used to display related results and support a narrowing-down of the search results. Broadening is the opposite process of narrowing results. Broadening is a less common activity than narrowing, due to the already overwhelming quantity of results that typically appear in DL search results lists. One important consideration a DL should account for is a hierarchical category design. Subject mapping based on hierarchical relationships might be helpful to broaden search scopes. User tags may also be used to display related results and thus broaden the search. Suggesting related search queries might help the user to obtain a larger quantity of search results.

Techniques and Methods:
1.1. Provide general help information about query reformulation on a general help page
1.1/2.1. Provide context-sensitive help tips (e.g. search tips) for search statement reformulation
2.2. Incorporate controlled vocabularies and user tags in the auto-suggestions provided
2.3. Display lists of controlled vocabulary terms and other related terms used for indexing
objects in the DL
2.4. Provide a subject map showing hierarchical relationship between subjects/categories
2.5. Provide breadcrumbs to allow broadening the search results
2.6. Provide related search features (e.g. find documents like this one)
2.7. Provide intuitive and accessible sorting features to narrow down search results by various types of facets or user selected terms
2.8. Provide options to narrow search results by various types of facets, aspects, or features used to classify information, e.g. subject, date, location, coverage, etc.
2.9. Provide “within search” features to narrow down the results

**Recommended Features:**
1.1. General help
1.1/2.1. Context-sensitive help tips
2.2. User tags
2.2/2.3. Controlled vocabularies
2.3. Related terms
2.4. Subject map description
2.5. Breadcrumbs
2.6. Related search feature
2.7. Sorting features
2.8. Facet-based search
2.9. Search within feature

**Examples**
2.2. aria-autocomplete="both"
role="listbox"
role="combobox"
aria-activedescendant="suggestion1"
aria-live="assertive"

Interaction in the search box: Add text showing whether there is pre-existing text or not.
Related Resources:


WCAG 2.0 Guideline 3.3 Input assistance. (2008). Retrieved from https://www.w3.org/TR/WCAG20/#minimize-error

See also: Help-seeking Situations > Difficulty constructing or refining search
Difficulty tracking searches

Definition:
A situation that arises from difficulty monitoring the progression of search terms used in a series of past searches in a DL.

Factor(s):
- Inadequate features for users to track past search activities

Guideline or Design Recommendation:
1. Make search terms from previous queries available on request for reuse and combination
2. Enable refining of the most recent query
3. Explain how to monitor the progressions of previously used search terms

Rationale and Objective:
For users who tend to use the same search terms more than once, retaining the search history can save time on subsequent searches. Lists of past auto-suggestions and keyword history help users to find a relevant term or phrase by trying to predict it. Display the recently visited links/URLs can be useful for monitoring searches, too.

Techniques and Methods:
1.1. Save search terms used in a session
1.2. Provide search history features to allow users to display their previous queries upon request
2.1. Keep the most recent query in the search box
2.2. Add a “clear search” feature next to the search box
3.1. Provide help tips and explanation for how to monitor the progression of search terms

Recommended Features:
1.1. Search terms saving feature
1.2. Search history feature that retains search terms for a single session
2.1. Pre-populated search box
2.2. Clear search feature
3.1. Help tips and instruction

Examples:
1.1. Previous search terms in the search box (Europeana, 2018)
1.2. Search history (Smithsonian Institution, 2018)

Related Resources:


See Also:
Help-seeking Situations > Difficulty constructing or refining searches
Difficulty with Compatibility Issues

Situations related to compatibility issues

Definition:
A situation that arises from the difficulty accessing/navigating/locating DL contents and components across diverse DL platforms, screen-reader software, Web browser applications, and operating systems.

Factor(s):

- Lack of system feedback
- Inadequate system knowledge
- Inadequate assistive technology knowledge
- Unclear instruction

Guideline or Design Recommendation:

1. Ensure DL maintains accessibility, navigability, and searchability across diverse DL platforms, screen-reader software, Web browser applications, and operating systems
2. Ensure that DL accessibility across diverse platforms is also maintained over time despite platform updates and modifications
3. Inform users about the compatibility of browsers, helper applications, and screen-readers to access a DL
4. Indicate when a user focus moves in or out of a DL

Rationale and Objective:
Complicated DL structure and incompatibility between web browsers, applications, and screen readers are a barrier to accessing information in the DL web pages. In addition, BVI users may become confused by features, such as dialogue boxes, and be unable to distinguish their location within the web component/application. It is important to maintain consistency and ensure predictable system responses. Some HTML/ARIA standards are not supported by browsers, web applications, and screen readers. To follow pervasive standards is practical, but additional work may be required to ensure functionality.

Techniques and Methods:
1.1. Test current DL platform with recommended applications such as screen-reader software, including upcoming releases, when available
1.2. Test current DL platform with common browsers and operating systems
1.3. Conduct user testing with pilot collections and then modify or enhance features and capabilities that are found to be problematic before DL launch
2.1. Schedule regular, recurring accessibility and usability testing of a DL with real users, including diverse screen-reader software, Web browser applications, and operating systems

3.1. Provide recommendations of preferred browsers that are most compatible with a given DL system

3.2. Provide recommendations for which helper applications, screen-readers, and assistive platforms are compatible and supported for a given DL system

4.1. Provide alternative text or sound alerts to notify the user when the focus moves in or out of the DL

**Recommended Features:**

3.1 Recommended compatible browsers and applications

3.2. Instructions/tips

4.1. Text and sound tips

**Examples:**

1.1./1.2./3.1./3.2. Screen reader compatibility for some of the HTML codes (e.g. `<span>` and `<br>`) are read as “blank” in Internet Explorer in different browsers.

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*JAWS* reads differently according to browsers.

* Some screen readers may not work in a specific browser. For example, in Microsoft Edge, JAWS is not working well. Headings and labels were not read (recognized) by JAWS. H (for heading), tab, and arrow keys are not working correctly. The overall description for the web page structure is not provided by JAWS, either.

**Related Resources:**


See Also:
Help-seeking Situations > Difficulty with compatibility issues
Help-seeking Situations > Confusion about multiple programs and structures
Glossary

A
Access pathway
Navigation features that indicate the ways an item can be accessed.

Alt attribute
An HTML attribute that provides information in an alternative format for an image on a webpage using a text display. It is used when a user cannot view an image and wants to read the text alternative instead.

Alternative Text (Alt Text)
A word or phrase (typically less than 100 characters long) used in the Alt Attribute of an image item or graphical interface element that describes its content or function in the context.

ARIA
The acronym for Accessible Rich Internet Applications. It is a set of attributes that define ways to make web content and web applications more accessible to people with disabilities.

B
Browsing structure
A function or feature that organizes the digital collections in a digital library for easier skimming.

BVI
The acronym for Blind and Visually Impaired, and it refers to BVI users who rely on screen readers to understand DL content.

C
Caption
A text transcription for the audio track of a movie or video, and it synchronizes with the audio of a video. Captions are designed to ensure the viewer can understand all of the essential audio in the video including not only the spoken audio but also the non-speech sounds that are essential to the understanding of the video and are normally shown in brackets.

Color contrast
The difference in luminance between two colors (adjacent or overlaid).

Content change indicator
A cue, such as a sound alert or notification that informs or provides awareness to BVI users when dynamic content is changing within a page without a user’s input.
**Context-sensitive help**
A help function that delivers immediate assistance to the user without the user having to leave the current context they are working in.

**CSS**
The acronym for Cascading Style Sheets. It is used to format webpage layouts by defining styles for text, tables, and other elements in a webpage’s HTML.

**D**
_Description_
It is one of the metadata elements which offer text summary for a digital object.

**DL(s)**
The acronym for Digital Library or Digital Libraries

**Dynamic Features**
Features of a digital library, such as a play button, a Flash player, or a banner, change their content with or without a user’s input.

**E**

**F**
_Functional description_
A description that explains a function and its role (what it is, how it works) in a digital library.

**G**

**H**
*Handwritten Text Recognition (HTR)*
Technology that transcribes handwritten text contained in scanned images into digital text.

*High-quality recognition*
A high resolution setting for image scanning and text recognition. For digital images, the recommended scan level is at least 400 dpi for high quality.

**I**
*Image description*
A text statement that provides detailed description of an image, and it is one element of the metadata.

*Interactive audio*
A sound technology that creates audio in real-time in reaction to a user’s action or changes in the digital environment.
**Intuitive label**
A label of the feature, based on common knowledge or a given title name, which is as close to the targeted user’s expectation as possible.

**J**
**JAWS**
The acronym for Job Access with Speech (Screen Reader program). One of the screen readers for blind and visually impaired users.

**K**
**Keyboard accessible elements**
All the elements and functions in a digital library, such as clickable icons and buttons, which are navigable and operable by keyboard without any interruption.

**L**
**Location Indicators**
Indicators that provide the exact location or position within a digital library that a user is currently interacting with.

**Looped-animation indicator**
An audio indicator for when a user interacts with an animation that repeats images seamlessly, such as animated GIFs or banners.

**M**
**Metadata**
It is commonly called as ‘data about data’ that includes structured data to describe and organize resources in the digital environment and enables users to discover and use the content of digital libraries.

**N**
**Navigation indicators**
An indicator that shows where a user is currently located in a digital library and which sections they have browsed through.

**O**
**OCR**
The acronym for Optical Character Recognition. It is a method to convert physical text, such as printed text or handwritten text, to digital text by scanning physical documents.
Online item filter
A filter that shows whether an item can be available online or only offline, or both. It can also provide file formats, such as HTML, Word, or PDF.

Placeholder text
A character, word or sentence that temporarily fills the space in a box until it is ready to be used.

Pre-existing text
Text, such as a placeholder text or a previous search term input by the user, which is already listed in a digital library’s input box or search box.

Screen reader
A software program that reads textual information through synthesized speech, and it offers specialized keyboard commands to operate a computer interface.

Scanned image
A digitized version of an image created using a scanning device or a digital camera

Search Instruction/search tips
An explanation of how to use search tools or functions in a digital library.

Search jargon explanation
Explanation for specialized language, vocabulary, or terms that are used for search functions or search methods

Search term display
A populated list of suggested search terms that automatically appear in a search box after a user enters a query in a digital library.

Skip-link for visual items
A feature that allows a user to jump to visual items, such as images.

Snippet/summary
A brief description that summarizes a list of items, search results, or collections.
**Sorting options**
Arranging or ordering information or data by certain criteria, such as time or publication year.

**Speech recognition technique**
A technique that converts an analog speech signal to a digital sequence of words using computer programs.

**Static content**
Content that can be delivered to an end user without having to be generated, modified, or processed.

**Structure description**
A statement for providing information on a current interface framework and layout of a digital library.

**Subtitle**
A text description displays at the bottom of a video screen that translates or transcribes the audio dialogue, and it synchronizes with the audio of a video. It does not include non-speech elements.

**Transcript**
A text script that is derived from audio tracks or scanned documents.

**WCAG**
The acronym for Web Content Accessibility Guidelines. These are guidelines created by W3C to increase accessibility in the web environment for users who have had difficulty accessing information resources on the web.
References
Docparser. (n.d.). What is OCR and What is it used for?. Retrieved from https://docparser.com/blog/what-is-ocr/


