# Working paper: Guidelines for producing accessible research outputs

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February 2018

## **Introduction**

The Disability Human Rights Research Network (DHRRN) was established in 2016 by the University of Melbourne and partners around the globe. Its purpose is to provide a platform for disability rights researchers to link with key human rights organisations and with the voice of persons with disabilities, spurring research that is directly responsive to rights violations discovered by human rights bodies. It will also ensure that researchers listen to the voices of persons with disabilities through direct interaction and collaboration with organisations led by them (Disabled Persons’ Organisations).

The DHRRN produces protocols and information papers designed to stimulate and support disability human rights research that is consistent with the goals of the disability rights movement and the wider disability community. These include a forthcoming Protocol for Disability Rights and Justice Research, which sets out key ethical principles for conducting disability human rights research that is guided and led by the voices of the disability community and contributes to the realization of the human rights of persons with disabilities.

This working paper develops one element of that Protocol by providing guidance for researchers on how to make written and recorded research outputs (including print, electronic, web-based and audio-visual materials) accessible to persons with disabilities. Future working papers will address other elements of the Protocol, such as principles for ensuring accessibility in the research process.

## **The need for comprehensive accessibility guidelines**

The United Nations Committee on the Rights of Persons with Disabilities (2014) explains that accessibility is a key principle for the realisation of the human rights of persons with disability:

“Accessibility is a precondition for persons with disabilities to live independently and participate fully and equally in society. Without access to the physical environment, to transportation, to information and communication, including information and communications technologies and systems, and to other facilities and services open or provided to the public, persons with disabilities would not have equal opportunities for participation in their respective societies.”[[1]](#footnote-1)

There are many resources available to guide the development of accessible information for persons with disabilities. Disabled Persons’ Organizations, governments and other bodies have produced guidelines and checklists on how to make information more accessible for particular audiences. However, there are few high-level guidelines or checklists that address all types of disability and the accessibility requirements associated with them.

This paper draws on a range of guidelines to provide a checklist and overview of accessible ways to present research outputs for different audiences, with the ultimate aim of universal accessibility. The table lists some of the more comprehensive resources available for making information accessible to particular groups.

## **A checklist for making research outputs accessible**

| **Potential Audience** | **Accessibility issues** | **Accessible ways to present information** |
| --- | --- | --- |
| Blind persons and persons with vision impairment | Hard copy documents and visual information presented in videos, pictures or graphs may be inaccessible to blind persons and persons with vision impairment.  Persons with vision impairment may be able to access some visual information, but may experience specific issues such as difficulty discriminating colours, difficulty with bright content, and difficulty with small or unclear font.[[2]](#footnote-2) | **Print:** The American Council of the Blind provides [comprehensive advice on making documents accessible to blind persons and persons with vision impairment](http://www.sabeusa.org/wp-content/uploads/2014/02/A-Guide-to-Making-Documents-Accessible-to-People-Who-are-Blind-or-Visually-Impaired.pdf). Its guide addresses how to make both print and electronic information accessible.  Blind persons require alternative formats to hard copy printed information. [Vision Australia suggests the following alternatives](http://www.visionaustralia.org/business-and-professionals/print-accessibility-services/alternate-format-production):   * Audio (CDA, DAISY, and audio files such as mp3 files for websites); * Large print in accordance with the guidelines established by the Round Table for the Print Disabled; * Braille; * Tactile photographs, diagrams and graphs, and bold print graphics; * Electronic text (such as Word, PDF or EPUB e-book format).   [Guidelines for implementing each format](http://printdisability.org/guidelines/) are available on the Round Table on Information Access for People with Print Disabilities website.  **Electronic and web:** Programs that read electronic and web content aloud, known as screen readers, can make written documents accessible to blind persons and persons with vision impairment. Word and PDF documents are often formatted incorrectly for screen readers. As research is often presented in PDF documents to avoid plagiarism, ensuring that these files are compatible with the assistive technologies is particularly important.  Adobe provides [information on creating accessible PDFs](https://helpx.adobe.com/acrobat/using/create-verify-pdf-accessibility.html) and checking the accessibility of existing PDFs on its website. The company PDF Accessible provides [detailed information in English and French about producing accessible PDF documents](http://www.pdfaccessible.com/en/).  The Microsoft website provides [guidance on producing accessible Word, Excel and Powerpoint documents](https://support.office.com/en-us/article/Overview-Creating-accessible-Office-files-868ecfcd-4f00-4224-b881-a65537a7c155?CorrelationId=c8d82730-b257-4fca-8ae7-dcba048b7279&ui=en-US&rs=en-US&ad=US&ocmsassetID=HA102671874).  Disability studies scholars Catherine Kudlick, Margaret Price, Lennard Davis, Jay Dolmage and Melissa Holquist have [published a template letter that contains useful guidance for making academic publications accessible](https://www.insidehighered.com/news/2015/06/16/disability-studies-scholars-present-accessibility-guidelines).  The World Wide Web Consortium (W3C), an international community, has produced [a global standard for web content accessibility](https://www.w3.org/TR/WCAG20/) called the Web Content Accessibility Guidelines, [including detailed guidance and examples](https://www.w3.org/WAI/WCAG20/quickref/).  WebAIM offers [a free tool for assessing the accessibility of web content](http://wave.webaim.org/), the Web Accessibility Evaluation Tool.  **Visual:** Visual content in electronic formats such as videos, images or diagrams may be inaccessible. For images, a description should accompany the image (for example, a detailed title or ‘alt text’ in an online image).  For videos, audio description can be used to describe the visual-only aspects of the content. The Practical Ecommerce website provides [more information about audio description and lists some accessible video players](http://www.practicalecommerce.com/articles/97439-How-to-Make-Videos-Accessible-for-Blind-Disabled-Users). |
| Persons with atypical colour perception | Persons with atypical colour perception may have difficulty discriminating between colours in images and colour-coded graphs and charts.[[3]](#footnote-3) | **Print:** Information conveyed in images, charts and graphs that use colour to communicate something important should also be described in writing. There should be a high level of contrast (brightness and hue) between text and background colours.  **Electronic and web:** The Web Content Accessibility Guidelines specify that [colour should not be the only visual method of conveying important information](https://www.w3.org/WAI/WCAG20/quickref/) in web content.  Masataka Okabe and Kei Ito provide [detailed guidance on ‘Colour Universal Design’](http://jfly.iam.u-tokyo.ac.jp/color/), including examples relevant to academic publications.  It is also useful to test the colour contrast of websites and other electronic documents to ensure that they are accessible to a wide range of people. The [Colour Contrast Analyser](http://www.paciellogroup.com/resources/contrastanalyser/) is available for download for this purpose. |
| Deaf persons and hard of hearing persons | Information presented in audio or audio-visual formats such as videos, speeches or music may be inaccessible to deaf persons or hard of hearing persons.  Some deaf persons or hard of hearing persons may be able to access some audio material, but may not be able to discriminate certain sounds or may frequencies, or may have difficulty with material that is of low volume or quality, that is delivered too quicly, or that is accompanied by background noise.[[4]](#footnote-4) | **Video and audio:** Videos, audio recordings, speeches and music can be made accessible to deaf persons and hard of hearing persons through synchronized captions or sign translation. Minimising background noise and ensuring that sound quality is high will also increase the accessibility of video and audio content.  The Web Content Accessibility Guidelines reference guide provides [information on making audio/visual content accessible](https://www.w3.org/WAI/WCAG20/quickref/).  Norman Peckham (Boise State University) and the University of Washington provide [lists of captioning tools](http://edtech2.boisestate.edu/normanpeckham/502/accessibility.html) and [resources to use when posting audio or visual content on the web](http://www.washington.edu/accessibility/videos/).  Media Access Australia also recommends [providing users with a transcript of all audio/video content](http://www.mediaaccess.org.au/practical-web-accessibility/online-audio-and-video/transcription). |
| Deaf-blind persons | Deaf-blind persons have varying accessibility requirements that may differ from those of blind persons or deaf persons. For example, a blind person who is hard of hearing will have different access needs to a deaf person who has low vision.[[5]](#footnote-5) | **Print, electronic, web, video and audio:** There are few existing guidelines on making written or audio content accessible to deaf-blind persons. DeafBlind Australia provides [a brief set of interpreter guidelines](http://www.deafblind.org.au/interpreter-guidelines.asp) on its website. The guidelines described above in regard to accessibility for deaf persons and blind persons may address the accessibility needs of some deaf-blind persons.  Deafblind Australia advises that making information available in Braille, electronic, and sign language interpreted formats are key to making information accessible to deaf-blind persons.  The W3C Working Group [suggests multiple options for making audio-visual material accessible to deaf-blind persons](https://www.w3.org/TR/media-accessibility-reqs/#auditory-visual-deaf-blind):   * Captions that can be altered (such as enlarged or changed to different colours and contrasts); * Audio description of visual content; * Transcripts of audio-visual content. |
| Persons with physical disability | Persons with physical disability may have difficulty using a keyboard or a mouse or holding and turning pages of a hard copy document.[[6]](#footnote-6) | **Print:** Print information should be provided in multiple electronic formats to ensure that documents are accessible for people who cannot access hard copy documents.  **Electronic and web:** The W3C Web Accessibility Initiative provides [information on making web and electronic content accessible to users with physical disability](https://www.w3.org/WAI/intro/people-use-web/diversity#physical). Key requirements are that:   * documents and websites can be navigated using only a keyboard; * non-text content (such as buttons and images) is accompanied by text alternatives; and * time limits (such as automatically scrolling text and expiring pages) are extendable or avoided.   **Audio/visual:** The [Web Accessibility Initiative](https://www.w3.org/TR/media-accessibility-reqs/) states that media players must be useable with only a keyboard, including access to all player controls and methods for selecting alternative content. |
| Persons with cognitive disability, including persons who have actual or perceived mental health disability, psychosocial disability, intellectual disability, developmental disability, dementia, Alzheimer’s, acquired brain injury, and others. | Many documents use complicated language, busy layout, and a lot of detail, making them inaccessible to some persons with cognitive disability.[[7]](#footnote-7) | **Print and electronic:** Easy-to-read formats can make print information accessible to persons with cognitive disability. Easy-to-read documents convey information using simple words and short sentences. Pictures and photographs can also be used to reinforce the meaning of short sentences.  The International Federation of Library Associations and Institutions has published [guidelines for preparing easy-to-read documents](https://www.ifla.org/publications/guidelines-for-easy-to-read-materials). Scope Australia has also produced [guidelines on producing easy-to-read documents in English](http://www.scopeaust.org.au/service/accessible-information/) (also known as Easy English). Consultants can provide expert drafting and testing services for producing easy-to-read documents.  Some people may prefer to get information aurally, so research teams should also consider creating audio-visual versions of research outputs or delivering accessible presentations to interested audiences.  **Web:** The W3 Web Accessibility Initiative provides [information on how to make web content accessible for persons with cognitive disability](https://www.w3.org/WAI/intro/people-use-web/diversity#cognitive). This includes:   * ensuring that web pages are not visually cluttered or complex to navigate; * avoiding long sentences and large paragraphs; and * using images to convey information.   WebAIM lists [a range of additional suggestions for improving the accessibility of content for persons with cognitive disability](http://webaim.org/articles/cognitive/cognitive_too_little/#recommendations).  The National Center on Disability and Access to Education (USA) also provides [guidance on accessibility and usability of the web for persons with cognitive disability](http://ncdae.org/resources/articles/cognitive/).  **Audio/visual:** providing captions on video content, and ensuring that written content in videos is also delivered aurally, can enhance accessibility for people who benefit from both hearing and reading content.[[8]](#footnote-8) |

## **Planning for ‘universal design’ of research outputs**

Research outputs will not be universally accessible unless all audiences are accounted for. Researchers are encouraged to use the above guidance as part of a ‘universal design’ process. According to the United Nations Convention on the Rights of Persons with Disabilities, universal design refers to ‘the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design’.[[9]](#footnote-9) In this regard, researchers are encouraged to use the following universal design process, adapted from the process proposed by Sheryl Burgstahler (2015):[[10]](#footnote-10)

1. Identify the application: identify the research output that you want to develop;
2. Define the universe: identify your audience (all people who might use the output) and identify their diverse characteristics and requirements;
3. Involve consumers: involve your audience in all phases of the process (developing, implementing and evaluating);
4. Adopt guidelines or standards: identify or create guidelines for universal design and integrate them with other relevant guidelines or standards applying to the research process;
5. Apply guidelines or standards: apply the guidelines or standards to designing the research output;
6. Plan for accommodations: develop a plan and process for fulfilling accommodation requests from people for whom the research output is not accessible (this recognises that universal design is an ongoing process and ensures flexibility and adaptability to individuals’ circumstances);
7. Train and support: train and support stakeholders (such as research teams and other staff) in the process and delivery of accessible research outputs;
8. Evaluate: invite and facilitate feedback on research outputs from users, evaluate the research outputs with diverse user groups (and modify the output based on feedback) and include measures of accessibility and universal design in research evaluations.

## **Conclusion**

This working paper provides an overview of what is required to make print, electronic, web-based and audio-visual research outputs available to all persons with disabilities. The obligation to make research outcomes accessible extends to other elements of the dissemination process. For example, researchers with disability must have equal access to the workplace, interviews and other interactions with research participants should be conducted in accessible venues and with accessible communication, and events to celebrate or disseminate research outcomes must be fully accessible.

Ideally, all research outcomes – regardless of whether their subject matter relates to disability – should be accessible to the widest possible audience. This means that research accessibility must be treated as a standard element of all research, and rules for research funding should require researchers to develop accessibility strategies and to include accessibility costs in research budgets.

If you have any comments, feedback or suggestions in relation to this document, please contact Yvette Maker via [maker.y@unimelb.edu.au](mailto:maker.y@unimelb.edu.au).

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