Accessibility Testing of OverDrive

Conducted by the National Network for Equitable Library Service (NNELS)

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About NNELS:

The National Network for Equitable Library Service (NNELS) is a digital public library of ebooks for Canadians with print disabilities, and an advocate for an accessible and equitable reading ecosystem for Canadians with print disabilities. NNELS supports principles of openness, inclusion, and choice. NNELS is hosted by the BC Libraries Cooperative, a community service not-for-profit cooperative and a national leader in information and technology services.

Our team of Accessibility Testers has expert knowledge in the areas of accessibility testing, analysis, software development, and leadership. The team works to educate and advise publishers, technology vendors, and public libraries on best practices for accessibility. Our testers have lived experience with a range of print disabilities, including blindness, low vision, and learning disabilities.

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Summary

Readers with print disabilities utilize a variety of assistive technologies to access information through their phones, tablets and computers, including screen readers and screen magnification software. For this report, our team of testers evaluated the accessibility of the OverDrive mobile apps, as well as the platform in desktop computers, for people with print disabilities. OverDrive also has an app called Libby, which is evaluated in another report titled "Accessibility Testing of Libby App for Overdrive". The results show that the OverDrive apps have several accessibility issues that constitute barriers to accessing ebook material.

This report presents the results of the accessibility assessment of the OverDrive app in iOS and Android, and of the platform in desktop computers (Windows and Mac apps, as well as the website in computer browsers.) It highlights the accessibility barriers of the OverDrive apps and website, explains the barriers that these issues pose and why they are problematic, and advances some recommendations to enhance the usability experience for readers with print disabilities.

Introduction

The OverDrive platform provides access to various types of content including ebooks, audiobooks and emagazines. OverDrive supports 2 apps for reading –OverDrive and Libby– and we have done accessibility assessments of both. This report presents the accessibility experience of the OverDrive app. The type of content that a user can access is granted through their local public library. Please note that we only tested ebooks and audiobooks, and not emagazines, as these were only available to one of our testers through their public library. For the purpose of this report, testers assessed the experience of accessing this content through the OverDrive app on mobile devices (iOS and Android), as well as the website in desktop/laptop computers.

The objective of testing the OverDrive app is to assess the usability experience of readers with print disabilities,[1] and to what extent they can access audiobooks and ebooks through their local public library effectively and efficiently. People with visual or learning disabilities use screen readers[2], refreshable Braille displays[3] and other assistive

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[1] Print disabilities are defined by Canada's Copyright Act and include visual, mobility, or comprehension impairments such as dyslexia.

[2] A screen reader is software that runs at the same time as other programs in a computer or mobile device and reads aloud the text that is displayed on the screen.

[3] A Braille display is a hardware device that connects to a computer or mobile device and converts text into Braille in real time. It contains sets of pins which are raised and lowered to form the Braille encoding.

technologies in their computers, or mobile devices, to access information. It is important that readers with print disabilities can choose the reading systems that offer the accessibility features they require.

iOS and Android devices are equipped with screen readers (VoiceOver for iOS and TalkBack for Android) that read the contents of a smartphone's or tablet's screen out loud, allowing users with visual disabilities to browse apps, open links, send and receive texts and emails, and accomplish many other tasks with ease. They utilize a variety of gestures in order to interact with software; to open an app or activate a function users tap on the icon twice; to move through the screen the user swipes, along with other gestures, to allow them to read text, type, and perform all other tasks. These devices are also equipped with an on-screen magnifier, large text option, and high-contrast viewing mode to assist people with low vision. Screen-reading software also helps blind people to use laptops or desktop computers with a system of keyboard shortcuts that makes it possible to navigate pages without using a mouse.

To ensure usability and accessibility of an application by people with print disabilities, all functions and controls must be accessible using assistive technologies. The DAISY Consortium explains that the basic assumption of accessibility evaluations is that reading systems "should support reading with eyes, ears, and fingers." (DAISY Consortium, 2017). It should be possible for users to read the content of the document by:

- Reading the text with screen readers or self-voicing text to speech (TTS) applications
- Adjusting the display including font size, alignment, and color contrast, or combination of some or all of these options
- Reading the text with a refreshable Braille display
- Reading with assistive technologies designed for persons with dyslexia or other disabilities
- Reading with the app's built-in read aloud functions

The OverDrive app was tested on iOS and Android mobile devices, as well as Windows and Mac computers, using a variety of assistive technologies including screen readers and refreshable Braille displays. It should be noted that if a feature can be accessed with a screen reader, it is generally accessible for a Braille display (which presents the information in Braille, rather than with synthetic speech.) A complete list of all the platforms and technologies used in this assessment can be found in the Systems and Assistive Technology section of this report.

In the testing Results and Recommendations section, we present information covering the mobile apps first, followed by information on the desktop apps, and organized by sections grouping similar features. We highlight the problematic issues as they relate to the different functions of the application in each of the platforms tested, but we do not elaborate on every single feature. You can find the list of questions in Appendix A. The last section of this report includes information on the usability of the OverDrive website using browsers in Windows and Mac OS. Since many of the findings related to the websites are similar across the different sections, we describe these issues more broadly, and present

specific examples to illustrate some of the usability challenges. Some of the barriers found when using a browser are similar to those that the testers identified while using the apps. The OverDrive mobile web page was not tested, since the majority of readers who are blind usually default to use native apps, which are simpler to interact with than it is with mobile browsers.

Summary of Accessibility Performance

iOS with VoiceOver

The OverDrive mobile app for iOS is powered in part by a web-view of the OverDrive website. Our testers found that OverDrive pages are easy to use, and very few accessibility issues were discovered. Signing in and selecting a library is easy, as is searching for titles and looking through loans. Testers also reported that the experience of reading an audiobook is quite pleasant; users are able to adjust reading speed, skip through headings and seek through the audiobook easily.

With some exceptions, in general the text labelling of buttons is excellent. Because the OverDrive app is partly powered by a web-view of the OverDrive website, some testers reported the usability experience to be similar to that of using the website on Safari in their mobile devices.

Our testers noted that there are unlabeled navigation buttons at the bottom of the browser view (eg. back, forward, etc.). It was discovered though that these buttons can be clicked, and their positioning is familiar enough that some people will know what they are. Nevertheless, having no labels means that users relying on assistive technologies will have to troubleshoot to figure out what the buttons are, which can lead to user frustration. One tester commented:

> Overall, the app still requires the user to rely on the browser to perform several tasks, and this increases the number of steps to use several OverDrive features. For example, when a user downloads an ebook/audiobook, they have to do it using Safari, and they have to select the app with which they want to open the file, rather than OverDrive picking this information automatically and opening the file without asking them. This would not be an issue with tighter integration.

Occasionally, VoiceOver will mistakenly read text and controls that are no longer visible. We refer to this phenomenon as "backfield interference". It occurs when new controls are painted over existing ones, without first clearing the screen of its old content. One area where backfield interference is prevalent is the table of contents in ebooks, but it is important to note that this issue comes up randomly throughout the entire app.

Testers found navigating through ebooks to be frustrating. It is possible to search, download and open them, but the usability experience of reading them left much to be desired, specifically with navigating them and scrolling (more details are provided below, in the section related to reading content.)

The following is a list of what the testers identified as priorities for recommended improvements for iOS with VoiceOver.

- Ensure that ebooks are automatically downloaded to the bookshelf when they are checked out.
- Improve readability of ebooks for VoiceOver users, in particular to ensure the position in the screen changes consistently when the user scrolls through the content with VoiceOver gestures.
- Fix the backfield interference issue described above, to prevent confusion for VoiceOver users.
- Provide tighter integration between the app and a browser, and expand the number of features available only through the app, without the need for a browser

Android with TalkBack

The app is accessible to users of assistive technologies and our testers in Android found the usability experience to be quite positive. For instance, searches are easy to do, as is listening to and moving through audiobooks. The ebook viewer is also fairly accessible, as users are able to read the text.

Our testers discovered that there is an issue with all edit fields within the app for this platform. Due to the way textboxes are coded, it is not possible for users of screen readers to select the text within them. Testers noted that when they select all the text in an edit box, the keyboard disappears, and users are unable to hit the delete key to clear the box. To troubleshoot this issue they have to double-tap to edit the textbox again, but the entire selection gets cleared with no option to edit the text by character, or by word. This is similar behavior if the user selects part of the text, the keyboard disappears and the user is stuck in the "selection mode" option in TalkBack to select text. The normal commands to select text by character, word, or line do not work.

It was also noted that the lists of ebooks are very cluttered. For example, testers found the lists with ratings were an issue, meaning that it takes a long time for screen reader users to find the desired title.

Another accessibility issue was the way the Help information is presented. Any hypertext in this area that is meant to expand into additional links is not identified by the screen reader as being clickable; instead it is just read as text. This means that the role of those links is not seen by TalkBack, which creates confusion for users who do not know that those are links, and this becomes a barrier to accessing that information.

Accessibility Priorities

The following is a list of what the testers identified as top priorities for recommended improvements for Android with TalkBack.

- Make sure that all controls are properly labeled, and place them in a fixed and standard place on the screen, to minimize the learning curve of this app.
- Fix the reading menu to make it more intuitive. Consider changing some menu items to give them their own higher-level access, such as putting them on the main menu.
- Simplify the lists of ebooks, by turning ratings into sliders to eliminate some of the clutter that creates confusion for some users.
- Add a "read-to-end" function, to allow TalkBack users to read a whole ebook without the need to move in small increments such as paragraphs or pages.
- All hyperlinks or elements that can be clicked should be identifiable by TalkBack as clickable links to alert users that they display more information, and enable access.

Testing Approach

NNELS developed a list of criteria for testers to perform a structured review of the accessibility of mainstream library reading applications. We drew on the guidelines that the DAISY Consortium developed for the systematic assessment of the accessibility of hardware and software-based reading systems. This methodology allows us to determine the accessibility of the functions and features of each reading application from the user's perspective.

For more information from the DAISY Consortium, see the Accessibility Screening Methodology Guidelines and Checklist: http://www.daisy.org/accessibility-screening-methodology-guidelines-and-checklist.html

Six testers with print disabilities reviewed the OverDrive mobile applications using screen readers. They include testers with visual impairments and learning disabilities, all of which have accessibility expertise and extensive experience using assistive technology. One additional tester, who is sighted and is proficient in the use of a screen reader, also assessed the application in the Android platform; in particular, those features related to visual adjustments aimed to provide access to readers with print disabilities other than blindness, such as low vision or learning disabilities.

All testers performed several tasks, corresponding to the different functions of the application, and answered questions systematically. The questions for all functions are grouped into various categories, including:

- Library access – Creating an account, login, searches, results, downloads
- Reading (listening to audiobooks, and reading ebooks) - app resuming reading at the same position, pausing before different sections
- Navigation – Moving through different elements in an ebook or an article such as headings, paragraphs, as well as spelling words; moving to different sections in an audiobook
- ebookmarks – Adding and navigating through ebookmarks
- Visual adjustments - adjusting colour contrast, font sizes and types

Systems and Assistive Technology

OverDrive Application Versions

- iOS version 3.7.8
- Android version 3.8.0
- Windows version 3.7
- Mac 1.2.0

Devices, Operating Systems and Assistive Technologies

- iPhone and iPad with iOS 12.01 using VoiceOver screen reader
- Tablet and smartphone with Android 7.1.1 running TalkBack 6.2.0.199837370 screen reader
- Mac OS version 10.14 Mojave with VoiceOver screen reader Version 10.14
- Windows 10 Home (x64) with the following screen readers:
    - JAWS for Windows versions 18.05038 and 2019
    - NVDA version 2018.3
- Windows Browsers:
    - Internet Explorer version 11
    - Chrome Version 72.0
    - Firefox 66.0
- Mac OS with Safari 12.1
- Braille displays:
    - BrailleEdge 40
    - BrailleSense U2-Mini

Libraries

Testers accessed the content provided by OverDrive through their local public libraries, including:

- Edmonton Public Library
- Markham Public Library
- Richmond Public Library
- Toronto Public Library
- Vancouver Island Regional Library

Notes

The results of testing included in this report were accurate at the time of delivery/publication. They, however, may not reflect all personal experiences, which can be affected by the version of the application, as well as the assistive technologies used. In the following pages, we provide detailed information related to the most prevalent accessibility issues as they pertain to the user experience, but this report does not include descriptions of all features of the OverDrive mobile apps and website.

The OverDrive mobile web page was not tested, since the majority of readers who are blind usually default to use native apps, which are simpler to interact with than it is with mobile browsers. The reason for this is fairly straight forward, there are usually more elements on mobile web pages than native apps, making the latter easier to navigate and interact with.

Testing Results and Recommendations

In this section we dive deeper into specific accessibility issues of the different features of the OverDrive app and website. Below you will find the testing results and their related recommendations as they pertain to:

- Library Access
  - Signing In
  - Searches
  - Downloading Titles
- Reading and Navigating Content
- Creating eBookmarks
- Visual Adjustments
- The OverDrive Website

We highlight some of the problematic issues as they relate to the different parts of the application in each of the platforms tested; but we do not elaborate on each of the features. To see the list of questions, please see Appendix A.

Library Access

For this evaluation, Library Access includes all features related to accessing OverDrive and the content it offers through a user's public library, including signing-in, searching for audio or ebooks (such as filtering searches,) downloading and removing ebooks and publications, and help.

Signing In

iOS with VoiceOver

Testers found some unlabeled buttons in the "Sign in using your library card" dialog, but by trial and error they were able to sign in and get into the app.

Recommendation. Label all buttons and controls.

Android with TalkBack

Overall, testers found that logging in is accessible, and that the edit fields are labeled properly for the most part. It was noted that the label for the "Card Number" edit field is written as "Card   Number," which likely matches the text title to the control.

Recommendation. The use of labels is commendable and improves the experience tremendously, but markup such as " " should not be removed, as the screen reader speaks this unnecessary markup. These labels are not rendered in visual form, so their text need not be marked up.

Due to the way the textboxes are coded, testers discovered that selecting text within them is cumbersome. It was noted that when the tester selects text in an edit box, the keyboard disappears until the user double-taps to edit the textbox again.

Recommendation. Fix the functionality of text-boxes to enable TalkBack users to select and delete text.

Searches

This applies to all content types—ebooks and audiobooks.

iOS with VoiceOver

Testers noted that the basic search is very straight forward. They did not encounter any issues with entering queries. They did note that the different views in this section of the app can be problematic. By default, it is set to grid view, which is the most accessible view. If the user sets the view to list, it then becomes inaccessible since there are more elements to swipe through. Most often, lists are found to be accessible by screen readers across the board. Testers also discovered that there are unlabeled radio buttons in results displayed in list view.

Recommendation. Make sure that both view modes in the search results are entirely accessible for VoiceOver users by removing or simplifying elements that get in the way or slow down usability when the user swipes.

A minor issue is the "Clear" control that deletes what the user has entered into the search box. Testers noted that it can be navigated to, it is not clear that it is clickable. This is because it only shows up as text, and the control type/role is not mentioned.

Recommendation. Ensure that clickable items are identified as such.

Android with TalkBack

Testers found that the search feature is well laid out, and all combo and text boxes are labelled properly. As explained earlier in this report, the only accessibility issue is with the text selection in the edit fields.

Recommendation. Fix the functionality of text boxes to enable TalkBack users to select and delete text easily.

On the search results page, the filter options are repeated twice; as a collapsible item, and as a collapsible item with a link. These repeated options can cause confusion with some users.

Recommendation. Ensure all filter options are clearly and concisely labelled for use with screen readers.

There are two possible views for the search results: grid view, or list view. The default is set to grid view, which is accessible and navigable by TalkBack. The only issue noted by testers is that there are blank spaces that TalkBack encounters while moving through the grid. This can reduce efficiency if the user swipes instead of exploring by touch. Testers discovered that list view also works, but the only issue is the radio buttons are labelled with verbose and complex phrases. For example, it says "you rated this title 4 stars" when the user comes across the radio button. In addition to being confusing, it can also take a blind user longer to move through the buttons than if they were labelled more concisely.

Recommendation. Change the way the radio buttons are labelled for rating ebooks. For example, text that says "Rate this ebook" followed by "1 stars," "2 stars," etc..

Checking Out Titles, Browsing the Bookshelf and Removing Titles

iOS with VoiceOver

Testers found it confusing that ebooks had to be downloaded after being checked out. Even if they had automatic download turned on in their user settings, users have to search or add a title first in order to get to the list of ebooks they have on loan. Since the testers had adjusted the settings and turned automatic download on, they expected that the ebook would appear on their bookshelf after borrowing it, but this was not the case. Testers found that they still had to manually download/open the books.

Recommendation. Fix automatic downloads so that books are indeed downloaded after a user checks out titles.

Although testers found it easy to return an ebook from the bookshelf, they also found that the list of ebooks can be frustrating to interact with when trying to locate a specific title. The number of stars and ratings are read out for each title, and this has a negative impact on user interaction. The testers noted they found this confusing as it was difficult to skip through all this additional information, specifically all the stars. This caused the overall navigation of this section to slow down for users relying on VoiceOver.

Recommendation. Consider changing the star ratings into a picker, which could be swiped past with one gesture, instead of the twelve swipes it currently takes. Another option is to consider hiding the ratings by default and adding a button to display them, or even make them available when the user seeks more information about the ebook.

Android with TalkBack

Although testers found that the check-out process is accessible (with all the combo boxes and buttons properly labelled,) they noted two issues with sluggish responses and loss of focus for TalkBack, which caused frustration. The loss of focus was reported to occur after a tester clicked the "Borrow" button. If the user tried to click on other items, there would be

no response until they were able to relocate the area again to dismiss the Successfully Borrowed message. This meant that the focus was outside the dialogue box for confirmation of the borrowed item, and all other sections of the page were inaccessible. It is important that the focus of a screen reader, like TalkBack, can keep focus in an area until the user chooses to leave through a series of clear actions and commands, and that there is a clear notification when something changes on the screen that requires the user to interact with it before moving to another section.

Recommendation. Ensure that there is a notification that can be read by screen readers so that the user is aware they need to click a button to dismiss it before continuing to use the app.

When in the bookshelf, the screen reader only reads the title and gives no other information, such as publisher information, page total, or when the loan expires. Testers also noted that there are unlabeled buttons below each title, and through trial and error they were able to figure out that these buttons are for "Return to Library," "Details," and "Share Options."

Recommendation. Label all buttons, and consider including more information about the title to the user that is accessible and easy to locate with screen readers.

Reading, Listening and Navigating Content

Audiobooks

iOS with VoiceOver

The audiobook playing screen is easy to navigate. Testers found that the biggest problem in this area is the "Close" button, which is used to navigate from the ebook information, or Table of Contents, back to the ebook player. This button is labelled "ebookmark," which does not give adequate information for its use. Testers discovered this through trial and error and were confused that it does not add an ebookmark, nor does it consistently close the Title menu. This was noted whether the user is looking at chapters or ebookmarks. When listening to audiobooks, testers found that there are other elements that have similarly ambiguous labels, such as the elements meant to show time remaining, or time elapsed. These elements only show as numbers with no context as to what they are. Again, it was only through trial and error that the testers figured out their use.

Recommendation. Ensure all buttons are labeled in a clear and concise manner, so users with screen readers can know their functions.

Testers found that they are not always able to get VoiceOver to interact with the elements on the audiobook player screen when there is a popover, such as Table of Contents. This means the user can still find the buttons, but they cannot be activated. These are controls outside of the focused area, such as Player Screen or Menu, that are read by VoiceOver, but cannot be activated, and are actually not directly related to the focus area.

Occasionally, VoiceOver will mistakenly read text and controls that are no longer visible. We refer to this phenomenon as backfield interference. It refers to these type of situations, as described above, when new controls are painted over existing ones without first clearing the screen of its old content, which is what VoiceOver continues reading. This leads to significant confusion, since they can get lost trying to find the correct, usable controls.

Recommendation. The best way to avoid the behaviour described above is to use real popover controls to ensure that the screen reader can keep focus on the popover area until the user chooses the correct controls to close it. Each screen of the user interface should be free and clear of old controls and text.

Android with TalkBack

In the audio player screen, by the "Play/Pause" button, there are numbers that indicate time elapsed and time remaining. Testers with TalkBack noted these controls only show numbers.

Recommendation. Add a label for "Time Elapsed/Time Remaining" before the numbers so that users know what those numbers are for.

Ebooks

iOS with VoiceOver

Testers found that ebooks can be read, but described the process of interacting with the interface challenging. For example, if a user wants to access the Table of Contents, they need to double-tap to reveal more options and then tap on the "Table of Contents" button. This process is not as straight forward as it seems. Unfortunately, there is no message to indicate that in order to see more options it is necessary to tap on the screen of text. Once there are more options on the screen it is possible to find a list of the sections, but when the tester clicked on them, nothing was activated. Because it is not clear that they need to double-tap on the "Table of Contents" button first to activate these sections, testers reported confusion and user frustration.

Recommendation. Simplify this part of the interface so that less steps are required. Ensure that the app shows user messages with specific information about elements that can be expanded/clicked, and that VoiceOver reads those messages automatically.

Testers also noted that the navigation slider is unlabeled. VoiceOver just read it as "Slider" followed by the percentage. Despite this, the slider does work normally, and can be adjusted with the one finger slide gesture of up/down.

Recommendation. Label the slider with a meaningful label such as "percentage" to make it easier for users to find and use it.

The main issue testers found when reading an ebook is the disconnect between VoiceOver's navigation and the actual ebook. When the tester scrolled through the ebook

using the "read all" gesture (two-finger flick down, or the swipe left and right), they were taken through the paragraphs of the ebook, but noted that the screen didn't change. This means that, although it is technically possible to read the ebook, the app does not follow the user's progress as they navigate through it. When the app is reopened, it opens at the page they started on, and not the last point they were at (i.e. either the beginning of the ebook or section, or a percentage of the way through when using the position adjustment). When a sighted user reads an ebook they are able to scroll the screen in any direction with a single finger. For VoiceOver users, they should be able to do this by using three fingers in the same direction (which is VoiceOver's gesture to scroll.)

Recommendation. Provide for better integration of VoiceOver gestures to allow all users to scroll the ebook. Also ensure that VoiceOver is able to recognize the text as scrollable.

Testers also found backfield interference in this section of the app, specifically with the Table of Contents. It is possible that a user will swipe out of the Table of Contents and VoiceOver will announce controls that don't exist. The button to open and close this section is labeled as "Title Menu."

Recommendation. Fix issues related to backfield interference by ensuring that each screen of the user interface is free and clear of old controls and text.

Android with TalkBack

The menu to navigate the reader is not very easy to find. One tester reported that when the menu opens, the screen reader does not always read the menu to alert them that they are already in it. The items on the main menu were all labelled, but some items appear to be somewhat out of place. For instance, the information about the Loan, as well as the menu for ebookmarks, are both nested under the Table of Contents section.

Recommendation. Fix the reading menu to make it more intuitive. Consider changing some menu items to give them their own higher-level access, such as putting them on the main menu.

The ebook viewer is accessible, although testers recorded their experience as not ideal. Simple navigation through the ebook works well with TalkBack; users were able to scroll to the next or previous page while swiping forward or back through the text, and a three-finger swipe works well to move by page. Regarding full-screen view for the ebook, clicking on the page number at the bottom of the screen to display controls works well, but is not intuitive at all.

Recommendation. To allow users to find and activate "full-screen," add a text label to decrease the learning curve, such as "Click to show controls."

Although testers were able to navigate by chapter and read the text, they could not find a "Read to End" or "Read Aloud" feature, and had to manually scroll to continue reading text. Also, all the headings are identified as hypertext, but testers reported mixed results when clicking these; they did not appear to work consistently.

Recommendation. Change the ebook text so that TalkBack's read to end function automatically turns pages and continues reading, to allow users to read a whole ebook without the need to move in small increments such as paragraphs or pages.

There are blank elements for "About," "Table of Contents" and list of "ebookmarks." Although it is possible for users to navigate to these buttons, TalkBack remains silent, which means that the user does not have access to information related their functionality. Again, it is only through trial and error that a user can discover the use of these labels.

Recommendation. Make sure that all buttons are properly labeled.

Ebookmarks

iOS with VoiceOver

On the play back screen there is an option for ebookmarks, but after clicking the "ebookmarks" button there is no confirmation to let the user know that the app added an ebookmark. The tester only figured this out after they went to the Title Menu, and was able to find the information about the new ebookmark.

Recommendations. Add a notification that the ebookmark has been added, that then prompts the user to go to the Title Menu to find it. This additional message could only occur once for a new user (most probably an existing user would already be familiar with where to find them.) Add a heading for ebookmarks in the Title Menu, so users with screen readers can quickly jump to that section.

Android with TalkBack

For TalkBack, there is a well-labeled button on the top-right of the screen to set a new ebookmark. After this is selected, the tester noted that there is a popup message confirming that the ebookmark has been set, complete with its title. However, the process to show the list of ebookmarks is nearly impossible to figure out without visual assistance. The tab that lets the user cycle between ebook contents and ebookmarks is unlabeled. The testers did note that the "Contents" button is well labeled, as is the clickable list of chapters that appears.

Recommendation. Label this button as "ebookmarks" or something similar.

Visual Adjustments

In this section we mention some of the features that are missing from the mobile versions of the OverDrive app that are helpful for users that have low vision, or a learning disability (such as dyslexia.)

iOS

Other than magnification options provided by the device itself, the app does not seem to have a built-in magnification option for its user interface. In the iOS edition, buttons along

the bottom of the screen are used to change font particulars, but there are only two options for font size here. The large font option is only 11 pt, which is not large enough for low-vision users.

Recommendation. It would be helpful to have more options to enlarge fonts, as well as an in-app option for magnification of the entire screen.

A specific font or background color cannot be selected, this can only be changed through pre-defined styles. The color of highlighted text cannot be changed.

Recommendation. Add more options to enable users to choose font colour, and different combinations of foreground and background, which can be very useful for some people with visual and learning disabilities.

Android

Although there are many options for visual adjustments, additional options for text and background colour would be beneficial. Some people with low vision find it helpful to read on blue backgrounds, and would benefit from a larger selection of colour. The tester noted that there is a dyslexic font, which is a wonderful option for people with dyslexia.

Recommendation. Provide more options for customization, in particular adding more options for text and background color.

Computer Apps

In this section we present results from the assessment of the OverDrive app for Windows and Mac. We highlight the main aspects of the apps and the accessibility priorities, followed by descriptions of the main features with recommended improvements.

Windows with JAWS and NVDA

There are two versions of OverDrive for Windows: A desktop app that works with all versions of Windows, and an app that is downloaded from the Microsoft store, which we'll refer to as a universal app. They appear in testers' computers as "OverDrive for Windows" and "OverDrive - Library ebooks audiobooks", respectively. Testers described the usability experience of the former as excellent. Unless otherwise specified, most issues in this report refer to the universal app.

One of the significant features of the universal app is its ability to load the OverDrive website directly within the app itself, rather than requiring the user to open it in a browser. This "embedded" browser is extremely sluggish; our testers found that it not only caused the screen reader to react slowly when navigating the web content, but it also affected the computer's performance across all other apps. In order to fully test this they opened their library's OverDrive page and then navigated to the various applications open on their machine; this severely impacted the screen reader's performance until they closed the OverDrive app. They reported that it takes between seven and ten seconds for NVDA to respond after they navigate an app in a way that causes the screen to change. This is

debilitating to the usability of the app through this platform, and since it often applies to the OverDrive app, it makes the process of navigating the web content very impractical. It is also not possible to use the Windows version without interacting with the website for many functions, such as searching. For this reason, access may also be impacted by the accessibility of the specific library's OverDrive page (e.g. virl.OverDrive.com,) including how operable the site is via the keyboard, and whether buttons and links have clear labels.

The testers also noted that there are buttons scattered throughout the app that lack text labels. This results in screen readers simply saying "Button," which does not give adequate information for the buttons functionality. The only way the user can know what the button is for is through trial and error, which can lead to user frustration. Another issue is that most list boxes have mislabeled items, such as "MediaConsole.ViewModel.LinksViewModel". Again, this has a negative impact on accessibility and usability since the user does not have clear access to what this information is. For instance, one of the unlabeled buttons is the main menu button, which provides access to functions such as adding a library and opening settings. This is an essential section of the app that users are shut out from accessing unless they discover it by accident.

Accessibility Priorities

The following is a list of what the testers identified as top priorities for recommended improvements for the Windows app to improve usability with screen readers.

- Improve stability of the embedded browser that users can open from the app, or provide in-app functionality for the tasks that requires the use of the web browser.
- Add the ability to navigate back to the ebookshelf after selecting a title to read. As it is now, users have to constantly close and reopen the application, which becomes frustrating and unnecessarily cumbersome.
- Add functionality for users relying on screen readers to move back to the reading pane after selecting a new ebook chapter and add a read-to-end feature.

Regarding the sign-in process, selecting the local library was described by testers as being extremely difficult, requiring extensive workarounds to emulate the mouse pointer. List boxes and other controls, such as check boxes and buttons, lack titles and textual captions. Once a short list of local libraries was finally presented, each selection was simply named "MediaConsole.ViewModel.LinksViewModel" with no way to distinguish between the various options. When the testers searched to add a library, they were presented with a list of 43 numeric OverDrive options in various countries, and an untitled button that didn't appear to do anything. As it is, this step is a huge barrier for accessibility with screen readers.

Recommendation. Ensure that all list boxes, buttons, check boxes and other controls have text labels.

For searching, the app loads the web version of OverDrive, which for the most part appears to be accessible. Testers found it easy to search and checkout ebooks from their local library's OverDrive website. However, as mentioned above, the app severely impacts the

performance of the computer and the responsiveness of the screen reader, especially when loading new pages. This slows down the process, even though the site appears to still be functional and searches can be conducted. To troubleshoot this issue, the testers had to use the OverDrive version of their local library's website.

Recommendation. Consider offering in-app functionality for searching titles, without the need to open the browser.

Testers found that the best way to feed titles to the OverDrive bookshelf is to download a helper file for their audiobook, then click on that file to open it in the OverDrive app, after which the audiobook itself would download. This helper file is the .ODM files users download from the OverDrive website; these are tiny text files that tell the OverDrive apps how to download the actual audiobook. The website handles downloading of these .ODM files, and the app takes over from there and downloads the necessary audio files to play the audiobook.

When it comes to the bookshelf within the OverDrive app, testers found it difficult to navigate; each item is read as "MediaConsole.ViewModel.MediaViewModel", which means there is no way for the user to distinguish between the titles. In addition, the position of the items in the list seems to change, so the user is not able to troubleshoot the title text issue by trying to remember the items by location on the list.

Recommendation. Make sure that items in the bookshelf are properly labeled, to allow screen reader users to locate and interact with them.

Although testers were able to play audiobooks, they found there were a few issues with some of the elements within the player. Testers noted that there are list boxes for chapters and parts, but both are improperly labelled with "mediaConsole." Additionally, pressing enter on a Chapter or Part has no effect on what's currently playing. Testers also found that several buttons are mislabeled as "button." Through trial and error, they discovered these are navigation buttons including: Play/Pause, Next and Previous Section, and Skip Back/Forward. It was discovered that there is also an unlabeled "Close" button that returns users to the library. Once in this section, the buttons in the small "Now Playing" bar are labelled. However, the controls that are meant for sleep timer and speed control are labelled as "1x" and "off," though they do update to reflect a change in speed, for instance it will change to "1.5x." It was noted though that when the user does select these buttons, a regular Windows menu opens that is fully accessible.

Recommendation. Ensure that buttons, list boxes and other controls are properly labeled within the player for audiobooks.

For an audiobook, the listening begins at the same reading location the testers left off. However, testers found that there does not appear to be a way to return to the list of titles without closing and reopening the app. If the user pauses the audiobook before closing the app, the resumed position when they returned to the audiobook was within 30 seconds of where they left off.

Recommendation. Ensure there is a clearly labelled control to exit the audiobook play and return to the list of titles.

The ebooks are displayed chapter-by-chapter, eliminating the ability to skip to a heading or table outside the current chapter. Testers did note that navigation within any given chapter works fine. The screen reader usually begins reading the ebook as soon as it is opened, and navigating between paragraphs works well. However, once a list of chapters is pulled up, or the next chapter button is pressed, testers could not find an easy way to navigate back to the reading pane without closing and reopening the app.

A Windows user relying on JAWS and NVDA reads an ebook by pressing Control-T to pull up the ebook navigation pane. However, while the list of chapters is fully accessible, there appears to be no way to select one from the keyboard. To troubleshoot this, the user has to review the Table of Contents with the keyboard, then find the appropriate chapter with the mouse curser and click it, then close and reopen the app to read the next chapter. Though testers noted there is a slider to indicate ebook position (which can be repeatedly clicked with the mouse to go back, and a page counter which can be advanced to the next chapter with repeated clicking) this method of navigation is inexact, and it causes the window to lose focus, necessitating closing and reopening of the app.

Recommendation. Add a button to go back to the reading pane directly from within a chapter in an ebook.

One tester tried opening content with Adobe Digital Editions (an option that OverDrive provides). They reported that reading a downloaded book from OverDrive in Adobe Digital Editions was a better reading experience than reading in the app itself.

Testers were unable to use ebookmarks. They did not find links or buttons to access this feature.

Recommendation. Ensure that users of screen readers can access all the features available in the app. ebookmarks are important for everyone, and not having access to them represents a barrier to users of assistive technologies.

Mac OS with VoiceOver

The OverDrive app for Mac OS is mostly a downloader and basic player, and only for audiobooks. When it comes to interacting with ebooks, the tester found that there is no way to search through the catalog, or even to choose titles a user has checked out from within the app itself. This means that in order to access an ebook they must rely on the browser, and not the app.

Testers found that the browser has its own accessibility issues, for example users can open ebooks from the catalog in the browser, but cannot turn the pages. In order to read the ebook users need to open it with Adobe Digital Edition. This proved to be problematic if they tried to read an ebook they previously opened in the browser, as it creates issues with the licensing of the ebook in Adobe Digital Editions.

Overall, this means that users of OverDrive on Mac OS require a web browser, and optionally, the OverDrive app for listening to audiobooks, and Adobe Digital Editions for reading ebooks.

Accessibility Priorities

The following is what the testers identified as top priorities for recommended improvements for the app to work well in Mac OS with VoiceOver.

- Allow functionality to search, download, and return (including both ebooks and audiobooks) titles from within the app. As it is now, it is mostly a media player for audiobooks.
- Add functionality for users relying on VoiceOver to read ebooks, without the need to use a third-party application such as Adobe Digital Editions.

In order to listen to audiobooks, testers found that they needed to download a helper file using Safari and the OverDrive website. Once this is clicked, the OverDrive app will open, interpret that file, and download the chosen audiobook. It was noted that if the helper file does not work, the user can go to the file menu and choose "Open" to select the file that way instead. After the tester clicked on the helper file in order to download the audiobook, they got a popup screen that asked for a save location on the computer for the title; this screen also allows selecting or unselecting of individual chapters and parts to be downloaded. The tester found this screen to be fully accessible. Audiobooks are downloaded as regular, unencrypted MP3 files to the computer.

The OverDrive player screen is accessible through this platform. There are hotkeys for every major function including: Playback, Speed Control, and Volume. Everything appears to be labelled, and it is possible to read the information about the currently opened audiobook.

To read OverDrive ebooks on Mac OS, users have to rely on a browser plugin. When the user clicks the link for an ebook in their library, they are presented with 2 options if they already have the ebook checked out. The first option is to read the ebook within the browser, and the other option is to download it to read with Adobe Digital Editions. The tester was able to open an ebook, but found the only reading option was to flip to each single page. When they tried to use the command to read the entire document only the screen that appeared to be visible was read.

Recommendation. Consider adding functionality for reading ebooks from within the app for VoiceOver users, and have more reading options for people using screen readers.

Testers were able to add ebookmarks, and noted that the ebookmarks menu then populated with each one they added. Nevertheless, the ebook position did not change when they chose one bookmark. There was no way for the testers to activate them. This means that they could not access the ebookmarks at all, even though they could read them on the menu, making this feature inaccessible for VoiceOver users.

Recommendation. Ensure that users of screen readers can access all the features available in the app. Bookmarks are important for everyone, and not having access to them represents a barrier to users of assistive technologies.

The OverDrive Website in Desktop Computers

This section specifically deals with only the website tested on desktop and laptop computers. For test results and recommendations for in-browser app accessibility please refer to the above sections.

Overall, testers accessing the OverDrive website using browsers in Windows and Mac OS reported mixed results. In this section of the report we highlight the problematic issues as they relate to the different parts of the OverDrive website as it was tested in Windows (Firefox, IE and Chrome,) and Mac OS (Safari) browsers. Please note that we do not elaborate on each of the features.

Since many of the findings related to the websites are similar across the different sections, we describe these issues more broadly, and present specific examples to illustrate some of the barriers relevant to each operating system.

There are two versions of the OverDrive website, the official one, and the one corresponding to the specific public library that provides access to content; in the latter case, accessibility depends on the design of that particular website.

Windows Browsers with JAWS or NVDA

At first, testers found the web interface very impressive with a screen reader, and felt it was properly designed with accessibility in mind. However, as soon as they tried to read ebooks or audiobooks online the functions were completely inaccessible, because the buttons had no text labels. The only way they could get an audiobook to start playing was through trial and error until playback started. Testers did note though that the website in Windows can be used easily to check out ebooks and then they can play them in Adobe Digital Editions, or the mobile OverDrive app, which is more accessible.

Recommendations. Label all buttons and controls. Improve functionality and readability of the web-control player from the website.

Mac OS Safari with VoiceOver

The tester was able to browse the collections and choose two available titles, one ebook and one audiobook. They were also able to change the hold time to seven days, and found the check-out an easy process. The advanced search was also found to be very usable. The tester noted that the numerous filters are rendered as pop-up menus, which work well with VoiceOver. However, when it came to reading the book through the website, they came across some barriers. The biggest issue was that they were not able to find a "Play" button, or any other navigation controls (such as pages for ebooks, or time for audiobooks.) The tester also discovered that there are numerous timestamp controls over each page of the item, and these seem to be a minute apart and span the entire content. For example, it

was noted in a 12-hour audiobook that there were over 700 controls on each page. When the user clicked them, there was no effect. This has a negative impact on reading comprehension.

Recommendation. Clean up the timestamps in the titles so they do not interrupt reading for uses with screen readers.

When the tester opened a popover screen, such as Table of Contents or Search, they were not able to close it again. They attempted to close these screens by pressing the "Done" button that shows up near the other controls, but it did not work. They also found that the other buttons have inconsistent labels and seem to do nothing when pressed. The tester found that there are elements throughout the pages of the site that are simply labeled "big.jpg", and was not sure of their function. They recorded that there were a few buttons that did have proper labels, such as the "Chapter" button, and it was noted that most of the problematic labels were at the bottom of the screen.

Recommendations. Label all buttons and controls. Improve functionality of all controls so that users relying on VoiceOver can click them.

Conclusion

In this report we highlighted the main barriers of the OverDrive platform for readers with print disabilities. We also recommended some improvements to make it a better option for users relying on assistive technologies.

The most important priorities across all platforms (iOS, Android, Windows and Mac) include: labeling all buttons and controls; expanding the number of features available only through the apps, so that users are not required to also rely on a browser, which is particularly relevant for mobile devices; and simplifying some of the menus and improving the functionality of pop-overs.

Several parts of the OverDrive app and website are quite pleasant to use, such as browsing the catalogue and reading audiobooks, which are both enjoyable and intuitive. This is especially true for the iOS version. However, the reading functions for ebooks was not very accessible. This has a negative impact on the usability of the app for people with print disabilities. As OverDrive is one of the most widely used library apps, it should be fully accessible to people who use screen readers or other accessible technologies. By fixing these issues the app will become more accessible, and can be enjoyed by a wider audience of users. Hopefully, this feedback can be used to improve the apps so people can enjoy the content available through their library's general ebook and audiobook collection.

There are new versions of the OverDrive app for Windows and iOS, but we did not test them for this report. As of June 10, the latest versions are as follows: 3.8.0 for Windows and 3.8.1 for iOS.

Contributors

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Appendix A: Evaluation Questions

Testers answered the following questions using an Excel document to record their findings and provide relevant details. The first questions are about the application tested, the platform and screen reader used. The rest of the questions require a yes/no answer, or a 1 to 5 rating of the accessibility of each function: 1 (not accessible) to 5 (very accessible.) If any of the questions was not relevant to the application tested (e.g. if there are no options for creating notes) testers recorded N.A. (not applicable.)

- Application name/version
- Operating system
- Did you use a computer or a mobile device?
- Which screen reader did you use?
- [1-not accessible/5-totally accessible] How accessible is the process to sign-up?
- [1/5] How accessible is the function to login with library barcode/pin?
- [Yes/No] Is it possible to use email to sign up/login?
- [1/5] How accessible is the function to set preferences (e.g. loan period, hold auto-checked out, etc.)?
- [1/5] How accessible is the function to search for titles?
- [1/5] How accessible is the function to navigate search results?
- [1/5] How accessible is the function to check out ebook titles?
- [1/5] How accessible is the function to check out audiobooks?
- [1/5] How accessible is the function to place holds on a title if the book is unavailable?
- [1/5] How accessible is the function to explore bookshelf/my account for titles on hold and checked out, usage history, wish-list
- [1/5] How accessible is the function to recommend a title for purchase?
- [1/5] How accessible is the function to delete/return a title?
- [1/5] How accessible is the function to renew a title?
- [1/5] How accessible is the function to cancel a title on hold?

- [1/5] How accessible is the function to navigate and use curated lists (e.g. new summer reads, teen titles, etc.)?
- [1/5] How accessible is the function to limit/filter searches?
- [1/5] How accessible is the function to navigate help screens?
- [1/5] How accessible is the function to log out of the application?
- [1/5] How accessible is all the reference information about the title (publisher, year, number of pages etc.)?
- [1/5] How accessible is the function to activate the reading function for audiobooks?
- [1/5] How accessible is the function to activate the reading function for ebooks
- [1/5] How accessible is the function to open an audiobook within the application?
- [1/5] How accessible is the function to open an ebook within the application?
- [1/5] How accessible is the function to access "where am I" information (percentage, time, page number)?
- [Yes/No] Is it possible to read from the currently focused position in an ebook, rather than beginning at the top of a chapter/section?
- [Yes/No] Can you pause and resume reading at the same location rather than changing focus to the top of a chapter/section?
- [Yes/No] In an audiobook, can you pause and resume listening at the same location rather than changing focus to the top of a chapter/section?
- [Yes/No] In an ebook, can you pause and resume reading at the same location rather than changing focus to the top of a chapter/section?
- [Yes/No Is there a "read-to-end" function?
- [Yes/No] Can you adjust the reading speed from within the application?
- [Yes/No] As you read an ebook, does the TTS or your screen reader pause to indicate the beginning of a new heading or section?
- [Yes/No] Can you read skippable structures like sidebars, annotations and producer notes?
- [Yes/No] Does the app read image alt text?
- [Yes/No] Does the application read MathML?
- [1/5] How accessible is the function to move from the table of contents to different sections/chapters within the book?
- [Yes/No] Can you navigate an ebook by headings separating sections (e.g. chapters)?
- [Yes/No] Can you navigate an audiobook by sections (e.g. chapters)?
- [Yes/No] Can you navigate the ebook by page?
- [Yes/No] Can you navigate by reflowed page number?
- [Yes/No] Can you move through page elements, such as paragraph, table, etc?
- [Yes/No] Can you move by character?
- [Yes/No] Can you move by word?
- [Yes/No] Can you move by line?
- [Yes/No] Can you navigate within a table (e.g. move to next cell or row)?
- [1/5] How accessible is the function to navigate within internal hyperlinks?
- [1/5] How accessible is the function to search for a string of characters and move to the results?

- [1/5] How accessible is the function to add bookmarks or highlights?
- [1/5] How accessible is the function to add notes?
- [1/5] How accessible is the function to review bookmarks and notes?
- [1/5] How accessible is the function to view a single note?
- [Yes/No] Does the application support Braille devices?
- [Yes/No] Are mathematical equations shown correctly in a Braille display, if it is possible to use it with the application you are testing?
- [Yes/No] Is it possible to export content to a different application?
- [Yes/No] Is it possible to copy text content in the application to the clipboard?
- [Yes/No] Can the font size be changed?
- [Yes/No] Can font colour and foreground colour be changed?
- [Yes/No] Can font type be changed?
- [Yes/No] Can brightness be changed?
- [Yes/No] Can highlight text color be changed?
- [Yes/No] Can text, word, and line spacing be changed?
- [Yes/No] Can alignment (left, center, right) be changed?
- [Yes/No] Can margins be changed?
- [Yes/No] Can user visual preferences (style sheets) be changed?
- [Yes/No] Can all styling be removed?
- [Yes/No] Is it possible to select a pre-defined style theme or honor high contrast system configuration?
- [Yes/No] Is it possible to change from paginated to scrolled view
- [Yes/No] Is it possible to change from single to dual page view
- [Yes/No] Does the application support UI magnification?
- [Yes/No] Do all buttons/controls have text labels? Please provide details.
- [Yes/No] Does the links' text adequately describe what the links do? Please provide details.
- [1/5] Rate your overall experience using this application in a 1/5 scale (1 very poor and 5 excellent)
- List the three top priorities to enhance accessibility of this application.