Google News: How User-Friendly is It for the Blind?

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ABSTRACT

Being able to read text, find out information and know about the latest news has always been a challenge for those who cannot access the printed version, such as the visually-impaired. The advent of the Web has been a big step in the right direction for blind people to obtain up-to-date information on the internet. Many portals and Web sites offer online services for up-to-date news. In this paper our aim is to evaluate how easy and rewarding it is for blind people to access this. For this purpose, we are focusing on the well-known online service provided by Google, i.e. Google News as a case study. In order to truly benefit from access to the information available on the Web, the page interface must be simple and easy to use by everyone, including people who have to use assistive technologies. In this work we analyze not only the accessibility of the service offered by Google for its News, but also in particular the usability when interacting via screen reader.

Categories and Subject Descriptors

H.5.2 (User Interfaces): Auditory (non-speech) feedback, Evaluation/methodology, Graphical user interfaces (GUI), Interaction styles, Screen design, Voice I/O.

General Terms

Design, Human Factors.

Keywords

News service, user interfaces, accessibility, usability, blind users, screen reader.

1. INTRODUCTION

Being able to read text, find out information and know about the latest news has always been a challenge for those who cannot access the printed version, such as the visually-impaired. The advent of internet and advancements in User Interfaces (UIs) as well as in assistive technologies make this challenge increasingly feasible. Reading and retrieving information from several sources

are important research subjects widely studied in the accessibility and usability field for people who have difficulty in accessing the printed version. To have books and documents in electronic format, as well as platforms for supporting distance education usable by all, is certainly a big step towards a more inclusive community. Accessing information of any type is not only possible from reading books or using distance-learning systems, but it includes other opportunities such as obtaining information on recent events or up-to-date news. Therefore, the information services should not only be accessible, but especially simple to use, so that it possible to read the latest news with little effort. To ensure that all available resources, on the Web or for desktop applications, are truly usable via assistive technologies (such as screen readers), the interfaces should be designed according to specific principles.

In this paper we analyze blind user interaction with an information service (on-line news) in order to understand the main accessibility and usability issues related to it when using a screen reader. We consider the news pages offered by the well-known Google service as a case study to identify the main issues encountered by the blind when accessing the information. Google News is a computer-generated news site that collects headlines from more than 4,500 English-language news sources worldwide, groups similar stories together and displays them according to each reader's personalized interests (http://news.google.co.uk/intl/en_uk/about_google_news.html).

For this kind of service, we consider the accessibility and usability issues for the two main functionalities "Reading the news" and "News personalization". Google has been considering accessibility properties (http://www.google.com/accessibility/), especially for its search engine. The aim of this study is to understand the main accessibility and especially usability issues encountered by blind people when reading the news. The results can be useful to focus on the most important functionalities related to an information service in order to identify specific aspects to be considered when developing a similar portal for on-line news.

This paper is organized as follows: after a short introduction to other studies in the field, the main functionalities offered by Google News are evaluated and discussed in section 3. A short discussion and some possible suggestions based on the results conclude the paper.

2. RELATED WORK

2.1 Screen Reader Interaction

A screen reader is a software that attempts to identify and interpret what is being displayed on the screen. Then, the content reported on the screen can be presented to a blind user as speech through a voice synthesizer or as a braille display.

For the Web, as well as for some other applications, screen readers are not reading the screen any more; instead, the screen reader is using the DOM to provide a speech rendering of data that is a web page. A screen reader must present the two-dimensional graphical web page to a user who is blind as a one-dimensional stream of characters, which is usually fed to a speech synthesizer. It is very important to be aware that this screen-reading process is converting a twodimensional page to a one-dimensional text string, whether spoken or displayed in Braille. Another way to picture the linearization process is to read the page from left to right and from top to bottom. The resulting text file is the linearized version of the page. The screen reader JAWS for Windows (http://www.freedomscientific.com/jaws-hq.asp) uses the Virtual Cursor in Web pages, which allows the user to read as if it is a word processing document. It seems that those users who are blind rarely listen to a page in full. Often, they navigate to the content and controls of the page. Tab and Shift+Tab move forward and backward through the active elements of the page—that is, through the links and form controls. Screen readers have key commands to read by characters, by words, by lines, and by sentences, as well as HTML features like headings, paragraphs, tables, and lists. It is in this linearized world that some of the accessibility and usability requirements begin to make better sense [9]. Thus, generally speaking, there are many different ways to use a screen reader [11]. Users can move to the next or previous lines, jump over a number of lines, or skip to items of a certain type such as headings, links, or form fields. There are also search commands which can be used to go directly to a given phrase within a page. In [1] there is an overview of the browsing strategies which screen reader users employ when faced with challenges, which range from unfamiliar web sites and complex web pages to dynamic and automatically-refreshed content.

In brief, the main problems for a blind person interacting through screen reader are: (1) Lack of context, (2) Information overload, (3) Excessive sequencing in reading (4) Keyboard navigation, and (5) Screen reader interpretation. So, based on these key aspects, possible principles and criteria have been proposed to enhance the interaction in terms of usability for people who use screen readers. Several studies have already proposed a set of guidelines or alternative solutions for the usability of accessible pages [6] and [10].

2.2 Web accessibility
In order to be truly satisfying and effective for users with disabilities, a Web service or page must not only be well organized and appealing but also accessible and usable. Accessibility and usability are two important aspects that are increasingly combined in order to improve user interfaces. In literature there are many studies that propose and discuss possible principles, approaches and solutions aimed at simplifying interaction for all users. In the context of the Web, several accessibility guidelines and recommendations have been proposed, such as the renowned W3C WCAG 1.0 and the new version WCAG 2.0 [12]. Several investigations show that focusing only on accessibility is not enough to ensure a satisfactory user interaction when using a screen reader [6] and [10]. Usability plays a key role because even when pages meet accessibility standards, they can still be difficult to traverse [4]. A study which evaluated 100 Websites with 51 users who had a disability [8] reports that 45% of difficulties encountered were on pages which complied with accessibility requirements. With

reference to services offered by Google, some accessibility and usability investigations have been conducted mainly for the blind [5]. The authors propose and evaluate a set of suggestions aimed at improving Google search user interfaces when interacting via screen reader. In this work we analyze the accessibility and especially usability aspects for the Google News service in order to identify the main issues for news services.

3. GOOGLE NEWS EVALUATION
3.1 Method
The Google News service has been selected as a case study of online news and information pages in order to analyze and identify potential problems encountered by people with visual disabilities when reading the news. To evaluate the main aspects related to a news service, we consider the two activities mainly involved when accessing a news service:

Reading the news: the page is opened by clicking on "News" on the Google home page (http://news.google.co.uk), which is available for each Google local version (i.e. English, French, Spanish, Italian, etc.);

News personalization: the "Add a new section", "Remove a section" as well as "section arrangement" features.

For our purposes we considered the browsers IE (Ver. 8.0) and Mozilla Firefox (Ver. 3.6), and the screen reader Jaws (version 11.0). The JAWS screen reader has been chosen based on the fact that it is widely used by several blind people [3], [6] and [7]).

In relation to the methodology, advanced familiarity with the interaction with the UI of the system through a screen reader, as well as some specific principles and criteria proposed in the literature [6], especially when interacting via screen reader, were the basis for analyzing the main features offered by the news service. Thus, to test the UI usability through a screen reader, an inspection evaluation method by an expert in accessibility and usability topics (the author of this paper, who is herself blind) has been applied. In particular, we based our accessibility and usability evaluation on the principles such as "Content structuring" (e.g., Logical partition of interface elements, Number of links, etc.), "Content appropriateness" (e.g., Proper link content, Proper names for tables and images, etc.), "interactivity" (e.g., operability via keyboard, Messages and dynamic data management, etc.) and so on. In brief we considered those aspects which can greatly influence the pleasure of reading. The screen reader interprets the Web contents sequentially. So, it is important to understand whether the contents have been properly designed to evaluate the correctness of their linearity and operability via screen reader and keyboard. The methodology herein used is based on the simulation of exploration of the web page in sequence (arrows and Tab keys) or using advanced Jaws commands (Insert + F6 for the list of headers, Insert + F7 for the links, "h", "l" or "t" for navigating the content, etc.). The two sequential and advanced interaction modalities have been considered in order to simulate both beginner and skilled users, and to evaluate the perception and ease of interaction with the interface via keyboard and screen reader. This method could therefore be used and applied by developers to test their Web pages.

3.2 Reading the News
While the Google News home page looks very accessible and simple to use, when interacting via screen reader some usability

issues may be encountered. The main goal of the page is to provide the latest news. Several different sources are made available by the service for each news item. So, the user can read part of the news item (i.e. just the headline and a small block) and then choose the preferred source to read as the full article. In this context, we analyze how a blind user perceives the content and how they move from one news story to another.
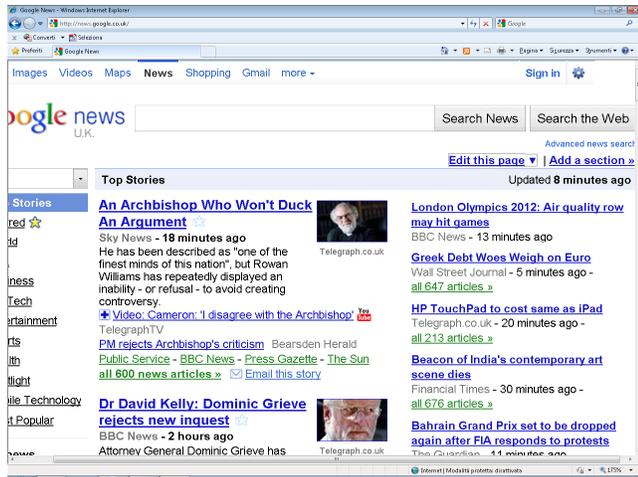

Figure 1. Google News Home Page.

According to the criteria mentioned in section 3.1, the main usability and accessibility issues observed are:

Content structure and layout (columns and Sequential Order).

The contents, including even those arranged on two or more columns, are well sequenced. The screen reader first detects the title of a section, it reads the items in the section, and afterwards it moves on to the next section that may be in the other column.

Sections and Articles (Headings).

A frequently observed strategy for "Logical partitioning of UI elements" is to use landmarks for orientation and navigation within the content [1] or headings obtained with the <Hn> tags [6], which offer several benefits [13] including being able to have "on the fly" a specific table of contents (JAWS command Insert + F6). On the Google News home page, headings are associated both to the sections and news headlines. All headings are at the same level "2" (<H2>) and therefore no hierarchical arrangement is used to structure topic sections and news items. As a result, the user is not able to quickly understand the main sections (i.e. world, health, sports, etc.) since the list of headings (Jaws command F6) shows both sections and headlines (more than 40 items). So the user has to read all the headings sequentially with no distinction between sections and headlines.
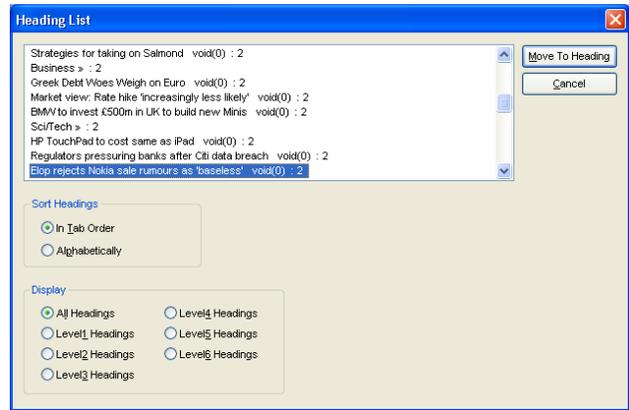

Figure 2. Google news: list of headings captured by Jaws.

Sources of Information (links).

For each news item several links related to various information sources are available (i.e. more than one article for each specific topic). The links can clearly affect the UI perception and operability in terms of accessibility and usability. Here below are some aspects related to the links which affect the user interaction via screen reader:

Number of links - The page contains more than 350 links. This makes scrolling via Tab key or scrolling through the list of all the links (Insert + F7 Jaws command) difficult and frustrating. The number of links or the negative effects derived from the interaction via Tab key should be reduced (e.g. by removing the links from the Tab key navigation order) (see below for more details). Using headings reduces only in part the undesired effects when exploring the UI via screen reader. User interaction should be enhanced also in terms of links.

Graphical links - The large number is not the only drawback regarding links. In fact, several graphical links have no alternative text, making it difficult to understand the associated content. The Tab. 1 shows portions of the Google News page read by Jaws and highlights how the screen reader sequentially interprets the content via the virtual cursor. The links associated with section titles in the table are an example of graphical links without alternative text. In particular, the links related to the titles of articles, which are identified by Jaws as "Void (0)" and graphically represented by the symbol "star", could cause confusion because neither its importance nor the resource linked by them is clear. The word "Void (0)" appears right next to each news headline, as shown in Fig. 2, which reports the list of the headers associated with the news (See the list of news headlines).

Unclear references - Links to external resources that are associated with each title of the article (i.e. the link located on the left for each headline) are not detected by Jaws in the correct way in relation to the sequenced content. In fact, as can be seen in Tab. 1, the link pointing to the information resource seems to be related to the previous article, because it is detected by the screen reader before the news headline. Indeed since Jaws sequentially interprets the content, the link related to the current news is located near the links for the previous news (i.e., the content is not appropriately linearized). Thus, in this way the user can notice that the link is associated with the previous news and not the right one.

Section index - The list of links on the left of the page is a kind of "table of content" for the sections available on the page. By clicking on one section of these links the corresponding page is opened. However, as the links are coded, the blind user might have some difficulty in perceiving correctly the content as a result of: (1) the graphical links without alternative text (see above); (2) the links are not local links within the page, but they point to external resources, although they are labeled with the names of the sections available in the current page; (3) the links are listed in a table without the summary attribute (see Tab. 1).

News Updating (dynamic messages).

When the Google News Page is automatically updated with the latest news (every few minutes), this change is not notified to the screen reader user. There is only a very short sound, but the user needs to explore all the contents in order to perceive and find the updates.

3.3 Content Personalization

Through Google personalization features it is possible to set up the personal news page to show just the preferred stories. In this perspective, the interface can be simplified by removing the unwanted sections, thus reducing the page complexity. In particular the personalization functionality offers the opportunity to add and remove sections, as well as to rearrange the whole News page by giving a preferred order to the news sections. In this way, the interface should be more suitable for a screen reading user. In this section we consider if the procedures used for personalizing the page are truly accessible via keyboard and using a screen reader.

3.3.1 Removing a section.

The procedure to delete a section highlights some accessibility and usability issues related to the interaction via keyboard and to the feedback notification for dynamic messages. To remove the section "Sports", for instance, it is necessary to click on the link "Edit this page". As a consequence a small portion of the page changes and the message "Drag to rearrange page. Click to edit" appears within the content, but it is not automatically announced by the screen reader. The user might perceive that nothing has changed. To find the new message, it is necessary to sequentially explore the page content with the arrow keys. This could take a large amount of time and effort by the user. Then, to choose the section to be removed, the user has to click on its name (e.g. World, Business... Sports, etc.). Unfortunately the screen reader detects each section name as a static text and no indication of the clickable item is announced. This makes the action practically inaccessible and the user cannot proceed. However, if the user could select the section name, the next step (i.e. personalization options) would be more feasible and accessible. To remove a section, a specific checkbox needs to be selected and confirmed with the "Save changes" button. Also in this case small portions are updated without reloading the entire page. The screen reader does not announce those changes, so exploration of the surrounding area is needed. After clicking on the "Save Changes", a short confirmation message is displayed briefly, but the user does not have time to read it, because it almost immediately disappears without notifying the screen reader. Thus this kind of dynamic feedback is inaccessible to screen reader users. This makes the procedure inaccessible for some required actions, and unusable for other activities especially by beginner users.

...

Link Edit this page

|

Link Add a section »

Other News Editions

Combobox U.K. 1 of 71

table with 2 columns and 12 rows

Link img/cleardot

Link Top Stories

...

Link img/cleardot

Link Sports

...

table end

Heading level 2   Updated 8 minutes ago

Heading level 2   Top Stories

...

Heading level 2 Link Sci/Tech »

Link msnbc.com

Heading level 2 Link HP TouchPad to cost same as iPad

Link void(0)

Telegraph.co.uk -

Link Matt Warman

 - 35 minutes ago

The TouchPad, HP's...

Link HP TouchPad to cost the same as the iPad 2 in the UK upon mid-July arrival

CNET UK

        Link HP TouchPad available in UK from mid-July

Mobile News

Link T3

 -

Link Reuters

 -

Link The Guardian (blog)

 -

Link BGR

Link all 219 news articles »

Link Email this story

...

Table 1. Google News: fragment read by Jaws.

3.3.2 Adding a Standard or Personalized section.

Google News User Interfaces have different versions (e.g., English, French, Spanish, Italian, etc.). However, generally speaking, the procedure used to add a new section is in practice feasible, although it is not particularly usable. After clicking the link "Adding a section", the next steps requested are basically accessible. The main issues are related to usability aspects. The main difficulties are related to the page focus, which does not automatically highlight the main and appropriate content. The user is asked to explore via arrow keys or Tab.

Just to give an example, Fig. 3 shows the page directory of the news found by looking for the string "assistive technologies". The results are visualized using tables, one for each identified section, according to the performed search (in our example the two sections "Disability" and "assistive technologies"). As shown in the portions interpreted by the screen reader (Tab. 2), the layout of the results was obtained with tables without "summary" attribute and graphical links with no alternative description (i.e. two important accessibility properties are missing). After confirming the addition of the new section, the user is redirected to the page related to the section that has been just added. So, this may confuse the blind user who does not understand what is happening due to the lack of content overview. To go back to the news page, the user needs to click on the link "Google News". So, in terms of usability, the risk is that the users become confused.

However, despite some usability problems, the user can choose the section to add. Therefore, we can conclude that the procedure was successful, even though more steps were required of the user. Moreover, for each section to be added, the entire procedure must be repeated.
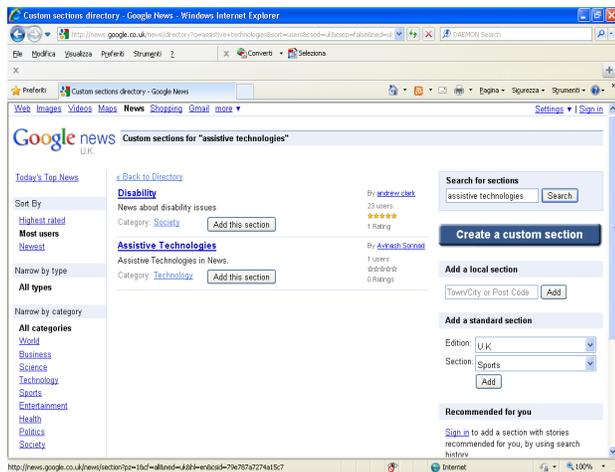

Figure 3 - Adding a new section: results found for "assistive technologies".

3.3.3 Rearranging the news sections.

To better personalize the contents of standard and customized sections in the personal News page, a Google function allows the user to move sections in any preferred order. To do it, it is necessary to click on the link "Edit this page" and then work on the available sections in a similar way as introduced in the previous paragraphs. Unfortunately, this specific function cannot

...

Link graphic Google News

Custom sections for

"assistive technologies"

Link Today's Top News

Sort By

list of 3 items

...

Link « Back to Directory

table with 3 columns and 3 rows

Link Disability

By

Link andrew clark

23 users

1 Rating

News about disability issues

Category:

Link Society

Add this section Button

table end

table with 3 columns and 3 rows

Link Assistive Technologies

By

Link Avinash Sonnad

1 users

0 Ratings

Assistive Technologies in News.

Category:

Link Technology

Add this section Button

table end

Heading level 3 Search for sections

Edit assistive technologies

Search Button

Link Create a custom section

Heading level 3 Add a local section

Edit

Add Button

Table 2 . Portion of Google Personalization page.

be performed via keyboard and screen reader because the drag-and-drop is required. The blind user cannot fully customize their news page. So, this feature is fully inaccessible.

4. DISCUSSION and DESIGN SUGGESTIONS

In this study we analyzed the main aspects of interaction via screen reader with the Google News service. The choice of Google News is based on the identification of a case which has the basic functionalities commonly available in an online news service, such as "Reading the news" or "Service personalization". In this perspective, the results reported in this study represent a starting point for identifying possible principles and guidelines for developers of information and news services.

On the whole we can say that the Google News service is accessible for "reading news". The main difficulties are related to usability issues, while severe accessibility problems result from some steps in the personalization procedure. In short, the main issues observed by analyzing the Google News service can be summarized as follows:

Unusable layout and messages: Unsuitable logical partitioning of contents, pages with too many links and lack of appropriate feedback on updating and dynamic messages make the interaction difficult and frustrating.

Inaccessible and non-flexible procedures: Personalization is difficult and sometimes inapplicable. Adding or removing more than one section implies repeating the whole procedure from the beginning for each section.

Inapplicable section rearrangement: Although the personalization page can be reached in just a few clicks, the section reorganization in a preferred order is not in practice feasible via keyboard and screen reader.

According to usability principles, in order to have a satisfactory interaction, it is necessary for the user to be able to achieve the goal (i.e. easily reading the news) effectively and efficiently. Indeed the user should be able to concentrate on the news without any type of technological interference. Thus the user should be easily able to read (1) the latest news, (2) the available information topics and (3) the listed news for a specific subject. In addition, it would be important to avoid undesired information as well as to arrange the news in a preferred order and position. In short, a news service should offer a powerful personalization function to allow the user to customize their preferences independently of their abilities (i.e. including people with disabilities).

Based on the main issues herein identified as possible difficulties affecting the interaction via screen readers and keyboard, some first suggestions to keep in mind when designing an information service can be identified:

Logical partitioning and clear structure for sections and headlines: the user should be able to quickly obtain an overview of topics and to easily move between both sections (topics) and articles.

Proper content for headlines and sources: the title of articles should be descriptive and include a clear reference to the main source the link points to.

Simple layout and agile navigation: if numerous links related to several information sources or additional references are available for each news item, an agile sequential navigation via keyboard should be made available (e.g. by excluding secondary links from the navigation order).

Easy and flexible personalization: an accessible procedure for layout and content personalization should be offered to simplify the user interface; removing, adding or rearranging sections should be easily possible including via keyboard. Other advanced personalization features (e.g. saving preferred articles, organizing by category, etc.) might greatly facilitate using the system and user interaction as well.

For Web-based information systems, W3C ARIA (Accessible Rich Internet Applications) suite [2] could represent a valuable solution to enhance user interaction through assistive technologies. In order to overcome the partitioning issues, for example, ARIA "landmarks" roles could be used for sections; or, alternatively, each section could be embedded in a DIV block included in a navigation order via Tab key. In this way a screen reader user could obtain the list of subject sections and choose one of them, or can move from one section to the next using the Tab key, and then it is possible to explore the section in a sequential way or move between the headlines using the Jaws command " H " (or Insert+F6 for the list of the News). In addition, ARIA could positively affect the interface regarding the usability issues for the links. The graphical links could be made available either by assigning the standard alternative content (i.e. alt =""), or by assigning the role "link" to the images while maintaining the same look-and-feel. Moreover, for each article there are a group of links pointing to other resources referred to the same news (i.e. the links listed below the news). Those links contribute to making navigation frustrating. So, they could be excluded from the order of keyboard navigation through specific ARIA properties; so that those links are detected when exploring the page in a sequential way, but they are not reachable by the focus when moving via Tab key. Consequently the user could move via Tab key article header by header, and they can explore sequentially via arrow keys when reading a desired news story.

5. CONCLUSION

In conclusion, the user interaction could be made not only accessible but especially satisfactory for those who use assistive technologies. Using ARIA through roles and specific attributes, the user interface via screen reader could be made accessible and more usable, especially for those functions that are currently difficult or impossible to use. Currently ARIA-based solutions are partially supported. Just some ARIA roles or properties work well with the screen readers and Web browsers. So, in order to have a really simplified user interaction for people with disabilities, both Web designers as well as user agent and assistive technologies should take into account and make practical use of the new recommendations and indications.

Future work includes a prototype for evaluating possible ARIA-based solutions to enhance user interaction via screen reader when using News Google service. Guidelines for news and information services will be more refined. Also accessibility and usability of reading news from mobile devices will be considered.

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