

Web 2.0: Twitter and the Blind

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ABSTRACT

The latest Internet phenomenon is Twitter, a micro-blogging platform that in just a few years has attracted millions of users. With short messages (tweets), following and followers, Twitter is reshaping ways of interacting online. Thus, its accessibility is very important for social interaction as well as for work. In this paper we discuss the accessibility of Twitter for blind users interacting via screen reader and voice synthesizer. First, basic functions such as registration, login, posting and reading tweets have been analyzed highlighting accessibility issues, then a discussion is based on the analyzed case study, offering suggestions for designers.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces – *Graphical user interfaces (GUI)*. K.4.2 [Social Issues]: Handicapped persons/special needs.

General Terms

Design, Human Factors.

Keywords

Accessibility, usability, Web 2.0, social network, blind, screen reader.

1. INTRODUCTION

Web 2.0 is the latest way to use the World Wide Web and its resources, moving from the passive reading of Web pages to a more active and collaborative interaction that facilitates participatory information sharing, interoperability, user-centered design, and collaboration. This new mode of interacting with the Web is currently used in many application fields, including working and learning through collaboration and cooperation. Web 2.0 also promotes socialization and interaction by exchanging news, comments, photos, videos, etc. Social networks like Facebook, Twitter, Delicious, and Flickr, allow people to stay in touch, make friends and much more.

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The social network system is clearly evolving, and is increasingly used by communities. For this reason it is important for the system to be open and usable for all, including people with special needs. Furthermore, it is crucial for user interfaces (UIs) to be not only accessible to everyone, but also easy to use. Usability plays an important role in the use of social networks because the user should be able to focus on content, and not waste too much time on the perception of the interface. If basic actions in a social network (such as reading messages or posting news) take a long time for users interacting via assistive technologies, they could decide to leave the system due to lack of time, or even frustration. Therefore, interaction should be very simple.

Accessibility and usability should always be considered when designing a user interface, in order to provide universal access for everyone. Accessibility allows users to reach on-line application content, while usability provides simple, efficient and satisfying navigation and interaction. Guidelines for designing accessible and usable Web user interfaces have been proposed by the World Wide Web Consortium, Web Accessibility Initiative group [1].

This study analyzes important aspects of interaction encountered by visually-impaired people in the social network environment. To better focus on the main issues, we will refer to the platform offered by Twitter to analyze usability and accessibility aspects when interacting via screen reader. In [2] we previously explored how a blind user interacts with the main pages of Facebook: when interacting via screen reader, even basic actions like reading messages posted by friends can be very difficult, because the UI is complex and hard to perceive sequentially as occurs with speech synthesis. In this paper we will examine interaction with Twitter using screen readers, to discover whether they present similar difficulties. To this end, we will analyze the following functionalities:

- new user registration and log-in
- adding tags
- posting a new message (tweet)
- reading tweets (posted by others).

According to the results of this analysis and previous studies, the paper will attempt to outline considerations on social network accessibility and usability aspects for people interacting via screen reader.

2. RELATED WORK

Microblogging has introduced a faster and more efficient mode of communication: "by encouraging shorter posts, it lowers users' requirements of time and thought investment for content

generation" [3]. Huberman et al. further characterized its essence: "Twitter has mashed up personal publishing and communication, the result being a new type of real-time publishing" [4].

Java et al. analyzed the community intention by aggregating behavior across communities of users. Understanding users' intentions, motivation and way of using microblogging can help attract and retain more users. This is especially valuable for sociology and viral marketing [3].

Several studies investigate the use of Twitter as an educational tool. Ebner and Reinhardt studied the use of Twitter in one popular e-Learning conference. Using the conference hashtag, authors gathered and aggregated conference-related tweets observing (using statistical analysis) that the number of tweets as well of Twitter participants increased arbitrarily during the conference. Top trendmakers indicate who leads the online community and key terms show the community interests [5]. Grosseck et al. investigate the educational use of Twitter based on literature and real experience, asserting its validity as a tool for effectively responding to a student's learning needs. Changing course rules, delivery methods, favoring collaborations, and microblogging model new pedagogy responses [6].

Measurement studies investigate social factors such as Measuring User Influence in Twitter (the user's audience, i.e., number of followers; the ability of the user to generate interesting content with pass-along value, i.e., number of re-tweets containing one's name; the ability of a user to engage others in a conversation; i.e., mention influence) [7].

Recently Kwak et al. crawled the entire Twitter site, with different ranking algorithms (number of followers, PageRank) offering a better understanding of overall Twitter dynamics. Twitter open APIs represent a valuable opportunity for studying human behavior [8].

Zhao and Rosson investigate the microblog's potential impact on informal communication at work. Results suggest that microblogging, favoring the sharing of personal details of lives, interests, preferences, and opinions between colleagues, may enable personal relations and generate new opportunities for building social connections that may favor future collaboration at work [9].

Honeycutt and Herring suggest potential design changes for making microblogging platforms such as Twitter more suitable for collaboration. Customization of individual and group spaces would favor the expansion of communication and collaboration environment [10].

However, to the authors' knowledge, no specific study has been conducted on the use/interaction of the Twitter user interface.

A proposed easy-to-use Twitter web application is Accessible Twitter (<http://www.AccessibleTwitter.com>), that can be used for accessing Twitter contents and it is based on web accessibility and web standards principles. Just a short time ago, Accessible Twitter changed its name to Easy Chirp (<http://www.easychirp.com/>) but the application is the same, as is the behavior (in the following we will refer to 'Accessible Twitter' but we could equivalently use 'Easy Chirp'). This application aims to provide a more accessible alternative version to users who interact via assistive technologies – such as blind people using screen readers. The system prototype (currently a beta version) includes the most important functions offered by the original version. Even when considering the extreme importance of having such applications, there are still a few issues to overcome in order to guarantee accessible Twitter interaction for all:

- The user must be aware that the app exists.
- The user must be able to install it; at this time the app is only English-based.
- The user has to grant the access right to the application to access her/his Twitter account. The app would execute nearly all operations (read/post tweets, see followers, add following, update user profile), while preserving confidentiality (private messages and the user password are not seen).
- Psychological considerations. The app user interface changes with respect to the original Twitter interface. The blind or visually impaired user may consider the app a non-inclusive opportunity, preferring to have direct access to the original Twitter web site.

For all these reasons, it is very important for Twitter to incorporate the principles of Accessible Twitter in its interfaces, while maintaining its appealing "look&feel".

3. THE CASE STUDY

In order to analyze the main issues encountered by blind people when interacting with a social network, in this study we consider the English version of Twitter.

3.1 Method

To evaluate the Twitter user interface, the common commercially available screen reader JAWS, English version 12.0 [11] has been used together with the Mozilla Firefox browser, versions 3.6 and 4. In order to analyze the Twitter environment and its main functions, an evaluation inspection has been applied. All three authors of this paper participated in this analysis. They have good knowledge of accessibility and usability of user interfaces for the blind; one, totally blind since childhood, is an expert in interacting with screen readers.

3.2 Accessibility and Usability Issues

To get an overview of the system interaction, main accessibility and usability problems experienced by a blind user are summarized. In brief, general observed issues include:

- Number of links: too many links (most of them repeated) are encountered when reading the tweets
- Info updates: use of AJAX (asynchronous JavaScript and XML [12]) to update portions of a page without specific support to communicate the changes to the screen reader (blind users do not perceive changes after clicking on a link)
- *Adding an interest*: not easy to find the item to add
- *Adding someone to follow*: the search for a person is not usable -- there are too many steps/clicks before to reaching the 'follow' button

and specifically for Tweet reading:

- Tweet region: not easy to localize the beginning of tweet area
- Tweet content: difficult to detect the 'tweet text' in the sequential reading (the screen reader announces, in the order, the images used as a icon by the user, the user nickname, the link to the user page, the tweet text, the link, the keywords, the date ...)

- Tweet navigation: difficult to navigate among tweets (moving quickly from one to another) without reading all the tweets sequentially.

In the following sections we will describe in more detail how the main Twitter functions are perceived and activated by a blind user when interacting via the JAWS screen reader.

3.3 Registration and Log-in

The log-in procedure does not present particular difficulties. The screen reader correctly detects the two required fields – i.e., the user name and password edit boxes – both via arrow keys and Tab key. Some issues can arise when typing an incorrect user name or password due to the lack of immediate readability of the error message: the user needs to read the content sequentially until encountering again the two edit fields (for user name and password), and then finally encounters the dialogue message about the incorrect user and password.

More difficulties occur when registering with the system. The field labels are not easily detected by JAWS either when moving via Tab key in 'Editing' modality nor when reading the page sequentially in the 'Virtual' modality [13]. In fact, for each field the label is detected after the edit box. Consequently, for the first edit box (i.e., name) the screen reader just announces that there is an edit field; for the second one the label of the previous one is read as it is the current label. In this way the user cannot accomplish the registration task correctly. Some additional difficulties also occur when the user name or the e-mail are already registered or invalid. In fact, as with the log-in procedure, in order to detect the error messages the user needs to read all the content sequentially.

3.4 Posting a New Tweet

To post a new tweet, first the “What’s happening?” edit field must be identified. The user is able to quickly move to that field both via Tab key, via arrows or through the heading level 2 (by pressing the “h” key). Some issues appear after writing the short text because after pressing the Enter key nothing occurs; otherwise if the user reads the content sequentially, there are two possible links below: “add your location” or “tweet”. It would be clearer if the two links were two buttons so that the user could quickly understand the available actions associated with the edit field. In addition, one of them should be selected as default when pressing the Enter key on the edit box after writing the message.

3.5 Adding Someone to Follow

Let us consider adding some “tags to follow” according to one’s interests. After logging in, by clicking on the link “who to follow” the corresponding page is opened. Here the user can search for interests by typing a specific keyword. The following screenshots report the results found with the keyword “accessible”. The user can reach “Results for: accessible” thanks to the heading <h2> assigned. Reading the results is possible and accessible, but a little difficult because a sequential way of reading is requested (Fig. 1). Furthermore, when clicking on a certain “follow item_name”, its description is reported below all the results and the user is unable to perceive it. No sound and no message are announced to the user, so they are unable to understand that something has been changed. This is just one example of what happens to various actions due to the partial updates of a page.

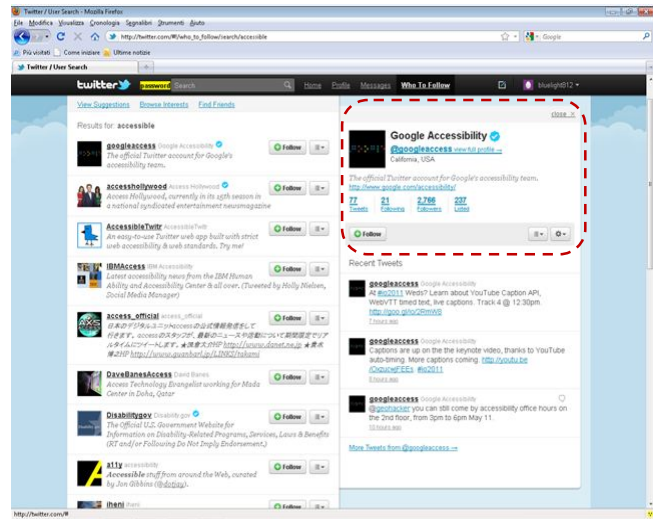


Fig. 1. Twitter: search results for “accessible”

In addition, even if the user reaches the updated portion – in this case the portion with the title “Google Accessibility”, there is no clear indication of what must be done to add the current “follow” to the own account. For example, the screen reader interprets the following content (red dotted box in Fig.1) sequentially:

```

Link close ×
Link graphic Google Accessibility
Heading level 2 Google Accessibility
Link @googleaccess view full profile →
California, USA
The official Twitter account for Google's
accessibility team.
Link
http://www.google.com/accessibility/
list of 4 items
Link 77 Tweets
Link 21 Following
Link 2,766 Followers
Link 237 Listed
list end
Follow
  
```

Fig. 2. Fragment read by JAWS - Twitter search: details about Google Accessibility account

As we can see, the word “follow” at the end of the block is not indicated as a link or other interactive element. Thus, the user does not perceive that he/she has to click on it to add “Google accessibility” to their own account.

3.6 Reading the Latest Tweets

This function is not very usable. Moving link by link means reading several links of the persons that the user is following, like “googleaccess”, or “n. minutes/hours ago”. Indeed the latest tweets are not listed and shown in way that is easily perceived via screen reader or in a sequential way. The following figure reports

a list of the kind of links that are perceived via screen reader (i.e., through the Insert+F7 command or via Tab key).

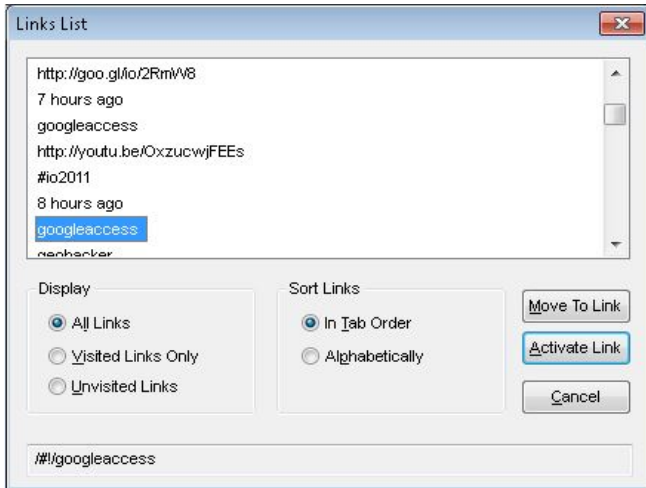


Fig. 3. Tweets from @Google Access: List of links

When reading the tweets sequentially via arrow keys the content is certainly accessible, that is, the screen reader correctly detects the text and links. The main issues are related to the simplicity of getting the new tweets and quickly navigating among the tweets. If the user wants to skip directly to the next tweet text there is no specific way to do it. Moving via Tab key is not a possible strategy due to the above mentioned inconvenience. This kind of issue is more feasible when accessing the Twitter system via Accessible Twitter since the UI is simplified. Indeed, a heading level has been added to each tweet writer so that the user can skip from one tweet to another, or get an overview of the tweets displayed on the page. However, some usability issues can be observed: (1) there are several headings with the same content (see Fig. 3) and (2) for each tweet too many links are displayed. This means that the user is probably able to skip from one tweet to another, but it is still difficult to read the content sequentially.

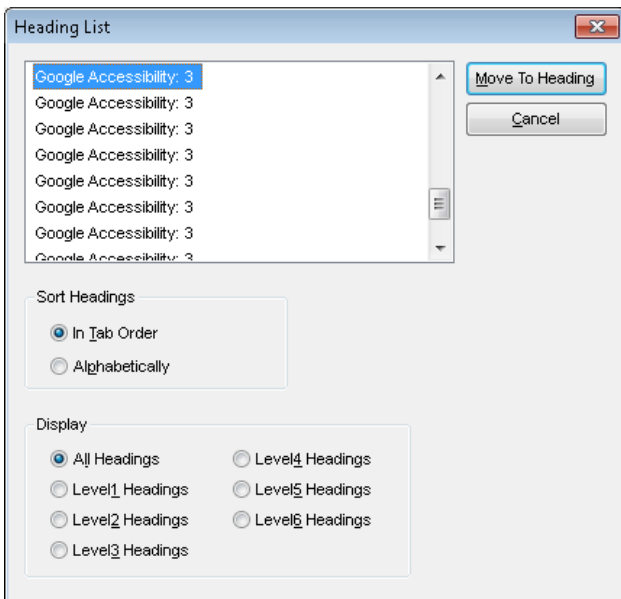


Fig. 4. List of heading levels assigned to the tweets captured on the AccessibleTwitter page



Fig. 5. Fragment read by JAWS about a published tweet captured on the AccessibleTwitter app

As we can see in the figure above, each tweet is quite “long” when reading sequentially, since the user listens many times to the word “Link” or “Link graphic”. Moreover, as highlighted in the previous fragment, when a link is encountered, the current line is split into several parts because each link is placed as a single element of a virtual line. Consequently, the lines are short and fragmented. Thus the reading can be tiring and frustrating even when an additional tag has been added to the tweet writer or some WAI-ARIA tags [13] have been added to partitioning the page portions (i.e., banner, navigation and main landmarks).

The idea used for Accessible Twitter could be revised and extended to the original on-line version. For instance, in addition to the landmarks used, other roles and attributes could be applied to improve the UI by maintaining the original layout at the same time.

4. DISCUSSION

Web 2.0 changed people's behavior from being passive readers to active content producers. Therefore it is important to ensure that all users can enjoy this opportunity regardless of their abilities and limitations. Moreover, social networks are increasingly used as a

tool for collaboration and sharing as well as for learning. Thus there are good reasons to open up the Web 2.0 to all, including those who are forced to interact differently with special technologies and systems. Specifically, Twitter has proved to be a valuable tool for many purposes: info and file sharing; commenting on news, books, articles, opinions; organizing events and conferences; arranging travel, etc.

Regarding Web accessibility, several proposals and studies have been presented, as well as guidelines and principles, some of them already applied and tested. However, users who interact through assistive technologies still encounter considerable problems and difficulties. Therefore, services like Twitter should not only be accessible but also be easy to use through assistive technologies (e.g., screen readers, screen magnifiers, or special keyboards).

In Section 2 we mentioned Accessible Twitter (now Easy Chirp) as an alternative version designed and developed for people who use a screen reader. This new user interface is more accessible and easier to use, thanks to WAI-ARIA suite [13], but still presents usability problems, especially in sequential reading of content. Furthermore, this approach does not satisfy the basic principles of accessibility and universal design, since alternative versions, although accessible, may not be perfectly in line with the main version, and can make the user feel 'different'. However, even when it is fully accessible, usable and completely consistent with the original system, the choice of an alternative version is not the best way to satisfy full inclusion principles in terms of equal access to the same tools and services.

When designing and developing a system, such as social networks like Twitter, some basic concepts should be taken into account:

- User Interfaces should be as simple as possible to allow quick search and smooth interaction according to the context (e.g., a simplified list of the results for searches, tweets when exploring the content, etc.)
- The main page content should be easy to perceive, such as reading the tweets, quickly jumping from one to another (e.g., making the list of tweets easier to scroll by keyboard and/or screen reader), etc.
- User interfaces and/or contents should be customizable by setting the layout features, such as which sections/parts are to be shown or hidden, etc.

Comparing the accessibility and usability issues raised for Twitter with those observed for Facebook [2], we notice that the accessibility and usability of the two social networks for blind users is quite different. The environment and user interface of Twitter are simpler than those of Facebook. The Facebook environment is not easy or very accessible for the blind, while with Twitter the main problems are related to usability aspects. The main issue of Facebook is related to the announcement of new events or messages (i.e., notifications for the user are not automatically detected by the screen reader); in practice to perceive the messages the user has to explore all of them in a sequential way, requiring great effort and being stressful for the user. There are other accessibility and usability issues related to the form elements (such as when the focus moves inappropriately from a field to another one; several labels are not identified or some edit boxes are not detected by JAWS or are very difficult to use) and with the "security checker" (captcha) that is not appropriately made accessible (the audio version provided is unclear) [2].

5. CONCLUSION

Social networks are spreading rapidly throughout our society, and are a new way to stay in touch and receive/share information. If social networks have been primarily considered tools for young people, today many services rely on this kind of channel. Full accessibility and usability must be guaranteed to avoid the exclusion of many users. In addition, social networks have editing features which are also offered by many other collaborative environments as well as by e-learning tools. The issues and considerations observed here can be easily referred to similar Web 2.0 systems such as e-learning tools.

In this paper we carried out a preliminary study to investigate accessibility and usability of Twitter, a very popular microblogging tool, for a blind user interacting via screen reader. Results of inspection via Jaws screen reader clearly indicate several usability issues in main interaction functions. Lastly, some basic general suggestions have been proposed to improve the experience of blind users with microblogging websites and related functions.

Although accessibility guidelines and criteria are often applied to web pages, and technologies and solutions are up-to-date to favor universal access to systems, unfortunately certain barriers still exist between user and system. To make a system very easy to perceive and use, the technology should be invisible and transparent; furthermore, the system should be simple and allow the user to focus on content.

User interfaces should be adaptable and customizable, not just according to the skill of the user, but also to the context. For example, if the aim of accessing the system home page is to read the latest tweets/breaking news, the page should provide/focus mainly on this content before the others even when the user is using an assistive technology. In practice, both User Interface and Assistive Technology developers should keep in mind that specific mechanisms and techniques should be combined and applied in order to facilitate data communication between the tools. Assistive technologies such as screen readers cannot offer all needed support unless the system takes into account suitable features for improving user interaction. Moreover, a more usable and adaptable system would certainly be more inclusive for any kind of user. Further improvements should be directed to:

- Increasing the UI's ability to adapt itself to user needs, according to both skills and context/functionalities available
- Reducing actions required of the user, to minimize the effort needed to find something and also minimize the possibility of getting lost among the functions and content of complex UIs
- Improving the information given, to provide immediately and automatically what is (most likely) needed in the current context.

In conclusion, to improve interaction, it is crucial to take into account a variety of users, their abilities and the characteristics of assistive technologies. Not only must developers of social network user interfaces meet the requirements of universality, but developers of assistive technologies and user agents (such as browsers) should also allow better interaction and then promote the new ways of interacting required by Web 2.0.

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