Health information in Italian public health websites: moving from inaccessibility to accessibility

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Abstract

Aims: In January 2004, the Italian government passed new legislation designed to give people with disabilities access to online services. Starting from the new legislation requirements, the purpose of this study is to investigate whether Italian Local Health Authorities websites are accessible to users with different abilities.
Methods: One hundred and seventy websites were analysed evaluating their compliance to the World Wide Web Consortium (W3C) Priority 1 guidelines via a combination of appropriate accessibility testing methods. This review was carried out twice: the first time it took place between the end of 2003 and May–June 2004. The same survey was repeated again in December 2004, after the issuing of the draft of the Implementation Regulations for The Stanca Law in July 2004. In this second survey, all the websites analysed before were checked again to establish if some measures to make those sites accessible were taken.
Results: Seventy-six per cent of the analysed websites fail to satisfy the most basic W3C requirements, but Italian Local Health Authorities websites are likely to present significant improvements to access for some disabled user groups: the number of accessible websites increased consistently between the first and the second review.
Conclusions: It seems that awareness of web accessibility issues is increasing among developers of health information websites because of law enforcement. Recommendations for future research and development are offered.

Introduction

The World Wide Web is barely 10 years old and in this short period of time it has had a huge impact on the way we live by spreading rapidly into all areas of society. The Internet has become a key source for many kinds of information, from news to distance learning, from government services to education. Web-based information seems to be increasingly important in the health field as a vehicle for communication between governmental administrations and people.[1] The Web can have an enormous potential for disabled people:[2] it can make their life easier, it can eliminate many barriers, by allowing them to do things that might have been impossible or very difficult in the past. For people with disabilities, the Web is often the only source of information they may access without having to depend on others.[3] People with different abilities must frequently overcome additional

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obstacles before they can enjoy the full range of information, services and social interaction offered by the Web. Nine times out of 10 they experience that websites of interest fail to satisfy even the most basic standards in providing access to the Net. With the introduction of multimedia content, the Web is becoming an information medium that is neither accessible nor easily interpreted by assisitive technologies used by people with disabilities.[4] Assistive technologies consist of software or hardware that has been specifically designed to assist people with disabilities in carrying out their daily activities. Examples of assistive technologies specifically designed for disabled people using personal computers are: screen readers, used by people who are blind or have reading disabilities, to help them read textual information through synthesized speech or braille displays; alternative keyboards, for people with certain physical disabilities which simulate the keyboard.[5]

Aims and objectives

Trying to make web content accessible to everyone is next to impossible but, in general, accessibility can be defined as the ability of anyone, including those who have disabilities, to access content and information on the Internet. Starting from the new legislation requirements, this paper provides an evaluation of the Italian Local Health Authorities websites[6] with the purpose of identifying whether basic accessibility standards are being met and what measures might be needed to ensure or improve equitable access. Italy's National Health System (Servizio Sanitario Nazionale) is administered by Local Health Authorities which have the task of planning and organizing services to citizens at a basic level. The focus of this study is on websites built by these units playing a fundamental role in terms of users' information needs. With regard to these websites, a selection of key pages were examined in order to check if the sites were:[7]

- assistive technology compatible;
- readily intelligible;
- intuitive and easy to navigate;
- consistent in design and language;
- Web Content Accessibility Guidelines (WCAG) 1.0—Priority 1 compliant.

Literature review

The spreading of the Internet as a medium of information transmission is a phenomenon largely discussed and analysed. The number of individuals seeking health information on the Internet is growing at a rate that exceeds the rate of overall web usage. It is estimated that in 2002 Internet health sites were among the fastest growing of all monitored types of sites.[8] It is also estimated that seventy-odd per cent of people[9] search online for health-related information for their decision making.[10] Statistical data referring to the number of individuals with disabilities show that almost 20% of the US population[11] and about 10% of European citizens[12] are affected by a disability so it can be easily understood how important it is to ensure that this new and powerful technology does not leave millions of people behind. There are 37 million people with disabilities in the EU, while the number of older Europeans is steadily increasing. These groups risk severe social exclusion as a result of the range of technical barriers they face when they use the Internet.[13]

An investigation carried out in 2002 by McMullin[4] analysed a huge number of websites operated by Irish organizations and can be seen as a first step towards a further monitoring of the evolving state of Irish web accessibility. This is one of the first examples of reviews conducted on this topic. As 2003 was designated as The European Year of Disabled People by the European Commission,[14] reports analysing the problem of the right to access the Web by people with disabilities were issued by many European countries. Specifically relevant is the formal investigation on British publicly accessible websites carried out in 2004 by the Disability Rights Commission drawing practical conclusions for the future development of website accessibility and usability.[1]

The European Union is increasingly focusing on issues regarding access to information for all. In September 2004, the European Internet Accessibility Observatory Project (EIAO) was begun in co-operation with industry and service providers. This survey brought together six countries across Europe.[15]

In Italy there are not many studies regarding the analysis of the accessibility of websites, comments

and updates were found on a governmental website specifically designed to give information about legal issues regarding the Italian Law on accessibility.[16]

For a general overview on accessibility and disabled users, Lilly[2] and Davis[17] describe how web designers can build sites accessible to everyone; Alexander[13] and Zeng and Parmanto,[18] give detailed reports on this issue. These were useful for obtaining methodological suggestions and practical tips to evaluate the accessibility of websites.

Specifically relevant for the survey was the World Wide Web Consortium (W3C) website.[5] To determine the website's accessibility rating it was decided to use a checklist based upon the W3C's WCAG Priority 1 checkpoints list.[19] To get a quick overview of possible accessibility problems, several accessibility validators: Bobby, Cynthia Says Portal[20] and Torquemada,[21] as suggested by the W3C Consortium.

In order to establish which measures might be needed to ensure equitable access for this survey, advice was provided by Jim Byrne,[22] and tips listed by the World Wide Web Consortium.[23]

Accessibility regulations in Italy—The Stanca Law

During 2003, designated the European Year of Disabled People by the European Commission,[14] all European countries were involved in issuing a growing body of national laws and in planning specific policies which addressed accessibility to the Web by disabled people. The accessibility of public websites is becoming mandatory for all European Public Administrations. The Italian government has passed new legislation designed to give people with disabilities greater access to online services. The 'Stanca Law on accessibility'[24] issued in January 2004 and its enforcement regulations (published in May 2005) forces all Italian government authorities to make their websites fully accessible and will develop non-compulsory access standards for private sector sites introducing disciplinary sanctions for public sector managers who do not comply. Under this law, new contracts drawn up by government departments to build Internet sites will not be considered valid unless they comply with accessibility criteria.

The availability of technical guidelines on accessibility does not automatically lead to their application. In Italy, the problem of accessibility to public websites has been faced quite adequately at a governmental level. Initiatives have not been limited to a mere legislative act, but include all aspects involved in its application, such as training, assistance to operators and finding the most suitable tools. Article 10 of The Stanca Law provides regulations that establish the criteria and the general organizational and operational practices for achieving accessibility.

Two types of website accessibility evaluation are envisaged:

- Technical evaluation carried out by experts using validation systems and involving the establishment of a 22-requirement compliance which constitutes the minimum level of a website accessibility.
- Subjective evaluation, conducted with the participation of users with different types of disability, on the basis of empirical considerations, which identifies 11 essential criteria to be taken into account.

The Stanca Law also foresees a quality seal or logo which awards accessibility requirement compliance. The logo, a personal computer joined to three human figures (Fig. 1), is given to websites on passing a technical evaluation, which is the minimum requirement for accessibility. The different accessibility compliance level, indicated by one to three stars, is given to websites passing the subjective evaluation.

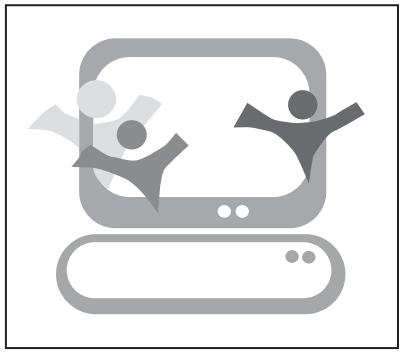

Figure 1 Italian accessibility logo

Methodology

Research design

One hundred and seventy Italian Local Health Authorities websites were checked to assess their compliance with the W3C's WCAG 1.0. These recommendations specify 14 guidelines with an associated set of checkpoints. In total, there is a set of 65 checkpoints ranked in three categories, defined by the W3C as Priorities 1, 2 and 3 according to their relative importance in enabling web access by people with impairments. In this study, the sites were assessed against the Priority 1 checkpoints only, the minimum requirements for accessibility that all sites must meet.[19]

The review was carried out twice: the first time it took place between the end of 2003 and May–June 2004. The same survey was repeated again in December 2004, after the issuing of the draft of the Implementation Regulations for The Stanca Law in July 2004.[25] In this second survey, all the websites analysed before were checked again to establish if some measures to improve their accessibility had been taken.

Methods and tools

A working method to investigate problems associated with accessibility involved the following steps:

Selection of pages
For each site, the analysis referred to the home page, as it shows the core activity of the agency and often determines whether users proceed further into the site. Moreover, it was decided to check several pages conveying useful information through tables, maps, graphics and their accessibility for people with different types of disabilities.

Use of Web Content Accessibility Guidelines 1.0
The selected pages were analysed to assess their compliance with the WCAG 1.0 set out in 1999 by the W3C.

A form listing Priority 1 criteria, as stated by W3C (Fig. 2), was utilized to check the websites and collect the data for evaluation.[19]

Additional checkpoints related to Priority 2 and 3
During the check, it was noticed that even if a site was found to be Priority 1 compliant it might still present accessibility problems for some disabled users, so other issues, identified as fundamental, such as keyboard use, search functions, site map and navigation bars, were included. These issues are all related to navigation mechanisms and information retrieval tools and can check if a website is intuitive and easy to navigate.

A web page's adherence to Priority 1 criteria was determined in a two-step process:

Use of automated testing
A number of free software products have been utilized to carry out automated assessments against the WCAG 1.0 and check if these websites were assistive technology compatible. These web-based accessibility checkers are:

- *Bobby*:[26] it allows pages with stylesheets and scripts turned off to be viewed;
- *Cynthia Says Portal*:[27] particularly useful for evaluating the use of text alternatives for non-text elements on a page;
- *Torquemada*:[28] identify quickly which parts of a page are in error and the HyperText Markup Language (HTML) code.

During the last check, WebXACT,[29] a service that tests single pages of web content for quality, accessibility, and privacy issues, was also utilized. It is important to underline that on 1 May 2005 Watchfire transferred its Bobby online service to WebXACT.

Use of manual testing
It is important to point out that automated checkers were used as indicators of accessibility; additional manual controls were set out to determine more precisely if the websites were readily intelligible and consistent in design and language.

The automated tools designed to help to make a website accessible must be used with caution. They provide automatic checks for only a limited number of accessibility problems. They are useful for issues such as locating missing text alternatives to graphics and checking untidy HTML coding. Nevertheless, more is needed to ensure that a site is accessible to all users. Software tools cannot evaluate a site for layout consistency, ease of navigation, provision of contextual and orientation information and use of clear and easy-to-understand language. The tools do not check what a site looks like without the graphics,

In General (Priority 1)

1.1 Provide a text equivalent for every non-text element (e.g., via 'alt', 'longdesc', or in element content). *This includes*: images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ascii art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video.

2.1 Ensure that all information conveyed with color is also available without color, for example from context or markup.

4.1 Clearly identify changes in the natural language of a document's text and any text equivalents (e.g., captions).

6.1 Organize documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document.

6.2 Ensure that equivalents for dynamic content are updated when the dynamic content changes.

7.1 Until user agents allow users to control flickering, avoid causing the screen to flicker.

14.1 Use the clearest and simplest language appropriate for a site's content.

And if you use images and image maps (Priority 1)

1.2 Provide redundant text links for each active region of a server-side image map.

9.1 Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape.

And if you use tables (Priority 1)

5.1 For data tables, identify row and column headers.

5.2 For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells.

And if you use frames (Priority 1)

12.1 Title each frame to facilitate frame identification and navigation.

And if you use applets and scripts (Priority 1)

6.3 Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page.

And if you use multimedia (Priority 1)

1.3 Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation.

1.4 For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation.

And if all else fails (Priority 1)

11.4 If, after best efforts, you cannot create an accessible page, provide a link to an alternative page that uses W3C technologies, is accessible, has equivalent information (or functionality), and is updated as often as the inaccessible (original) page.

Figure 2 W3C Priority 1 checkpoints

Table 1 General data related to the first survey (June 2004)

	Accessible	Non-accessible	Under construction
Number of websites	18	103	49
Percentage of websites	11%	60%	29%

Table 2 Most frequent errors recorded against WCAG 1.0 Priority 1 checkpoints

Priority 1 checkpoints	Error type	Percentage of websites in error
1.1	Missing alternative text for non-text elements	83%
6.1	Misuse of style sheets	69%
5.1, 5.2	Missing data tables markup	37%
12.1	Frames without titles	35%

Table 3 Less frequent errors recorded against WCAG 1.0 Priority 1 checkpoints

Priority 1 checkpoints	Error type	Percentage of websites in error
1.2, 9.1	Misuse of image maps	25%
2.1	Misuse of colour	22%
14.1, 4.1	Misuse of language	15%
1.3, 1.4	Misuse of multimedia	0%

Table 4 Errors recorded against additional checkpoints related to WCAG 1.0 Priority 2 and 3

Additional checkpoints	Error type	Percentage of websites in error
13.3 (Priority 2)	Absence of a site map	85%
13.5 (Priority 3)	Absence of a navigation bar	82%
13.7 (Priority 3)	Absence of a search function	57%
9.4, 9.5 (Priority 3)	Absence of keyboard shortcuts	13%

without colours, with different resolutions, with different font sizes or through a text-only browser. This step involved the examination of potential problem areas identified by the automated checkers, such as the appropriate use of colour, the adequacy of text labels, the format and presentation of information presented in tables and the use of clear and simple language in the document content.[18]

Data analysis

First review (June 2004)

Data analysis

The first analysis results showed that, out of 190 Italian Local Health Authorities, 170 offered their services by the Web or they were in the process of developing their own website. Data collected are shown in Tables 1, 2, 3 and 4.

Websites under construction were not considered in the first test therefore the data collection and discussion refers only to 121 sites of which 103 were found non-accessible.

Discussion

Most errors, identified on the non-accessible websites (Table 2), were recorded against WCAG 1.0 checkpoints 1.1, 5.1, 5.2, 12.1, 6.1. These specific accessibility errors, which represent 66% of the total number of errors noticed, are now discussed:

Checkpoint 1.1—missing alternative text for non-text elements. One of the most fundamental requirements for accessibility is the provision of text

equivalents for non-text elements. The use of ALT (Alternative Text) attributes is not only important for access by users with speaking browsers or with images switched off but it is also beneficial to other users, especially non-readers or people who have difficulty reading. It is important to underline that a high percentage of the checked sites failed to meet this checkpoint.

Checkpoints 5.1, 5.2—missing data table markup. In order for a data table to be accessible, it must have the proper markup in the HTML to associate data cells and header cells. When the proper HTML markup is in place, users of accessible browsers can navigate through data tables one cell at a time, increasing the comprehension of more complex tables. Most of the analysed sites do not use data tables at all, but where there are data tables they are not properly marked up.

Checkpoint 12.1—frames without titles. The use of frames is generally not recommended; it can cause problems for users with visual impairments. If frames are not properly titled it is difficult for users with specialized software to understand the organization of the page or to navigate through it. Therefore, most of the sites do not use frames, as it is found that those who use them do not provide meaningful titles which describe the purpose of the frame.

Checkpoint 6.1—misuse of stylesheets. The WCAG 1.0 recommends using style sheets in order to separate content from presentation to ensure that documents can be read when they are turned off. Users with colour blindness or low vision may choose to override the style used on web pages in order to modify the presentation according to their needs (e.g. avoid colours that they cannot distinguish, increase the contrast between text and background colours, make font sizes larger). It is worth noticing that most of the sites do not use style sheets or apply them in a wrong way.

Other Priority 1 checkpoints. For all sites, accessible and non-accessible, it is interesting to point out the data referring to some other checkpoints against Priority 1 set out by the W3C guidelines (Table 3). The results show none of the websites use multimedia presentations or image maps and colour to convey information and most of them use an appropriate language for the site content. That means that, in general, Italian Local Health Authorities websites are built in a simple and clear manner, without unnecessary images, applet and scripts.

Additional checkpoints. The analysis focused also on additional checkpoints related to Priority 2 and 3 (Table 4) referring to navigation mechanisms and information retrieval tools. In particular, the presence in the websites of some navigation tools such as keyboard use, search functions, site map and navigation bars was checked. Navigation mechanisms are important to people with cognitive disabilities or blindness, but they may also benefit all users. Content should be presented in a clear and simple manner, and should provide understandable mechanisms to navigate within and between pages. In this case, a high percentage of sites allow users to navigate by keyboard and have a search function, while few sites are provided with a navigation bar and less have a site map.

Second review (December 2004)

Data analysis

After the issuing of the draft of the Implementation Regulations for The Stanca Law in July 2004, all 170 of the websites were controlled again. In particular, those sites which were under construction and non-accessible were checked again to find if any measures to make them Priority 1 compliant were taken.

Data collected are shown in Table 5.

Discussion

The new control has pointed out some interesting differences which underline significant improvements on the accessibility of websites (Fig. 3).

Changes in the accessibility of websites highlighted by the second survey. The number of websites found to be Priority 1 compliant increased significantly over a short period from 18 to 41 (128%). Of those sites, 10 were previously non-accessible and 13 were under construction.

Table 5 General data related to the second survey (December 2004)

	Accessible	Non-accessible	Under construction
Number of websites	41	87	42
Percentage of websites	24%	51%	25%

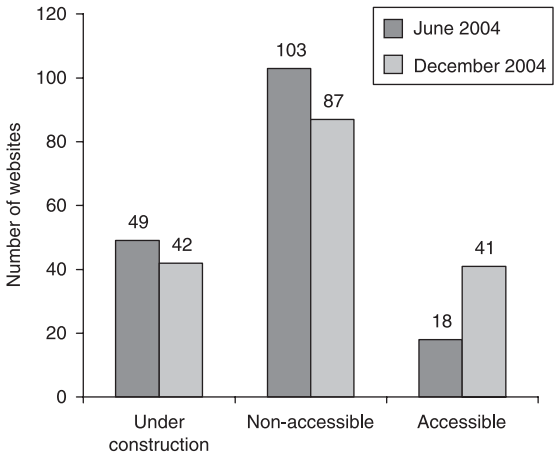

Figure 3 Accessibility of Italian Local Health Authority websites. A comparison of data collected from 170 websites in two studies—June 2004 and December 2004—to assess possible improvements

The number of non-accessible websites decreased from 103 to 87 (–15%) and, of those sites, six are now under construction in order to be Priority 1 compliant.

The high percentage (26%) of sites under construction that are now accessible represents a positive signal related to the new compulsory situation.

It was noticed that the new accessible website developers have also given more attention regarding the additional checkpoints such as navigation mechanisms and information retrieval tools.

In the second review, 60% of the accessible websites utilize the site map and 90% have search function and navigation bars.

General actions taken to improve websites accessibility. As an example of the necessary improvements to make websites accessible, it is interesting to underline the changes occurring in the 10 non-accessible websites becoming accessible. In this case, the websites were recoded and redesigned to adhere to W3C Priority 1 instead of retrofitting the site (the easiest way to ensure accessibility is to build it in from the beginning). In particular, these websites are accessible because they were designed for accessibility, removing potential problems identified in our previous review. These specific accessibility errors, such as missing alternative text, missing data, tables markup, frames without titles and misuse of style sheets, are analysed again in reference to our new control: all non-text contents (images, pre-recorded audio, video) of those sites are now provided with a text equivalent as required by W3C recommendations; it is interesting to underline that site developers have chosen to use CSS (Cascading Style Sheets) instead of frames to let users with specialized software understand the organization of the page and to navigate through it. All the tables have been removed, even if it is not obligatory, preferring to convey the same information through text-only content. Although properly marked up, sometimes tables may present special problems to users of screen readers.

Conclusions

This survey shows that, even if 76% of the analysed websites still fail to satisfy the most basic W3C requirements, Italian Local Health Authorities websites are likely to present significant improvements to access for some disabled user groups. The high percentage of sites under construction (25%) and the difference of non-accessible and accessible websites between the first and the second review (see Fig. 3) represents a positive signal related to the new compulsory situation. It seems that awareness of web accessibility issues is increasing among developers of health information websites as a result of The Stanca Law enforcement.

With some effort, all these health websites could be made accessible; the necessary HTML codes, such as the ones required to describe graphics and audio and provide alternatives to applets and scripts, are not difficult to implement.[11] Web accessibility

is all about following design standards and then adding in a few simple accessibility features. Any web developer with basic HTML and CSS design knowledge, and the time, can easily learn and implement web accessibility.

For health information websites to be of real use to people with disabilities, the accessibility must be taken seriously and considered when any changes are implemented to ensure the website remains accessible. Accessibility is not a permanent condition, periodic website accessibility checks must be foreseen.

This survey represents a first step towards an exhaustive comprehension of the issues related to the Italian governmental health information web accessibility.

According to the Italian Minister for Innovation and Technology, it seems to be true that the new law

'Will help to pull down the existing digital barriers and to create important opportunities for over 3 million Italians with disabilities'.[12]

In this way, access to appropriate information will be available for those who need it most.

Recommendations

- In order to follow the requirements of the new Law, effective from 2005, it is time for the Italian Local Health Authorities to upgrade their design and programming skills to match their newfound mastery of accessibility.
- As websites are constantly updated, it is recommended that all new pages added to the websites, or all revisions to existing pages, must be designed in accordance with the accessibility requirements. Even if it is fundamental to satisfy accessibility obligations, more importantly, accessibility rules must not be broken when developers update web pages.
- Content should be presented in a clear and simple manner, and should provide understandable mechanisms to navigate within and between pages.
- To determine more precisely the extent to which websites facilitate access, the experience of users with various disabilities will need to be studied as required by The Stanca Law.

Key Messages

Implications for Policy

- This survey should be repeated when The Stanca Law will be effective in order to identify changes.
- All those involved in the design of health websites need to be given thorough training in accessible web design techniques.
- Even if the minimum requirements for accessibility are assured, some additional checkpoints related to navigation mechanisms and information retrieval tools should be considered.

Implications for Practice

- For health information websites to be of real use to people with disabilities, the accessibility must be taken seriously and considered when any changes are implemented to ensure the website remains accessible.
- To evaluate a website's accessibility, the creation of a user panel that includes disabled users using their own assistive technologies should be foreseen.

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