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Shirley Cefai

Guidelines for accessibility in the historic city of Valletta

EdizioniCaracol

I-ACCESS

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1. Il progetto I-Access. Patrimonio culturale e accessibilià, Renata Prescia
2. Linee guida per un protocollo all'accessibilità della città storica di Palermo, Zaira Barone, Cinzia Ferrara
3. Guidelines for accessibility in the historic city of Valletta, Shirley Cefai

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3. Accessibility on the web: planning and conformance

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Abstract
In order give everyone the chance to access, enjoy, create and share contents on the web, it is necessary to design "interoperable" interaction systems, i.e., always reliable both in different contexts of use and in the presence of different input modes. For this purpose, UX/UI designers need to acquire specific skills in the field of web standards and in writing HTML, CSS, and Javascript languages, which are fundamental for the design of accessible web components.

Web accessibility: design and compliance
Per dare la possibilità a tutti di accedere, usufruire, creare e condividere contenuti nel web bisogna progettare sistemi di interazione "interoperabili" cioè sempre affidabili sia in diversi contesti d'uso sia in presenza di diverse modalità di input. A tale scopo l'UX/UI designer deve acquisire competenze specifiche nell'ambito dei web standard e nella scrittura dei linguaggi HTML, CSS e Javascript fondamentali per la progettazione di componenti web accessibili.

Keywords/*Parole chiave*:
Accessibility, interoperability, WCAG, WAI-ARIA, Web Vitals, front-end development.
Accessibilità, Interoperabilità, WCAG, WAI-ARIA, Web Vitals, sviluppo front-end.

Inclusive design is focussed on the needs of persons who may have a disability that is permanent, temporary, situational, or even one that is changing over time, in other words, all of us[1].

In fact when we consider the wide range of ability and disability, it may be noted that to design exclusively for the so-called "able" is counterproductive, because the experience that is offered is more stressful and less useful for all, and not at all inclusive for others[2].

To give everyone the opportunity to access, use, create and share web content we need to design "interoperable" interaction systems, that work reliably across various user applications and across different modalities of data input[3].

Such an accessible system may come closest to offering an equivalent experience to all, that even while changing according to the specific conditions in which it is being used, continues to function without compromising the quality of its content.

This content, therefore, is not tied to a single medium of representation (WCAG 1.0, 2016) but can, according to the situation, make coherent use of shared and integrated interfaces, which may be controlled by the user, offering alternatives and choices, while prioritising content and including functions that add value to the experience[4].

Since 1999, the Web Accessibility Initiative (WAI) working group has provided guidelines for web accessibility, known as the Web Content Accessibility Guidelines (WCAG), founded on four guiding principles: Perceivable, Operable, Understandable, and Robust (POUR).

Every guideline is accompanied by criteria to assess its successful application, and three levels of conformance: A (minimum), AA and AAA (maximum). Furthermore, every guideline and success criterion is accompanied by a series of techniques, divided into two categories: 'Sufficient Techniques' required to satisfy the criterion, and additional 'Advisory Techniques' (WCAG2.0, 2008).

It is clear that systematic application of the WCAG is not a guarantee of success. The guidelines themselves note that "even content that conforms at the highest level (AAA) will not be accessible to individuals with all types, degrees, or combinations of disability, particularly in the cognitive language and learning areas" (WCAG2.0, 2008). We may however deduce the efficacy of the tools provided through their direct use, above all by persons with different needs. Our experience as users with a screen reader will be notably different to that of a group of blind users, and the way the tools are used will be drastically different to ours, and will even vary widely within the group[5].

There are nevertheless some key practical aspects for the creation of accessible web content that the Google development group has divided into the three key themes of “focus”, “semantics” and “style”. Using keyboard input we may focus on elements of the HTML document (tag) and receive feedback on the activity we are engaged in, and on our position within the document. Just by using the TAB button, for example, we may shift our focus from one tag to another, to explore the document contents in a coherent and logical order (tab order). To continue with the same example, a well-structured tab order is fundamental to provide a pleasant experience to users with mobility impairments.

In a user interface that uses the screen reader, every visual element should be redundant: the document content and its functionality are fully described in oral form. In this case, the tag does not only have the purpose of marking a portion of content within the page (to determine its position or format), but also has a semantic value, describing its significance to the developer and to the supporting technology being used, in this case the screen reader (W3C).

Thanks to specific semantic tags, it is therefore possible to divide a document into sections and to establish a hierarchy of significance, function, and priority between activities.

Furthermore, to address any semantic gaps and to improve accessibility where needed, W3C has produced a set of indicators (WAI-ARIA) that define a series of additional HTML attributes to define “roles”, “properties” and “states” of individual elements.

The theme of “style”, on the other hand, addresses the issues concerning the layout of elements of the interface, and their accessibility.

CSS (Cascading Style Sheets) is the language used to define the visual properties of HTML tags such as size, colour or position. Correctly applied, these basic properties may resolve complex challenges of accessibility.

On a mobile device, for example, it is necessary to ensure that interactive elements such as buttons or links are large enough, and have enough space around them, to be easy to press without accidentally activating other elements. This is helpful to all users, but is particularly useful to those with a mobility impairment (Google developers group).

Not everyone perceives colour in the same way, and interactions between different colours are complex and manifold. As a result, some colour combinations that are easy to read for some persons may be

difficult or impossible for others who may have a deficit in their colour perception. Such difficulties may be mitigated by adjusting the colour contrast between different elements of the foreground and background.

In the WCAG, contrast is a measure of the difference in "luminance" or perceived luminosity between two colours.

The WCAG furthermore advise that when colour is used to communicate information, one should make sure to "provide cues in addition to colour so that users who may have difficulty perceiving colour differences or have low vision can identify them...Visual cues can take many forms including changes to the font style, the addition of underlines, bold, or italics, or changes to the font size."

In this manner we should ensure that the functionality of every element is not dependent on colour alone, for example through the use of icons to indicate the state of a button.

Furthermore, the CSS properties make it possible to design layouts based on flexible and reactive grids to provide the best possible experience across different functions. The layout reconfigures itself according to the screen size and the different zoom levels.

A vital characteristic in terms of accessibility is the ability to allow users to zoom in to different levels, to enlarge text or images, while maintaining the logical and functional coherence of all the document contents.

The I-Access project has aimed to render digital content through web and mobile interfaces that guarantees users with different needs as equivalent an experience as possible, in terms of value, quality and efficiency.

The writing of an HTML code with semantic elements (tags) that expressly describe their significance to the browser as well as to technological supports (such as screen readers) makes it possible to separate content from its representation, which is no longer confined to a single medium.

This multiplicity offers alternative channels for the enjoyment of the same textual content via screen readers, simple keyboard inputs or, in the case of Apps, through the augmented reality made possible by the Arianna system.

The 'mobile first' approach that has been adopted prioritises the optimisation of on–site user experience using mobile devices over desktop interaction, and exploits the interactively reconfigured layout[6] to guarantee a multi-faceted experience that is coherent in its logic, composition and function.

Colour contrast, developed in accordance with the WCAG2.0 guidelines and specific field testing, provides a high degree of legibility not only of the texts but also of interactive content such as maps.
The colour palette used for the latter is also helpful in the clear representation of geo-located information, in the form of points of interest that may be displayed through filters and clusters according to categories or themes, such as for instance conservation interventions.
Themes such as conservation interventions are rendered accessible through various components of the interface – such as for example the text or the map – and depending on the type of use, are made accessible in alternative but equivalent channels.
Two navigation systems were implemented in the mobile App, the first for Android systems based on environmental recognition and computer vision (Garlisi, 2020) and the second for iOS systems based on Machine Learning (Lo Valvo, 2020), adding another layer of accessibility.
The contents may be experienced in the form of a walk along which the visually impaired or the blind are guided along a physical (Lo Valvo) or virtual (Garlisi) line, installed along the route or by means of specific points of physical access (QRCode, stencil). Feedback in the form of vibrations and audio are provided according to the position along the route to indicate information (such as one's position), the presence of a point of interest (a monument or piazza) or access to information content (the story of a stage in a building's history).
On 28 May 2020 Google[7] introduced the Web Vitals programme, a unique guide to measure web user experience, "a set of metrics that measure real-world user experience for loading performance, interactivity, and visual stability of the page"[8].
Thanks to the Web Vitals programme, developers and website owners may evaluate the performance and quality of their coding, content and design: these are three fundamental aspects, all of which contribute in equal measure to the quality of the final product.
Beyond the metrics, the programme also generates a report to identify the critical issues that have been addressed, and those still present, while suggesting possible solutions. The same report also lists all those aspects which cannot be measured by an algorithm and which therefore have to be evaluated individually by the designers or users. For example, while an algorithm is able to measure and evaluate the colour contrast between figure and background, it cannot evaluate whether the logic of a page's tab order is correctly structured, or

whether the interactive elements, such as links or buttons, indicate their state, or whether they may be readily distinguished from non-interactive elements. Such aspects require study and analysis by the developer, designer and copy writer.

When evaluated, the I-Access project successfully met the greater part of the Web Vitals tests, particularly in terms of accessibility, where the page dedicated to points of interest (POI), registered the highest score. Following the online publication of the project, further empirical and manual evaluation is required of all those aspects which, as indicated above, cannot be automatically measured. Such evaluation need to be informed by the experience of diverse users, beyond the project team. This will be achieved by gathering and recording data on user satisfaction when accessing and using website content.

Some of this may be achieved by means of automated tools, such as the heat maps that represent user behaviour within a page, mouse movement, clicks, page scrolling, and screen taps on mobile devices. Other tools allow the anonymised video recording of actual real-life user experiences of navigating the site.

A different set of tools that is also available depends on the direct collaboration of users.

Sharing a checklist within the project team may be an excellent tool to check the design before and after its publication. The Vox Media team, for example, uses one subdivided in five specific sections (designers, engineers, project managers, QA, editorial)[9].

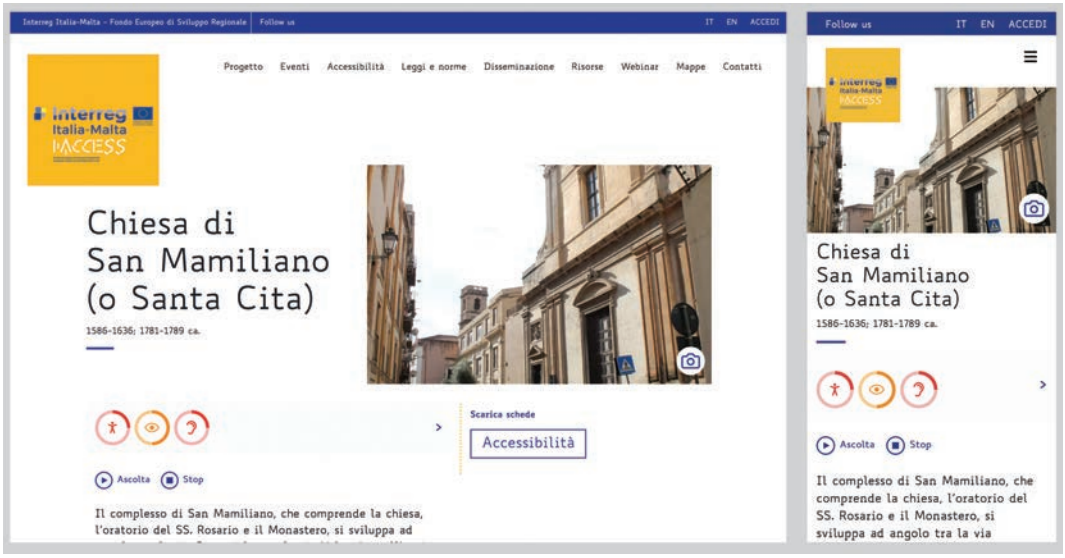
Personal testing or cognitive simulation may be effective methods to abstract and synthesize transverse needs that may impact a wide range of users[10].

The continuous evolution of technology and web standards requires us to continue to monitor the quality of our digital products. It would therefore be opportune to publish and update a “declaration” of the accessibility level of the web pages, indicating which are fully accessible, partially accessible, or not accessible.

Such a practice has already been implemented for all institutional websites of the Government of the United Kingdom[11] and of Italy’s Public Administration[12].

1. Responsive Layout adapts the display according to different screen sizes, while preserving the internal coherence of the contents.

2. Tools for developers allow them to simulate how a web page is experienced by people with different forms of colour blindness, from protanopia to loss of colour contrast.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Chiesa di
San Mamiliano
(o Santa Cita)
1586-1636; 1781-1789 ca.
Scarica schede
Accessibilità
Ascolta
Stop
Il complesso di San Mamiliano, che comprende la chiesa, l'oratorio del SS. Rosario e il Monastero, si sviluppa ad
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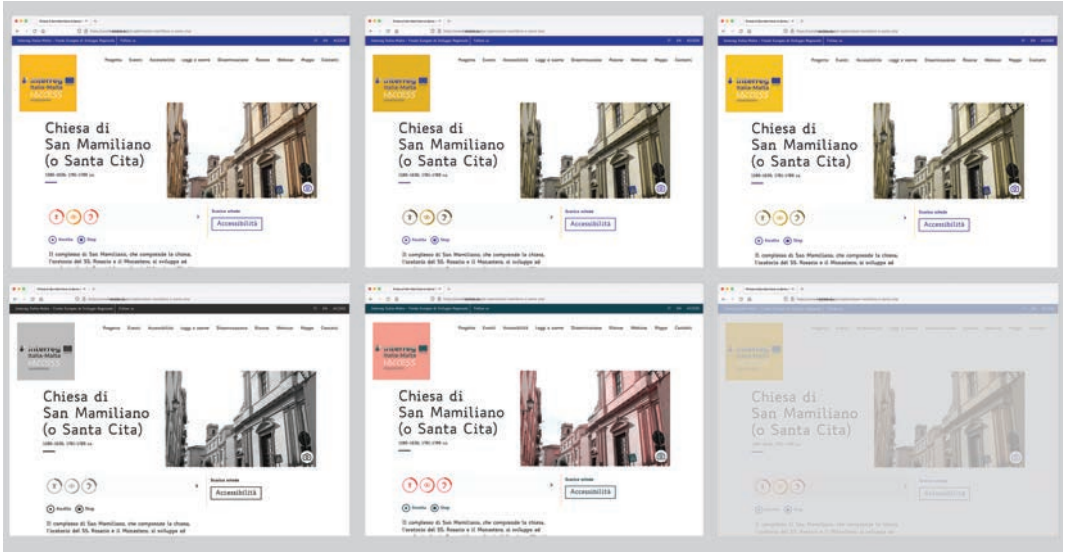
IT EN ACCEDI
Chiesa di
San Mamiliano
(o Santa Cita)
1586-1636; 1781-1789 ca.
Ascolta
Stop
Il complesso di San Mamiliano, che comprende la chiesa, l'oratorio del SS. Rosario e il Monastero, si sviluppa ad angolo tra la via


Chiesa di
San Mamiliano
(o Santa Cita)

1
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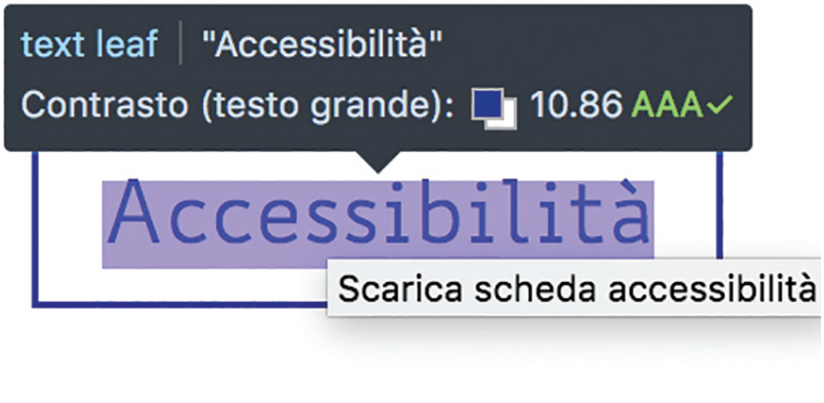

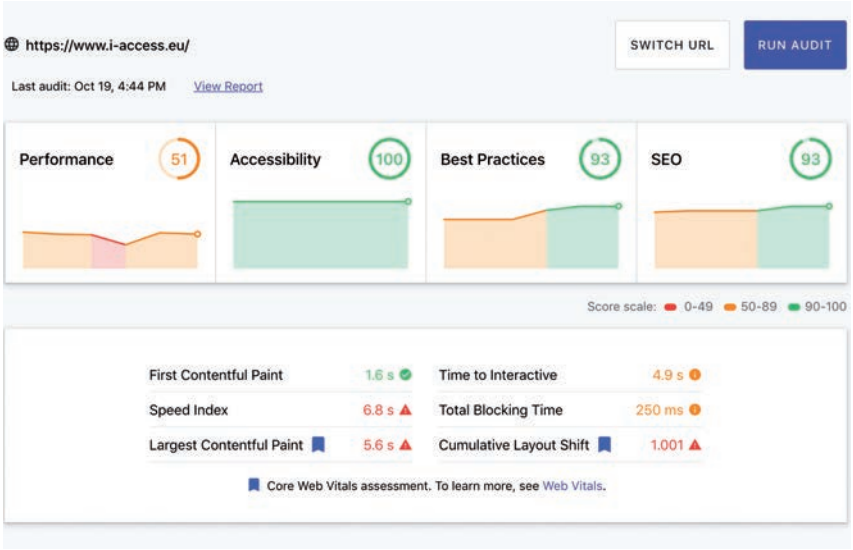

3
4

3. Developer tools being used to inspect a button, which is found to conform to standards in terms of font, contrast between figure and field (AAA 10.86), presence of labels and text describing the action.

4. An instrument to measure the performance of a website in terms of Performance, Accessibility, Best Practices and SEO is made available by Google at the following web address: https://web.dev/measure/.

5. Apart from the metrics, Google generates a dedicated report for each webpage analysed, providing advice for improvement to help resolve the critical issues identified, listing the components that satisfied the automatic checks, and those that require manual verification.

Accessibility

These checks highlight opportunities to improve the accessibility of your web app. Only a subset of accessibility issues can be automatically detected so manual testing is also encouraged.

Additional items to manually check (10) — These items address areas which an automated testing tool cannot cover. Learn more in our guide on conducting an accessibility review.

- The page has a logical tab order
- Interactive controls are keyboard focusable
- Interactive elements indicate their purpose and state
- The user's focus is directed to new content added to the page
- User focus is not accidentally trapped in a region
- Custom controls have associated labels
- Custom controls have ARIA roles
- Visual order on the page follows DOM order
- Offscreen content is hidden from assistive technology
- HTML5 landmark elements are used to improve navigation

Passed audits (23)

- `[aria-*]` attributes match their roles
- `button`, `link`, and `menuitem` elements have accessible names
- `[aria-hidden="true"]` is not present on the document `<body>`
- `[aria-hidden="true"]` elements do not contain focusable descendents
- `[role]`s have all required `[aria-*]` attributes
- `[role]` values are valid

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Notes

[1] SWAN, POUNCEY, PICKERING, WATSON, 2017.

[2] BOXHALL, DODSON, GASH, KEANEY, 2020.

[3] PICKERING, 2020.

[4] SWAN, POUNCEY, PICKERING, WATSON, 2017.

[5] PICKERING, 2020.

[6] MARCOTTE, 2011.

[7] CHROMIUM BLOG, 2020.

[8] SUBRAMANIAN, 2020.

[9] VOX MEDIA.

[10] HENKE, 2019.

[11] GOV.UK, 2019.

[12] *Team per la trasformazione digitale*, 2021.

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