

A Guidelines for Evaluating Web Accessibility, Level A.

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ABSTRACT

The Web Accessibility Initiative (WAI) defines the guidelines to facilitate access for people with disabilities to ICT. This article presents a proposal to promote the unification and improvement of the works of two authors, combining the procedures and considerations after the evaluation of some web sites Northeast Argentina (NEA).

Keywords: WAI, evaluation, proposed guidelines, W3C, Web Engineering, Web Quality, tools.

1. INTRODUCTION

Web accessibility became a common problem that has motivated the interest in which several global organizations have focused in. One of the most important actions is perhaps the developed by the World Wide Web Consortium (W3C), through the Web Accessibility Initiative (Oficina Española Consorcio World Wide Web, [16]). Its aim is to define guidelines to facilitate the access for people with disabilities to the web content.

As mentioned in [17] “the advancement of Information Society must involve an element of integration (...) for people with physical and / or psychological disabilities, not a barrier.”

The increment of Web Accessibility would impact on many types of disabilities, including visual, auditory, physical, cognitive, and neurological and speech. There are also, other non official disabilities, as the derived from the technology (lack of access or appropriate equipment) or ignorance (collective elderly, rural areas, children, etc...) As expressed in [7], currently, most of the sites and software systems developed in a Web environment contain accessibility barriers.

The accessibility refers to the set of features that an environment, product or service must present in order to be usable in terms of comfort, security and equality for all people, and in particular for those with a disability [7].

An accessible content means that the design of the user interface must provide a universal access to its information on an equal footing. In general, there are different procedures to check the accessibility of web pages, but they do not differ much from each other in the way of bringing up the steps.

With the purpose to contribute to the inclusion of people with different or temporary capacities, whether they access as Internet users or as disseminators of knowledge, the application of guidelines must be proposed. These are set up by organizations that regulate the WWW, and are used to raise awareness among software developers and companies of the need to build accessible sites to more people and functionalities from any Internet-connected device.

There are a variety of works that addressed the subject and measure the accessibility in a variety of fields such as those exposed in [5]; [6]; [7]; [12]; [15]; [19]. Some of

them mention the use of tools available on the web; to evaluate and repair the accessibility and therefore the designs of such environments.

This work is based on recommendations presented by [8] and [18], specifically applied to the study of the news sites in the NEA region [1] in order to develop a general proposal of evaluation of WAI guidelines, that is to say, suitable for validation at regional sites developed for various areas of knowledge.

2. METHODOLOGY

The applied methodology was composed of the following stages:

Stage 1. Survey of similar projects developed for other areas of the country and the studies mentioned by [18] and [8].

Stage 2. Deepening of the theoretical framework referred to the subject. Documents and tools provided by the W3C and other two authors that addressed the topic were used as data source.

Stage 3. Review and selection of web sites in the region. Only the homepage of each site was chosen for evaluation, since it is the gateway to the user.

Stage 4. Application of procedures defined in previous works.

Stage 4.1. The procedures suggested by [18] were used in a first approach.

- Selection of automatic validators available on the web. The following tools were used: HERA [9], EXAMINATOR [4] and MARKUP VALIDATION SERVICE [13]. The phases of this stage consisted of:
 - Study of the functionality of each validator and determination of the types of errors, identified and grouped into three priorities: i) HERA. Utility to check the accessibility of web pages in accordance with the recommendations of the Accessibility Guidelines for Web Contents 1.0 (WCAG 1.0). ii) EXAMINATOR. Online validator, very simple to use, offering the characteristic to emit an “accessibility score”. iii) MARKUP VALIDATION SERVICE. A practical tool of language validation of markup HTML provided by the W3C.
 - Utilization of tools available on the web. Each validating tool was applied to every web site selected.
 - Systematization and analysis of data. The results provided by the automatic validators were systematized, in order to analyze the current art state of the application of accessibility, and propose and elaborate further studies from the obtained results.
- Application of the mentioned aspects in the second, third and fifth to ninth procedures suggested by [18]. After these aspects were studied and evaluated, a

table was drawn up registering most of the mentioned items. Likewise, hardware and browsers used were distinguished. Equipments with the following characteristics were used: i) Notebook Lenovo (dual-core Pentium Processor 2.20 Ghz, 2 GB Ram), ii) Notebook Hewlett- Packard HP dv600 (dual-core Pentium Processor 1.60 Gbz, 1 GB Ram) iii) SmartPhone LG KM900.

- The procedure mentioned in tenth place was avoided, the data was obtained with the use of the automatic validators.
- To evaluate the eleventh procedure the aspects mentioned by [18] referring to navigation, were attended.
- In this work the fourth and twelfth procedures were not discussed. These will be approached in a further development.

Stage 4.2. In a second approach, the work was based on the concepts developed by [8] and applied to the evaluation of libraries. The following phases were performed:

- Deepening of the theoretical framework referred to the subject. Analysis and study of the mentioned author's work.
- Tools selection proposed in [8] and available on the web. The following were used: i) Brailersurf [2] and Lynx Brower (text mode browsers) [11]. ii) Netscape, Mozilla Firefox [14], Internet Explorer (graphical browsers) [10]. iii) TextAloud (page reader) [21]. iv) Web Developer Extension 1.8 (Mozilla Firefox extension) [24]. v) TAW (automatic validator) [20].
- Arbitrary selection of news websites in the NEA region, one per province.
- Application of five guidelines defined in [8], evaluating:
 - Analysis with the "text mode" browser. A table was drawn up with distinguishable and important characteristics to highlight.
 - Analysis with standard graphical browsers and screen reader. With the Netscape, Explorer and Mozilla Firefox browsers were revised those areas where there were failures in the "text mode". Additionally, with the use of the page reader "TextAloud" [22] the access was verified by means of the keyboard.
 - Analysis with Mozilla Firefox browser and its extension Web Developer Extension.
 - Source code analysis. Those considered more relevant were identified.
 - Final analysis with validators and manual review. The TAW validator was applied because it specifies those aspects that need to be manually checked.
- Systematization and data processing.

Stage 5. From the survey of the sites and implementation of the procedures proposed by [8] and [18] a comparison in between both authors was developed and improvements in the raised guidelines were proposed.

3. RESULTS

This section describes the methodological approach and the results obtained from its application in order to validate it

3.1 Methodological approach to evaluate web page Accessibility

In order to know whether a web page is accessible, it is necessary to "try it", use it and check it.

In the context of a research project web site of NEA were evaluated. This work approaches the accessibility by verifying the guidelines that respond to Priority 1. Level A, set by the W3C. The preliminary results were exposed in [1].

Based on the conducted surveys, an overcome proposal was developed aimed to guarantee the application of the common procedures to both authors and also to provide innovative recommendations inferred after the application of the ones exposed in [8] and [18].

Table 1 shows both procedures. Each cell in the first column indicates the proposals by [18], for which were identified the ones presented by [8], noticing like in some cases one, described by the first named author [18] corresponds with more than one of the mentioned in the second [8].

In [18] procedure is more complex and detailed, including a number of revisions that incorporate even the interaction with people with different limitations as visual problems, auditory, physical, cognitive, neurological and speech. Furthermore, there are others, as the ones derived from technology (lack of access or appropriate equipment) or the ignorance of technology (collective elderly, rural areas, children, etc.) as well as the use of different hardware and navigation with diverse types of connections.

It is mentioned as a disadvantage that some validation in practice could be performed in parallel with others, thus, saving time. For example, deactivate images, scripts, applets, among others. Concerning to this observation, the advantage of [8] proposal is that all those proofs are also present in a general procedure. In the project, the author proposes a way to obtain and reflect the data in tables and highlight specific aspects that are not so clearly distinguished with the other author. Nevertheless, this does not contemplate the survey applying different technologies as [18] exposes.

It was noted that the two studied models inquire into the same aspects; some of them receive more emphasis. Both promote the study of accessibility with tools and procedures that guide intuitively and simply such process.

Table 1. Procedures recommended by [18] and [8]

Segovia[18]	Gonzalez Florez [8]
i) Check the page - or site – with, at least, one automatic validator of accessibility.	v) Final analysis with validators and manual review.
ii) Check manually the potential problems of accessibility that cannot be tested by the automatic validators.	v) Final analysis with validators and manual review.
iii) Navigate the page – or site- with different browsers from diverse operating systems (including visual browsers, speakers, textual, WebTV, mobile phones, PDA's, etc.) and from different hardware.	i) Analysis with the “text mode” browser. ii) Analysis with the common graphical browsers and screen reader.
iv) Review the use of color on the page or site.	
v) Navigate the page – or site – with the images off, that is, determinate if it provides alternative text for non textual elements (images, embedded elements, animations, videos).	iii) Analysis with Mozilla Firefox browser and its extension Web Developer Extension.
vi) Browse the page – or site – with the sound off.	iii) Analysis with Mozilla Firefox browser and its extension Web Developer Extension.
vii) Browse the page – or site - with JavaScript disabled.	iii) Analysis with Mozilla Firefox browser and its extension Web Developer Extension.
viii) Browse the page – or site - with applets of Java disabled.	iii) Analysis with Mozilla Firefox browser and its extension Web Developer Extension.
ix) Browse the page – or site - only with the keyboard, without the mouse.	iii) Analysis with Mozilla Firefox browser and its extension Web Developer Extension.
x) Review the code page – or site - checking its validity.	iv) Analysis of the source code.
xi) Browse the page – or site - with old computers.	
xii) Test the page – or sites – browsing user with a disability.	

Subsequently, a proposal elaborated on the mentioned procedures is enounced. Its aim is to analyze and improve feasible aspects and propose a series of recommendations arising from the investigation.

The general idea in each point is to prove and verify that the sites offer the same services or functions even when some complements are inoperative, like images, sounds, applets, etc.

It consists of the guidelines below:

Stage 1. Check with browsers

1.1. Analysis with graphical browsers.

In the first instance, it is recommended to check the site with the browser that is regularly used. Observe and describe its behavior.

Once this step is concluded, a visit with several additional browsers is suggested, to have a larger picture of its behavior.

After applying the indicated steps, go over the site with:

- The disable images, that is to say, determinate if it provides alternative text for non text elements (images, embedded elements, animation, videos).
- Sound off.
- JavaScript code disable.
- Java applets disable.
- Access to the contents, only with the keyboard, without the mouse.

In the studies carried out, Mozilla Firefox, Internet Explorer, Netscape and Opera, browsers were used, among others.

When navigating with the keyboard see if it is possible to access to the same functions and areas than through the mouse.

1.2. Analysis with “text mode” browser.

It must be considered if the entire content and structure that the site offers in graphical browsers, is also present with a “text mode” browser.

In the studies carried out the following were used: Braillesurf and Lynx Brower.

Stage 2. Explore the sites from various operating systems, different hardware and from any page reader or a speaker browser.

Among the operating systems, could be considered: Windows in its different versions (3.1 to XP and Vista), MacOS, BeOS, UNIX in its different versions (IRIX, HP-UX, Linux, etc). For Hardware: PA'sD, WebTv, Mobile Phones, kiosks, Pcs, with different memory configurations, hard disk space, monitor resolution, with and without mouse, etc.

Among the feasible options mentioned above, it should be analyzed the scope of development in which they are and choose those according to the existing possibilities.

It is important to test various hardware configurations and to use different software, validating the access to the site from different platforms. Not necessarily the sites should be presented in the same way to the users in all cases, when adapted to different technologies they might suffer changes in their view; the essential thing is to provide always the same services.

As well, when trying to use the site through a speaker web

explorer or any page reader, it is necessary to verify the web site on a regular browser or a graphical one used in the previous section, to determine the services that it offers and then corroborate if the reader distinguishes the same ones.

It must be checked carefully if the images, the flash elements (commonly present in advertising) and the links are detected by the reader. If not, this kind of elements must have a description or alternative text, since this is a common problem.

Stage 3. Review the sites with, at least, one automatic validator of accessibility and manually those aspects that cannot be tested automatically by it.

As [18] explains, there are two types of validators, the accessibility and code. For each one of them a variety of options are presented, offering both more or less the same services.

It is essential that the sites are manually examined, attending the aspects considered by the accessibility guidelines because none of the specific software can check automatically all the contents. Besides, there are some aspects that only the human supervision can detect.

For this matter, it is recommended to use TAW or HERA, which verify the points that can be automatically made and also, they recommend those to be manually evaluated.

Stage 4. Analysis of source code

To verify the code it is suggested to use the product MARKUP VALIDATION SERVICE which validates the sites code with the standards dictated by W3C. The tool provides an error list. If there is knowledge of HTML, it is recommended to check the code manually in the aspects detailed on the report.

Verify if there are elements: Document Type Declaration, Namescape Declaration and Language Attributes.

There should be made a grammatical review of the website, in which other aspects can be corroborated:

- The errors in the HTML elements that do not belong to W3C technologies or are obsolete.
- The titles and the hierarchy order.
- The images maps or alternative content for the images and dynamic elements.
- The tables used to control the presentation.
- The links, which are only activated by scripts.
- Also, on the logical structures and the document contents, it is proposed to evaluate:
- The use of HTML attributes to control the presentation.
- The HTML document structure.
- The presence of the credits, authorship information.
- The links order.

To measure some aspects it is important to interact with the validator code. That is, if it was used in a previous stage, it will help to verify quickly and automatically some of the mentioned points on this phase, even though it is always needed the manual review to confirm the data obtained by the validator.

Stage 5. Navigate the site with old computers and/or slow connections

It is necessary that the sites can be tested on computers that have not got so recent technologies. That is, accessing with different types of connections and old PC's to check how it behaves in these cases.

The different types of connections can be simulated with the help of some graphical browsers, as Mozilla Firefox

or Internet Explorer.

3.2 Guideline Implementation

In this section, are described the results obtained from the implementation of the approach exposed in 3.1 in this paper to a web site belonging to NEA province to test its accessibility.

In Tables 2-6, the columns YES, NO, N/A characterize the presence, absence or INAPPLICABILITY of the evaluated procedures mentioned in the first column.

Results of the analysis with different browsers.

Table 2 shows the results obtained from the implementation of the procedures mentioned in Stage 1.1a (Analysis with graphical browsers) of the methodology, using Google Chrome, Mozilla Firefox, and Internet Explorer 9.

Table 2. Evaluation of the selected site using different browsers.

Website name	NEA' site								
Equipment	Notebook HP G 42 – 469LA								
Operating system	Windows 7 Starter								
Browser	Google Chrome			Mozilla Firefox			Internet Explorer 9		
Evaluated procedures	Y E S	N O	N/ A	Y E S	N O	N / A	Y E S	N O	N / A
It is possible to surf with the images disabled.		X			X			X	
It is possible to surf with JavaScript disabled.	X			X				X	
It is possible to surf with Java Applets disabled.	X			X			X		
It is possible to surf with the sound disconnected.		X			X			X	
It is possible to surf only with the keyboard without the mouse.	X			X			X		

The problem with the site is the impossibility of accessing completely to the contents when the images and Java elements and JavaScript are disabled, and also when trying to surf only with the keyboard, without the mouse.

The general results of the analyzed site, corroborating the ones obtained by the use of different browsers, would allow asserting that when there is not an alternative to every non textual element (images, Flash elements, sounds, and videos) the access is difficult. Many times, text only browsers do not offer information about images, (since they do not display graphics), therefore, it is important that

the source code offers textual alternatives for any image that acts as button or link. The site presents a hybrid design (tables and style sheets), this, on one hand, “favors” its interpretation without style sheets, but on the other, limits the access to users with readers or slow connections. These types of sites need, for their access, a cell to cell path within countless tables and images spacers to visualize their content.

Results of the analysis with the browser in “text-only mode”

With the purpose of surfing the site using the interface text-only (Stage 1.1b: Analysis with “text mode” browser), the “Webbie 3 Web Browser” [25] was used. This browser gives the possibility of visualizing the page in graphic mode also. The criteria observed are exposed clustered in Table 3.

Table 3. Evaluation of the site with the browser “Webbie 3” in Windows setting and with the browser “Links” in Linux settings.

Criteria	Browser	
	Webbie 3	Links
Graphics contain some description.	No	No
Links contain some description.	Yes	Yes
Another multimedia content is observed descriptively.	No	No
Most options that the site presents in a graphic browser are available.	Yes	Yes
It presents a correct structure.	Yes	Yes
It is simple to understand the site.	Yes	Yes

It is worth mentioning, that the website is full of dynamic elements that affect the visualization of the content in text-only browsers.

Results of the analysis with different Operating Systems and Hardware

For this aspect, corresponding to the Stage 1.2 of the Methodology, the different sites were evaluated with the Operating System Ubuntu and a mobile phone. Following, there is a summary of the observations done, taking into account the aspects described in Table 4, surfing the site with Mozilla Firefox, Midori and Google Chrome.

As for the hardware, Table 5 summarizes the results obtained through the implementation of the mentioned procedures but with the use of a mobile phone.

In all the cases (Tables 2 to 5) the site presents as a main problem, the impossibility to access fully to the contents when the images are disabled. The visualization of the site in a mobile context did not differ entirely from its conventional web version; neither did in the use of different browsers.

As peculiarities the following are worth mentioning:

- The access through the keyboard only is severely narrowed in some segments.
- The site is quite dynamic and it bases its use in that kind of content. When its access is not possible, several of the services that it offers are obsolete or when the JavaScript commands are disabled its options are not completely available.

Table 4. Evaluation of the site with the Operating System UBUNTU

Name of the site	NEA' site								
Equipment Description	Phenon AMDx3 3G RAM								
Operating System	Ubuntu 11.4								
Browser	Google Chrome			Midori			Mozilla Firefox		
Evaluated Procedures	Y E S	N O	N / A	Y E S	N O	N / A	Y E S	N O	N/ A
It is possible to surf with the images disabled.		X			X			X	
It is possible to surf with JavaScript disabled.		X			X			X	
It is possible to surf with java disabled.			X		X				X
It provides alternate text for non-textual elements.		X			X			X	
It is possible to surf with the sound disconnected.		X			X			X	
It is possible to surf with the keyboard only, without the mouse.	X			X			X		
It provides an alternate link for a page with W3C technologies.		X			X			X	
The page is loaded without changes in its original format.	X			X			X		

Table 5. Evaluation of the site using a Mobile Phone.

Name of the site	NEA' site		
Phone/ Equipment	Samsung Chat@t335		
Operating System	Windows 7 Starter		
Browser	Opera Mini 4.5		
Evaluated Procedures	Y E S	N O	N/ A
It is possible to surf with the images disabled.		X	
It is possible to surf with JavaScript disabled.		X	X
It is possible to surf with Java Applets disabled.			X
It is possible to surf with the sound disconnected.	X		
The page is loaded without changes in its original format.		X	

Results of the Analysis with Page or Screen readers

The evaluation was done by using the tool Visuals Desktop Access NVDA [23]. The general content can be read without many difficulties, but multimedia presentations (images, video, and animations) that contain subtitles or descriptions of the visual contents are not

visible. This is impossible to identify by the reader, who totally ignores this or just reads the name of the image or URL to which the image is linked.

The biggest problem is that most of the non-textual elements of these sites do not have “alternate text” and because of this the page reader does not have the possibility to interpret them.

Results of the analysis with Automatic Validators

In this point of verification, which corresponds to the Stage 1.3 of the applied methodology, the tools HERA and EXAMINATOR were used.

Likewise, some other points were collated manually. A technic file was applied to tabulate the results. It consists of sixteen criteria or verification points extracted from the proposed in WAI [3]. Priority 1 [3] issues were identified, minimal basic requirement, given that if it is not fulfilled it will be impossible for diverse user groups to access to the information.

The two used tools provide an additional analysis with reference to the priorities that are fulfilled and those that are not, and the obstacles that impede the accessibility of the sites. Likewise, the HERA tool generated a report of the aspects to revise manually. On the other hand, EXAMINATOR presented the results of its validation providing a score.

Among the similarities found when applying these tools, it is worth mentioning the following:

- a) Both tools focus on the criteria defined by the WAI [26] standards, basically they generate similar results, in some cases with a higher accuracy and in some others general results.
- b) They are easily used and do not require installation in the personal computer, the sites' analysis is an online process.

In table 6, the sixteen evaluated criteria are shown. In each cell, to represent the presence (YES), the absence (NO) or no application (N/A) of the aspects enlisted in the first column in the selected sites. Additionally, it is illustrated the percentage of fulfillment of the Priority 1/ Level A [3], according to the WAI standards of the evaluated sites. In figure 1, it is illustrated the percentages of fulfillment or not of these aspects.

The systematization of the data in the analyzed site determined as detected relevant aspects that:

- i. It does not provide an alternative page (simpler proposal of the WAI standards)
- ii. Use of Flash elements, embedded elements and images without alternatives for the access to other information resources.
- iii. HTML code errors (this will be treated in Results of the Analysis of the Code – Stage 1.4) generally due to the use of elements and obsolete attributes of the language and the employment of technologies alien to W3C.
- iv. Use of multimedia elements without alternatives for the access.
- v. It is not accessible if accessed without CSS.

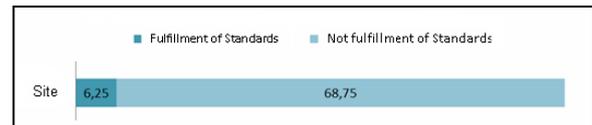


Figure 1. Percentage of Fulfillment of WAI Standards

Results of the analysis of the Source Code

For this aspect, corresponding to Stage 1.4 of the Methodology, it was used the tool **UNICORN UNIFIED VALIDATOR** [22] provided by the W3C [3].

Several fundamental aspects of the sites' codes were verified, these are detailed for each of them.

Selected SITE

Document Type Declaration: there is a DTD

Namespace: there is not a namespace declaration

Language attributes: language is not declared in the page

Grammatical Revision:

- There are HTML errors, elements that are extra, some are obsolete, some others that do not belong to W3C technologies.
- Titles are not found in hierarchical order, there is not semantic marking.
- Not all the attributes are quoted
- There are not maps of images or alternative content for the images and dynamic elements.
- There are tags without their corresponding closure.

Logic structures and document contents

- It does not present the complete structure that the HTML document must have, credits are missing.
- Tables are used to control all the presentation.
- It defines the type of browser that must be used.

HTML code errors were observed. In most cases, the main language of the site is not declared, which makes it difficult to surf with screen readers. The use of obsolete elements or attributes; the lack of alternatives for non-textual elements are other common mistakes.

The misuse of tables is a common error in the sites, as it is well known, these should be used only to tabulate data and not as site holders [6]. Another common error is that the site forces the user to use a specific browser.

Recommendations:

- Always declare the main language of a page; this will avoid problems when using a screen reader.
- Always use the attribute 'alt', all the images must have an alternative text in case that for some reason it is not possible to view them on the site
- Only use tables to tabulate data, on the contrary, use CSS.
- Do not develop pages for a specific browser.

As a final recommendation, it is suggested the application of the web standards, in this way a higher ease and speed are guaranteed to write a correct HTML. Besides, the pages' support would be facilitated, as the information would be well structured and the web understanding would improve (even by developers that have not generated it). HTML is used only to describe what each part of a web is.

Table 6. Evaluation of the site with the automatic validators HERA and EXAMINATOR; and manual revision.

Technical Evaluation File								
Website:		NEA's site						
Validator		EXAMINATOR			HERA			
Item	Description	Yes	No	N/A	Yes	No	N/A	
1.1	It provides an equivalent text for every non-textual element		X			X		
1.2	It provides redundant links in text format with every active zone of an image map of the server			X			X	
1.3	It provides an auditory description of the important information of the visual track of a multimedia presentation		X			X		
1.4	For every time-based multimedia presentation (e.g.: a movie or animation) synchronizes equivalent alternatives (e.g. subtitles or visual band descriptions) with the presentation		X			X		
2.1	The information conveyed by colors may also be available without color, for example by means of the context or indicators		X			X		
4.1	Identifies clearly the changes in the document's natural language of the text and in any other equivalent text		X			X		
5.1	Identifies the column and line headings		X			X		
5.2	Uses markers to associate the heading cells and the data cells, for the data tables that have two or more logical levels of line or column headings		X			X		
6.1	The site is accessible if accessed without CSS		X			X		
6.2	Assures that the equivalents of a dynamic content are updated when the dynamic content changes			X			X	
6.3	The page continues to be usable whether the scripts, applets or other programming objects are disabled or not		X			X		
7.1	Avoids blinking in the screen		X			X		
9.1	Provides image maps controlled by the client instead of the server, except when the sensible zones may not be defined with a geometrical shape			X			X	
11.4	If, after the biggest efforts, it cannot create an accessible page, at least should provide a link to an alternative page with W3C technologies, that may be accessible and has equivalent information (or functional) and may be updated as often as the (original) inaccessible page		X			X		
12.1	Titles every framework to facilitate their identification and surfing			X			X	
14.1	Uses the clearest and simplest appropriate language for the content of a site	X			X			
		1	11	4	1	11	4	
Observations		Results of Fulfillment Level A (WAI)			HERA		EXAMINATOR	
The alternative text "alt" must exist				Value	%	Value	%	
Language must be specified		YES		1	6.25	1	6.25	
HTML code and the CSS must be validated		NO		11	68.75	11	68.75	
		N/A		4	25	4	25	

Results of the Analysis with old computers and slow connections

Finally, on Stage 1.5, the selected site was tested by accessing it from different equipment with different connections, with the objective to measure the ‘loading time’. In table 7, the obtained data are illustrated.

The presence of accessibility standards, depend on the construction of the pages, for this reason, it is recommended the application of good practices.

Table 7. Evaluation of regional site using different connections.

Connection Site	Connection 56k	Connection 128k
Selected site	3 seconds	1 second

IV. CONCLUSIONS

The innovative conceptual proposal developed in section 3.1 permits to integrate the procedures established by the two studied authors, combining the steps in order to suggest a nourished methodology of both recommendations. It was applied to evaluate its performance experimentally, and the results demonstrate it is considered to be more efficient, from a practical point of view, to validate the sites’ accessibility.

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