Inclusive Design, Accessibility and Harmonization on Web – Questions to be Discussed

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Abstract

Aiming the universal design and providing access for a bigger universe of the population and its variations, inclusion is the target of numerous projects and consortiums around the world, and nowadays, inclusion is the main challenge of the Human Computer Interaction area.

Trying to promote the digital inclusion and reiterating that the information is for all, the Brazilian Electronic Government elaborated a Model of Accessibility for the development and adaptation of contents of the government in the Internet, generating a set of recommendations. The Model is based on the politics of information technology used by the Federal Government and was created specifically to take care of to the decree nº 5,296/2004 that regulates the Federal Laws nº 10,048 and nº 10,098 these ones related to the promotion of the accessibility. The Brazilian Government considers the digital inclusion as a way for the social inclusion.

This recommendation will provide that the accessibilization process of the websites of the Brazilian Government is made of standardized form, of easy implementation, coherent with the Brazilian necessities, and in compliance with the international standards. This model will be the reference of all the governmental institution for the construction and adaptation of its solutions with interface web.

Keywords: inclusive design, accessibility, harmonization on web.

1. Introduction

With the fast expansion of the Internet, websites had become a popular form to supply to all the types of information. However, for a great part of people with some type of deficiency find difficulties to access the information or services through the Internet. It seems as if they were excluded from this new technology. This inequality named as *Digital Divides* became a great problem [1].

In Europe the term "design for all" has a similar meaning to "universal design". However the term "inclusive design" also includes the concept of "reasonable" in the definition. The most commonly used definition for inclusive design is "The design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible on a global basis, in a wide variety of situations and to the greatest extent possible without the need for special adaptation or specialized design".

According to *Ron Mace (2005)*, who established *The Center for Universal Design*, the principle of universality is to design products, communication media and environment to be used for all, during a

longer period of time, without the necessity of adaptations or specialized projects, benefiting, in this way, people form all age and capacities [2].

The Brazilian Institute of Geography and Statistics (IBGE), during census 2000, points out that 14,5% of total Brazilian population has some kind of deficiency, what is equal to 24,537,984 people submitted to processes of social exclusion. [3]

2. Social Inclusion and Digital Inclusion

Main attribution of Brazilian Federal Government is to promote social inclusion, within better income distribution and minimize desigualties. One of the initiatives aiming this objective is the adequate usage of technology once this means digital inclusion as a way for social inclusion, in an equal right of access information. [4]

On last decade, the Internet expansion of revolutionize ways of communication, of access information and of business dealings. But why this phenomenon happened? Basically, because a great number of people can be reached instantly, no matter their geographic localization and socio-cultural context. In this context, the inaccessibility of electronic websites excludes a significant parcel of Brazilian population to access to the information diffused in the Internet. Accessibility means the effectively available places, products, services or information to the biggest number and possible variety of people independent of its physicist-motor and cognitive capacities, cultural and social realities. This requires the elimination of architectural barriers, the availability of communication, physical access, equipment and adjusted programs, content and presentation of information in alternative formats.

Aiming to promote the digital inclusion and reaffirming that information is for all, the Federal Department of E-government, linked to the Logistic of and Information Technology Secretariat of the Ministry of the Planning, Budget and Management of Brazilian Federal Government, had the commitment to elaborate a Model of Accessibility of Electronic Government for the development and adaptation of contents of the government in the Internet, generating a set of recommendations to be considered.

Such recommendations will provide that the process of acessibilization of Brazilian Government websites is lead of standardized way, easy implementation, and coherent with international standards. This model will be the reference for hole governmental institution for the design and adaptation of web interfaces of electronic government.

The Model was created specifically to assists decree nr. 5,296, of 2 December 2004, that regulates Laws nrs 10,048, of 8 November 2000 (that gives priority of attendance to the people that it specifies), and 10,098, of 19 December 2000 (that establishes general standards and basic criteria for the promotion accessibility of the people with special necessities) [5, 6, 7].

As affirmed by Simofusa (2005), coordinator of the Project Accessibility in Federal Service of Data Processing (SERPRO), besides the question of digital inclusion´ politics and laws established by other agencies, companies and developers in general, must exist the personal initiative, form each of us that is respect diversity in the world that we live [8].

3. Brief Historical Accessibility Standards in the World

The first countries to idealize parameters of accessibility in Internet had been Canada, USA and Australia, in 1997. In 1998, in the United States was launched, "Section 508", a law determining that electronic and information technology of the federal agencies should be accessible to the people with special necessities [9].

According to this law, "the inaccessible technology interferes within the individual capacity to acquire and to use information in fast and easy way. "Section 508" was decreed to eliminate barriers in information technology, allowing new opportunities for disabled people and encouraging the development of technologies that assist them to reach these goals. The law applies to all federal agencies that develop, acquires, maintain or use electronic and information technology ". This law leads to the development of accessible technologies and adaptable solutions for not accessible technologies.

Aiming to turn Web accessible to a bigger number of people and with the objective to take it to maximum potential of interoperability, W3C (World Wide Web Consortium), a Committee formed by big companies, created WAI (Web Accessibility Initiative). Beside other attributions, WAI keeps workgroups elaborating guidelines to guarantee the accessibility of the Web content to people with special necessities, or that have access the Web in special conditions of environment, equipment, navigator and other Web tools.

As result of this work, it was launched, in May

1999, the Web Content Accessibility Guidelines 1,0 (WCAG 1,0), main worldwide reference in terms of accessibility in the Web until now. Also, in 1999, Portugal regulated rules of information accessibility available in Internet by Portuguese Public Administration for citizens with special necessities. This initiative - stimulated for the first electronic petition presented to a parliament (that counted on 9,000 signatures) leads Portugal as the first country in Europe and fourth in the World to legislate on Web accessibility. In June 2000, when approving the action plan e-Europe 2002 - that it includes the commitment of the adoption of the guidelines on accessibility of the W3C in public websites, the European Council extended the Portuguese initiative to the 15 countries of the European Union [10].

In Brazil it was possible to mention the following development:

- Decree nr. 5.296, of 2 December 2004, that regulates Laws nrs 10,048, of 8 November 2000 and 10,098, of 19 December 2000 (as explained in item nr. 2 – Social Inclusion and Digital Inclusion);
- Committee CB-40, that it is dedicated to the standardization related to accessibility, taking in account the premises of universal design. The Committee has many commissions, defining standards of accessibility in all levels, since build environment until virtual space;
- Many other laws in State and Municipality levels

With the American legislation for disable people and similar laws and regulations in other countries, these users demanded same access in computer systems.

The necessity of web resources be accessible for people with some kind of deficiency was always important. To recognize this importance had been the supplied by a legal requirement in lot of countries to assure accessible resources.

Recently, many initiatives and research have been developed in national and international scope. Due to the urgency of a governmental initiative in this area, the Accessibility Model of Brazilian Electronic Government was elaborated.

4. Accessibility Model of Brazilian Electronic Government

It is a complete accessibility model of the contents (information, services, etc.) of the Brazilian government, published in official press in 17 January 2005, which was elaborated for the Department of Electronic Government, in partnership with the NGO Brazil Accessibility intending to include a significant parcel of Brazilian population in access information available in Internet. Within this model was created the "Technical Manual" that deals more specifically with the modifications to be done in Web pages [4].

A study about accessibility' guidelines, through a comparative method was carried, verifying the standards adopted for many countries (U.S.A. - Section 508, Canada - CLF, Ireland - NDA, Spain, Portugal, among others). After that, a detailed analysis of the rules and checkpoints of international agency WAI/W3C was performed. Technical Manual has a proper and singular vision, with simplified indications and suitable priorities to the Brazilian reality.

Aiming to focuses on Brazilian priorities and lined up with what exists in this segment, the Accessibility Model was developed, with two points of view/ sides:

- *Technical' side*: guideline manual for the design and/or adaptation of electronic websites. The Technical point of view is centered in the developer, to the person that will adjust the codes used in websites;
- *Citizen' side*: architecture of the segmentation of the Technical side. Citizen's side of the Accessibility Model provides an orientation and more logical and intuitive understanding of the model properly and of the Vision Technical' side.

It is important to point out that the considered model (Technical Manual and Accessibility Model) does not have, as objective, be a method of implementation for websites' accessibility. Its main focus is help the content implementation and adaptation in an accessible way.

So, Citizen's point of view intends to separate the principles of accessibility in areas, which denote a specific type of benefit can be perceived. Below it's listed the Accessibility areas of this topic (see Fig. 1):

- Perception area;
- Operation area;
- Understanding area;
- Compatibility area.

Perception area deals with benefits related to the content's of information presentation. It is about the perception of graphical, sounds, images, and multimedia elements. Opera*tion area* is about the information manipulation of the content, or either, it must guarantee alternative ways to the access to the

information through different ways of navigation or similar technique. It is also responsibility of Operation area guarantee to the user the control of navigation and interaction with the website.

In a little more semantic and less concrete level, we define the *Understanding area*. This area deals with questions related to the understanding of the published content. It must guarantee that all content presented is easy to understanding for any kind of user. Finally, the *Compatibility area* approaches questions as the necessity of always using accessible and compatible technologies that fit the Model.

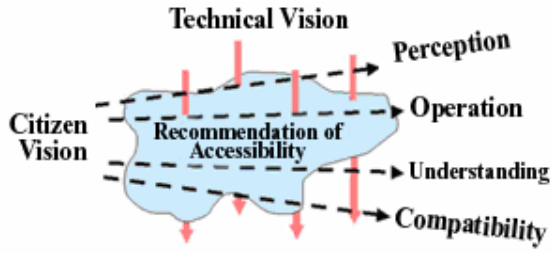

Fig. 1: Accessibility areas in Citizens' point of view

In contrast of the Technical' side, the Citizen' side has its focus in bigger public, also including non-technical people, using for this a more intuitive perspective of understanding about the results of the accessibility process. The Accessibility Recommendations can be also segmented into the Citizen' side, helping in understanding in which point each recommendation really contributes into the perceived result by citizen. In this way, Citizen's point of view becomes a link between the technician and the user, becoming a tool for the developer to better understand the "perspective of the citizen", what the citizen values and perceives.

4.1 Strategy of Implementation

4.1.1 Levels of Accessibility

Complementing the Accessibility Model of Electronic Government (e-MAG, 2005), it was defined that the necessities of contents access must be divided in three levels of accessibility:

- *Accessibility Level Priority 1* - basic Requirements of accessibility. Points that must be satisfied by designers and adapters of Web content. If not attended, groups of users will be incapable to access information in the document
- *Accessibility ·Level Priority 2* - accessibility guidelines and recommendations that are being implemented must guarantee the information access of the document. If not fulfilled, groups of users will have difficulties to navigate and access information in the document;
- *Accessibility Level Priority 3* - accessibility guidelines and recommendations that are being implemented will turn easy the access to Web documents. If not fulfilled, groups of users will find difficulties to access information available in Web.

These priorities levels will put in order the technical procedures to be followed in the contents' accessibility. The recommendations of *Accessibility Level Priority 1* must be analyzed and implemented before the recommendations of *Accessibility Levels Priorities 2 and 3*. In an analog way, the recommendations of *Accessibility Level Priority 2* must be analyzed and implemented before the recommendation of *Accessibility Level Priority 3*.

4.1.2 Process of Accessibilization

According to the model, the process of accessibility occurs basically in five distinct stages:
1 - Verification of necessity of contents' accessibility;
2 - Contents' Accessibility;
3 - Validation of contents' accessibility;
4 - Promotion of conquered accessibility;
5 - Continuous guarantee of accessibility.

First of all it is verify the real necessity of site adaptation. After that and concluding that exist changes to be realized, it's time to transfer to the other phase - contents' accessibility. After finished the process, begins a constant concern to assure that the site remains accessible.

4.2 Accessibility Validation

This process of conformity evaluation occurs through of three (3) distinct phases [4]. They are:

1. First, it is suggested to use programs that assure accessibility automatically;

2. After, it is considered that a human validation must be performed, through site navigation with programs readers – carried through the technician that implemented accessibility model, through of program of directed and planned tests that specifies the developed requirements;

3. At last, it is suggested also be performed another human validation through site navigation with programs readers; however, at this time, done by disabled users, reproducing a real situation of the site

usage.

Based on W3C/WAI international recommendations, software was developed to evaluate the accessibility level on Internet sites. Such programs produce reports pointing out problems and that should be corrected to turn the site accessible.

Finally, disabled users interact with programs that are capable to read and interpret information directly from computer screen.

4.3 Promotion of Conformity

Finally, when implementing accessibility recommendations and, consequently, fulfilling all checkpoints of Priority 1, it will be considered conforming first accessibility level (A). To be conforming to the second accessibility level (AA) it is necessary the fulfillment of all the checkpoints Priority 1 and 2. So, it is considered in conformity with the third accessibility level (AAA) after fulfilling all the checkpoints to the Priorities 1, 2 e 3 [4].

After approved by the evaluation software, it is considered to be adopted the orientation of decrees nr 5.296/ 2004 and federal regulations 10.048/2000 and nº 10.098/2000 to identificate the level of certification of the site (see Fig. 2, 3 e 4), attesting the accessibility level reached (A, AA, AAA) in those webpages.

Fig. 2: Stamp that identificates accessibility level A.

Fig. 3: Stamp that identificates accessibility level AA

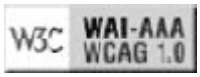

Fig. 4: Stamp that identificates accessibility level AAA.

5. Harmonization on Web

A research carried out with 32 web developers questioned their knowledge about accessibility and usability concepts. The results indicate that although the respondents recognize that the accessibility in the websites is of great importance, the majority of the web developers are unaware of the laws, guidelines and evaluation tools that allow a project of websites accessible. Even that the evaluation tools and recommendations are available to help the web developers to make its accessible websites, a great amount of websites continues inaccessible for people with special necessities. One of the causes for this fact is the lack of standardization of the evaluation tools and also recommendations and patterns [11].

In the area of Web accessibility, W3C developed an international standard of WCAG 1.0 in 1999 and is developing a new guideline, WCAG 2.0. There is no ISO standard in Web accessibility. The "Accessibility Model of Electronic Brazilian Govern" was developed under these circumstances.

International standard harmonization is important not only between Brazil and W3C but over the world.

It might be difficult to achieve international standard harmonization in one quick step because social conditions and level of assistive technologies are quite different among countries. Level of screen readers and assistive technologies are different with countries which mother tongue is not English. Japanese's characters, which are ideograms, may cause peculiar accessibility problems in web. It, however, is needed to exchange information of local problems and communicate and discuss each other to the goal of international standard harmonization.

6. Concluding Remarks

People think that turn accessible web pages are difficult. Accessible pages are also considered to need more cost and time. In other words, valance of cost and merits are bad: more cost and a few merits. If making accessible web content cost much money and time and merits or profits is low, is probably that only legislation can push web accessibility.

In Brazil, even after Decree 5.296/2004, is important to say that directives indicated in the Accessibility Model of Brazilian Electronic Government by itself aren't capable to guarantee accessibility. Recommendations only guide to the accessibility requirements to be fulfilled. It is important that the site must be evaluated and tested by specific accessibility programs focused in disabled people.

A true approach in web accessibility requires a harmonization of standards of all the elements involved in this process: the author, the authoring tools, the browser and the message. For each element in this process there are recommendations to be followed that interact between themselves. Around the world there is currently a fragmentation (multiple divergent

standards) rather than harmonization of Web Accessibility standards. Many countries have already developed or are now developing their own guidelines or standards. Harmonization of Web Accessibility standards is the key to turn Web accessible once it creates a unified market demand for improvement of the access to the information.

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