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Support resource based on standards for accessible e-Government transactional services

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ABSTRACT

As the world moves towards an information society, it is not possible to consider the concept of e-Government that is restricted to the ability of just a few. At present, it is common to have to fill out forms electronically in order to carry out administrative procedures. The web interfaces of public transactional e-Services must be accessible by system users, regardless of whether they are disabled or not, according to the regulatory framework. This accessibility is not always taken into consideration in online forms in a process flow. One possible reason for this is the fact that guides are not available to assist in the design and evaluation of their accessibility. It is necessary for the transactional processes on Government e-Service websites to be accessible and well designed, in accordance with the current standards. In order to achieve this goal, the standard Web Content Accessibility Guidelines (WCAG) must be complied with, according to legislation. However, these guidelines do not cover many of the obstacles faced by people with disabilities, as well as the general public, while filling out web forms, thus leaving accessibility problems undetected and unsolved. For this reason, web accessibility standards are not enough and should be supplemented by official government design patterns focused on transactional e-Services and online forms. In this article, we propose a support resource, which includes the accessibility criteria to be followed while designing and evaluating government transactional e-Service websites that incorporate online forms in the process flow. For the purpose of evaluating the reliability of the method and explaining it, a study was carried out on a sample of Spanish government e-Services used for making appointments in order to detect accessibility and design problems; this is presented as an example of good practices.

1. Introduction

There are barriers to web accessibility, which deny the right of People with Disabilities (PWDs) to access content on public-sector websites and Internet services, even though equal access is mandatory for e-Government websites in most countries. This legislation is important for everyone, including those who do not currently have any disability. A digital society can only be complete when citizens have access, and this access must include persons with disabilities. Despite the numerous efforts by various governments, universal web accessibility is still a global issue. Data indicates that a vast number of public websites continue to present serious barriers to accessibility [1].

While these barriers mostly affect users with disabilities, numerous other user groups are at risk of exclusion. The number of PWDs is very large. One billion people, or 15% of the world's population, experience some form of disability. One-fifth of the estimated global population, or between 110 million and 190 million people, experience significant disabilities [2].

It is not possible to consider the concept of e-Government in which the ability to receive information is restricted in some way. Interactive technology is becoming the native language of newer generations of citizens, including people with and without disabilities, who require access to as many e-Services as possible in an inclusive and user-friendly way.

The citizens input data by filling forms, and this is the reason why it is important to avoid barriers of accessibility in this element. The versatility of web forms has made them an important interface for interacting with our public institutions. In its 2015 report on the use of e-Government, OCDE states that 33% of individuals have filled out administrative forms electronically and 78% of businesses have filled out a form online [3].

The population in Europe is becoming increasingly older, and the proportion of senior citizens who need assistance in their daily life will continue to rise in the coming years. Between 2016 and 2080, the elderly will account for an increasing percentage of the total population: those aged 65 years or older will account for 29.1% of the EU-28's

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population by 2080, compared with just 19.2% in 2016 [4]. With ageing, disabilities develop, which imply the emergence of accessibility barriers that prevent the elderly from accessing government e-Services if they are not fully accessible.

Evaluation methods play a useful role in ensuring the accessibility of e-Government websites related to public administration. Public policies for web accessibility should consider such tools, and regulate and promote their use [5]. Therefore, it is important to study evaluation methods that enable the evaluation of e-Government services comprised of transactions using online forms. With the goal of tackling this issue, this work starts by pondering if evaluation processes consider accessibility in online forms found in process flows. By following an exploratory research method [6], a variety of relevant studies and works are analysed. Although online forms in the process flow are an essential element used by individuals when carrying out administrative tasks, they are also likely to present accessibility barriers. The results of this study show that while studies that analyse the accessibility of online forms according to the WCAG criteria do exist, they do not evaluate the accessibility of online forms found in process flows. In other words, no studies that specifically assessed the accessibility of online forms in a process flow could be found. In order to solve this issue, a support resource is proposed, which would assist in evaluating the accessibility of online forms found in process flows. Using this resource, we presented an evaluation of a sample of Spanish government e-Services.

This paper is organized as follows. Section 2 offers a panoramic view of the various aspects related to both this work and other relevant studies. An analysis of the WCAG 2.0 for online forms and the official government design patterns for form flow is presented in Section 3. In addition, Section 3 provides a support resource for the design and evaluation of transactional e-Services and online forms. To demonstrate the applicability of the proposed support resource, Section 4 discusses the evaluation of a sample of the Spanish Government's e-Services using the support resource. Finally, the conclusions are discussed.

2. Overview

This section discusses how PWDs access the web and reviews the main standards and regulatory framework regarding accessibility for e-Government. In addition, by means of an exploratory study, a search for works on the accessibility of online forms in the process flow of e-Government websites was carried out.

2.1. How people with disabilities access the web

There is a wide range of PWDs, including individuals with blindness and low vision, deafness and hearing loss, learning disabilities, cognitive disabilities, limited movement, speech disabilities, and combinations of these. In addition, some people may have disabilities due to an illness, or they may develop impairments with age [7].

PWDs use assistive technologies for support when performing tasks. Assistive technologies include screen readers that read web pages aloud for the blind, screen magnifiers for people with low vision, and selection switches for people who cannot use a keyboard or mouse.

People with cognitive disabilities may encounter accessibility barriers when attempting to carry out a transactional process if this process is not well designed (by including accessibility criteria during its development). Individuals must be informed of which stage of the process they are completing. Moreover, forms must be well-designed and should provide clear information regarding the information they are asking for, in order to help the user fill out the form, etc. [8].

Accessibility support is considered to be satisfied if accessibility standards and guidelines are followed. In a study regarding web accessibility and blind users [9], it is noted that accessibility guidelines alone cannot address all the problems encountered by blind people. Therefore, in addition to applying accessibility standards and guidelines, the participation of disabled users in the design and evaluation processes of services is essential, thus adhering to an inclusive design that is focused on the user.

2.2. Accessibility policies for public websites

Accessibility laws are essential for reaching a consensus about a regulatory framework that is applicable for all. There are barriers to access content on public-sector websites and Internet services, even though equal access is mandatory on e-Government websites in most countries, as is indicated below.

Starting in the late 1990s, several countries began to enact laws related to computer system accessibility for technology supported or provided by the government. Some examples are the U.S., with the Section 508 of the Rehabilitation Act [10], and the UK, with the Disability Discrimination Act (DDA) [11].

The "United Nations Convention on the Rights of Persons with Disabilities" was ratified by the European Union and its member states [12]. It recognizes that disability is an outcome of the interaction between a person and the physical, technological, and economic barriers in addition to other aspects that prevent their full participation in society.

Following this path, many countries have directives and laws that address the accessibility barriers with regard to technologies. These stipulate that accessibility is mandatory for e-Government websites. Some of these countries are Australia (with the Disability Discrimination Act), Canada (with the Human Right Act), France (with Law No 2005-102), Germany (with the Federal Disabled Equalization Law), Italy (with the Stanca Law), Ontario (with the Ontarians with Disabilities Act (AODA)), and Spain (with Royal Decree 1/2013). In January 2017, the US Access Board released their latest proposal to update the ICT Standards and Guidelines related to Section 508 called "The Refresh" [13].

In October 2016, the European Directive on Web Accessibility for Public Sector Websites was approved by the European Parliament. This new situation means that PWDs will have improved access to the websites and mobile applications of public services [14].

As can be seen, there is a broad regulatory framework with regard to accessibility, although difficulties are encountered in complying with it.

2.3. Accessibility standards

In order to achieve overall ICT accessibility and compliance with the legislation, numerous initiatives, directives, and standards exist, which identify problems and suggest new accessible designs. With regard to accessibility standards, special mention must be made of the World Wide Web Consortium (W3C) and its Web Accessibility Initiative (WAI) [15].

The WAI has been in force since 1997, with regard to accessibility guidelines. The most relevant guidelines are the Web Content Accessibility Guidelines (WCAG) [16]. WCAG 2.0 covers a broad range of recommendations for making web content more accessible. Version 2.1 of the WCAG is currently under development.

With regard to its structure, WCAG 2.0 contains three main levels of guidance: principles, guidelines, and success criteria. There are four principles that form the foundation of web accessibility: perceivable, operable, understandable, and robust. Twelve guidelines provide the basic goals that web designers should work towards, in order to make content more accessible for PWDs. Furthermore, there are sixty-one success criteria provided for each guideline. These criteria allow WCAG 2.0 to be used when requirement and conformance testing are necessary, such as in design specification, purchasing, regulation, and contractual agreements. To meet the needs of different groups and different situations, three levels of conformance are defined: A (lowest), AA, and AAA (highest). In most regulatory frameworks that have adopted the WCAG 2.0, conformance with level AA is mandatory.

An analysis of accessibility standards and guidelines following regulatory framework was conducted, and the result of this analysis is presented in Table 1.