How Accessible is the Public European Web?

Morten Goodwin Olsen *

* *Tingtun AS. PO Box 48. N−4791 Lillesand. Norway. (e-mail: morten.g.olsen@tingtun.no).*

Abstract: Making public web sites accessible to all European citizens is an important goal of the European i2010 strategy. This paper presents results from an accessibility evaluation of European governmental web sites, showing that Europe is far from reaching the goal of having all public web sites barrier free within 2010. In fact, 28% of all applied tests discover barriers which causes significant problems for people with special needs.
The evaluation has been carried out using the first fully automatic implementation of the Unified Web Evaluation Methodology. Evaluation of web accessibility is traditionally carried out manually which includes several challenges. In contrast, over approach avoids the usual bias part of manual accessibility evaluation. It further makes it possible for the first time to have a sadistically sound comparison of web accessibility between European countries.

Keywords: Web Accessibility, Benchmarking, Public Procurement, eGovernment.

1. INTRODUCTION

A barrier is an obstacle which is challenging or impossible to overcome for some users, such as having the only entrance to a building through staircases which prevents a people with wheelchairs to enter the building.
Poorly designed web sites may also contain barriers. As an example, some web sites are designed in such a way that users are required to use a mouse to navigate within the web site. People who have challenges with using a mouse, such as some people with motor impairments, will experience this as a barrier and may not be able to use the web site at all.
An accessible web site is barrier free and works for all users, even users with special needs. Web accessibility and the desire to make public web sites barrier free has in recent years received increased attention. Most significantly, having all public European web sites accessible for all citizens, is an important goal of the European i2010 strategy (European Commission [2005]).

1.1 Existing Surveys

Several recent surveys on web accessibility have received a lot of attention, such as the "Measuring Progress of eAccessibility in Europe" (MeAC) (Cullen et al. [2007]), the UN Global Audit (Nomensa [2006]), and the UK Cabinet Office (Cabinet Office [2005]). The existing surveys mostly rely on manual evaluations and there exists no large scale study with comparable results on web accessibility in Europe.
Following is the advantages and disadvantage of the existing manual studies and a completely automatic study.

(1) **Manual** studies are performed by experts who may (subconsciously) favor particular types of web sites.
Automatic implementation may include errors or omissions which could influences the results. However such errors would normally not have any bias towards any particular type of web site.
(2) **Manual** studies are costly as it requires humans to perform the evaluation.
Automatic evaluation includes operating an observatory which has significantly less cost than manual evaluations specially for large scale benchmarking.
(3) **Manual** evaluations can in practice not evaluate many web pages since evaluating each web site takes quite a lot of time. For example for each web site, MeAC only evaluated 25 web pages even though most web sites contain substantially more web pages.
Automatic: The number of pages to evaluate is limited by machine capacity. It is substantially larger than what is possible with manual studies.
(4) **Manual:** Studies are hard to repeat since many manual tests rely on subjective human judgment. As an example, an accessible web page has clear and consistent text. However, what is perceived as clear and consistent may vary between different experts and is therefore not repeatability.
Automatic: Studies are completely repeatable and can investigate web accessibility over time.
(5) **Manual:** Can perform all accessibility tests.
Automatic: Can not reach the same test coverage as manual evaluation. In fact, 80% of the Unified Web Evauation Methodology (UWEM - see section 2) tests require human judgment.

The basis for most of the existing surveys has been the well known and accepted Web Content Accessibility Guidelines (WCAG) (World Wide Web Consortium [1999]) − guidelines stating what is and is not accessible in a web site. Even though the same guidelines have been used for several studies, different methodologies and scoring schemes have been developed for each European country. This makes it very hard to compare accessibility results between European countries, and there is no way of knowing which European country has the most accessible web sites.

2. UNIFIED AND AUTOMATIC EVALUATION

To improve the limitation in existing evaluations, a Unified Web Evaluation Methodology (UWEM) (Web Accessibility Benchmarking Cluster [2007]) was developed, creating a common basis for web accessibility evaluation across Europe. The European Internet Accessibility Observatory (EIAO) is an implementation of UWEM and allows measurements of accessibility completely automatically avoiding the limitations of manual testing (see section 1.1).

2.1 European Internet Accessibility Observatory

The UWEM includes both manual and automatic testing. This paper is however limited to results retrieved automatically. Comparison between automatic and manual evaluation results and technical details of EIAO is available in Bühler et al. [2008]. Details of the evaluation methodology is available in Web Accessibility Benchmarking Cluster [2007] and Nietzio et al. [2007].
The main parts of the evaluation methodology is for each web site as following: (1) Download the entire web site if possible. 15% of the evaluated web sites are too large to download completely, and only 6000 web pages [1] are downloaded. (2) Randomly select 600 web pages for accessibility testing, allowing the accessibility results to be representative of the web site. (3) Calculate web site score and store the detailed results. (4) Present both low and high level results.

2.2 Accessibility Score

Each applied UWEM test has two possible results; **fail**: a barrier is detected or **pass:** a barrier is not detected. An example of a fail result is when EIAO finds an image without an alternative description. This is a barrier because people who are unable to see [2] images images rely on the alternative texts to understand the image. When such alternative text is not present, the information conveyed in the image is lost to these users.
The accessibility results are presented as a fraction of detected barriers of applied tests. The larger percentage barriers detected, the less accessible the web site is. In a completely barrier free web site EIAO will not detect any barriers and the score will be 0%, if half the tests detected barriers the score would be 50%, and so on. The accessibility results on country level is the average score of all evaluated web sites part of the study.

EIAO performed an evaluation of public web sites in EU and EFTA. The web sites have been representatively selected from each by the 20 Services Evaluation (Capgemini [2007]). In total this survey consisted of 2198 web sites divided by the different countries. It should be noted that some of the web sites scheduled to be part of the evaluation where not available. Countries with two few web sites available have deliberately been removed.

[1] Note the difference between a web site and a web page. A web page is identified by a single URL e.g. `http://www.example.com/directory/somepage1.html`. In contrast a web site contains many web pages and is typically identified by a domain name e.g. www.example.com.

[2] People who are unable to see images include, but are not limited to, people with visual impairment, people using a mobile phone and has turned off images to reduce the data traffic and people using non visual web browsers.

3. RESULTS AND DISCUSSION

Figure 1 shows the over all web accessibility score produced by EIAO. Each evaluated country has a distinct colour shade. A dark red shade means that many barriers were detected and the web sites in the country are inaccessible. In contrast, a light yellow shade means few detected barriers. Even though it is possible to reach results from 0% to 100%, the figure ranges from 17% (best country result) to 38% (worst country result).

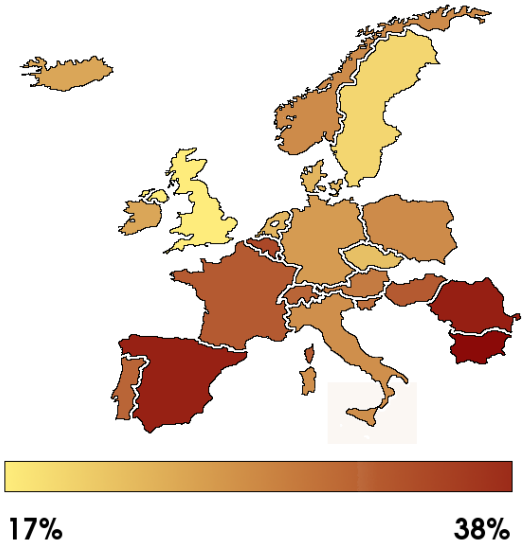

Fig. 1. Accessibility Barriers in Europe. A dark (red) colour means many barriers found.

	Country	Score
1.	United Kingdom	17%
2.	Sweden	20%
3.	Czech Republic	21%
4.	Netherlands	22%
5.	Denmark	23%
6.	Ireland	24%
7.	Iceland	25%
8.	Germany	26%
9.	Italy	26%
10.	Poland	27%
11.	Norway	27%
12.	EU level sites	28%

	Country	Score
13.	Austria	28%
14.	Slovenia	28%
15.	Switzerland	29%
16.	Portugal	30%
17.	France	30%
18.	Cyprus	31%
19.	Belgium	31%
20.	Hungary	32%
21.	Luxembourg	34%
22.	Romania	34%
23.	Spain	35%
24.	Bulgaria	38%

Table 1. Countries ranked according to web site accessibility.

In table 1 the evaluated countries are ranked according to the average percentage of barriers detected (score). The results also include web sites on EU-level (web sites not directly connected to a country but to EU).
Most significantly, these results show that the goal of making all public European web sites barrier free within the year 2010 is far from reached.

In fact the United Kingdom, ranked as number 1, 17% of the applied tests found barriers. This means that even for the country with most accessible web sites in Europe there exists significant amount of barriers, which will cause challenges for many people and significant problems for

people with special needs. The average score for Europe is 28%.

3.1 Most Common Barriers

Our findings show that some barriers are more common than others. In this section the most common barriers are presented.

(1) **Invalid or deprecated (x)HTML and/or CSS** was detected in 82% of the evaluated web pages. (x)HTML and CSS are the most used technologies for web pages. The latest version of these technologies are built with accessibility in mind. This means that assistive technologies can more easily and successfully present the web page content when the latest (x)HTML and/or CSS is used correctly.

(2) **Graphical elements without textual alternative** occurred in 63% of the evaluated pages. An example of this is images without alternative text, which causes challenges for people with visual impairments who are unable to see the pictures. Any information conveyed in an image is lost to these users whenever a textual alternative is missing.

(3) **Form elements without labels** occurred in 62% of the evaluated pages. An example of this is not correctly marking a search button as "search". The fact that the web site is searchable, is sometimes understood by the context around the search field, such as a magnifying glass nearby. People with visual impairments and dyslexia sometimes have the web page text read out load using screen readers, and are unable to a see magnifying glass. If a button is not clearly marked as a search button, it is no way of knowing that it is intended for searching the web site.

(4) **Links with the same title but different target** occurred in 32% of the evaluated pages. There is often a problem that links on web pages are not describing the target pages well. A typical example is having links with the text "read more" (which does not say anything about what the link is actually linking to). Instead links should be more descriptive such as "read more about the economic crisis". For fast and efficient navigation, some accessibility tools present all links within an a web page to the user. However, if all links have the text "read more", presenting all links to the user is useless since it is impossible to know what information each link points to.

(5) **Mouse required** occurred in 15% of the evaluated pages. For web sites which requires the use of a mouse it causes problems for people with motor impairment who often have challenges with using such devices. An example of such is web sites with menu items which can only be accessed by clicking with a mouse. Often, people with motor impairment are not be able to use such web sites at all.

4. CONCLUSION

This paper presents an Observatory for automatically measuring accessibility of web sites. With this implementation a survey has been carrier out showing that in average, 28% of the applied accessibility tests detect barriers. These barriers will have a significant impact for many users, and will prevent some citizens from using these the public web sites. The public European web is far from accessible.

ACKNOWLEDGEMENTS

The research in the EIAO project which made this paper possible, has been carried out by a large group of highly talented people. All participants are listed in Snaprud [2008] [3] .

REFERENCES

Christian Bühler, Helmut Heck, Annika Nietzio, Morten Goodwin Olsen, and Mikael Snaprud. Monitoring accessibility of governmental web sites in europe. In *International Conference on Computers Helping People with Special Needs.*, pages 410–417, 2008.

Cabinet Office. eAccessibility of public sector services in the European Union. Available online at: `http://www.cabinetoffice.gov.uk/e-government/eaccessibility`, 2005.

Capgemini. 7th annual measurement of the progress of online public service delivery across europe., 2007.

Kevin Cullen, Lutz Kubitschke, and Ingo Meyer. Assessment of the status of eAccessibility in Europe. Available online at: `http://www.epractice.eu/document/4823`, 2007.

European Commission. i2010 - A European information society for growth and employment. Available online at: `http://europa.eu.int/information_society/eeurope/i2010/docs/communications/com_229_i2010_310505_fv_en.pdf`, 2005.

Annika Nietzio, Nils Ulltveit-Moe, Terje Gjœsæter, and Morten Goodwin Olsen. Unified Web Evaluation Methodology Indicator Refinement. Available online at: `http://www.wabcluster.org/uwem1_1/`, 2007.

Nomensa. United Nations global audit of web accessibility. Available online at: `http://www.un.org/esa/socdev/enable/documents/fnomensarep.pdf`, 2006.

Mikael Snaprud. European Internet Accessibiliby Observatory. Available online at: `http://www.eiao.net`, 2008.

Web Accessibility Benchmarking Cluster. Unified Web Evaluation Methodology (uwem 1.2). Available online at: `http://www.wabcluster.org/uwem1_2/`, 2007.

World Wide Web Consortium. Web content accessibility guidelines 1.0. W3C recommendation 5 May 1999. Available online at: `http://www.w3.org/TR/WCAG10/`, 1999.

[3] This work is part of the eGovMon (`http://www.egovmon.no/`) project, co−funded by the Research Council of Norway under the VERDIKT program. Project no.: Verdikt 183392/S10