Accessibility of eGovernment Web Sites: Towards a Collaborative Retrofitting Approach

Annika Nietzio[1], Morten Goodwin Olsen[2], Mandana Eibegger[2], and Mikael Snaprud[2,3]

[1] Forschungsinstitut Technologie und Behinderung (FTB) der Evangelischen Stiftung Volmarstein, Grundschötteler Str. 40 58300 Wetter (Ruhr), Germany
egovmon@ftb-net.de,
http://www.ftb-net.de

[2] Tingtun AS, PO Box 48, N−4791 Lillesand, Norway
{morten.g.olsen,mandana.eibegger,mikael.snaprud}@tingtun.no
http://www.tingtun.no

[3] University of Agder, PO Box 509, N−4898 Grimstad, Norway

Abstract. Accessibility benchmarking is efficient to raise awareness and initiate competition. However, traditional benchmarking is of little avail when it comes to removing barriers from eGovernment web sites in practice. Regulations and legal enforcement may be helpful in a long-term perspective. For more rapid progress both vendors and web site maintainers are willing to take short-term action towards improvements, provided that clear advise is available. The approach of the *eGovernment Monitoring project (eGovMon)* integrates benchmarking as a central activity in a user-driven project. In addition to benchmarking results, several other services and background information are provided to enable the users – in this case a group of Norwegian municipalities who want to improve the accessibility of their web sites – to gain real added value from benchmarking.

1 Introduction

Web sites of municipalities have evolved into an important means of interaction between government and citizens. However, many of those web sites are not accessible enough to allow all citizens to use them. An overview of eGovernment accessibility issues that arise at the different levels of service provision is given by Nietzio et al. [1]. Although the awareness about accessible eGovernment is fuelled by periodic benchmarking campaigns, several recent studies show that there is still much room for improvement.

The municipalities participating in the eGovMon project have expressed a strong demand for practical support. Often the web site maintainers are not aware of accessibility problems in their web sites or do not know how to resolve them. Therefore the eGovMon project is currently establishing a dialogue between content authors, software vendors, and web accessibility experts. In a

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collaborative effort they can analyse the nature of the accessibility barriers and determine who can address the barriers most efficiently.

The remainder of this paper is organised as follows. In Section 2 we discuss some recent accessibility studies and analyse the shortcomings of benchmarking. The eGovMon approach to overcome these shortcomings is presented in Section 3. Finally, results of the project so far and future plans are summarised in Sections 4 and 5.

2 State of the Art

The goal of improving web accessibility is addressed by a variety of measures. The two opposite ends of the continuum are *benchmarking*, which aims to inform and support policy decisions on the one hand and on the other end *technical knowledge* disseminated formally via university courses such as the "Joint European Study Programme on Accessible Web Design" [2] and vendor seminars; or rather informally through blogs and other dedicated web sites such as `http://www.alistapart.com`, `http://www.webstandards.org`, or `http://www.456bereastreet.com` – to name only a few. Whereas the former addresses mostly management and policy makers, the latter targets a technical audience of web designers and web developers. In between these two areas there is a gap. There are only few accessibility projects and initiatives addressing the needs of the people and organisations who run the web sites, such as maintainers of the Content Management Systems (CMS) and web editors.

2.1 Benchmarking

In the past few years a number of national and international studies on eAccessibility have been conducted. Some are covering mainly web accessibility, while others address a wider range of ICT products and services. The accessibility topic also found its way into eGovernment surveys such as the 2009 Capgemini study "Smarter, Faster, Better eGovernment" [3].

The "Assessment of the Status of eAccessibility in Europe" [4] and its follow-up from 2009 [5] present a policy survey, a status measurement based on a set of key indicators, and the results from questionnaires sent to stakeholder groups (ICT industries, user organisations, and public procurement officials). The main purpose of these studies was to follow up on previous studies and support the future development of European policy in the field of eAccessibility.

There are also national and regional benchmarking approaches that have been in operation for several years [6]. In general, the results are presented as a list of aggregated results which do not contain technical details and thus are not helpful for web site owners who want to improve the accessibility of their web sites. In Norway the annual survey carried out by the the Agency for Public Management and eGovernment (Difi) recently started to include additional information about the individual tests and their results [7]. However, none of the surveys we are aware of links the test results to practical advice for a specific content management system.

2.2 Barriers to Web Accessibility Improvements

Benchmarking, as well as other types of evaluation that are not commissioned by the subject of the study, often fail to have an impact. The results are published but are used neither by the site owners to improve their web sites, nor by CMS vendors to improve their software. This can have several reasons:

- The results are not detailed enough to be used as basis for implementing improvements.
- It is not clear in which part of the publication chain the barriers were introduced or who is in a position to fix them.
- The site owner does not have the resources to hire external consultancy to fix the accessibility problems; and the staff responsible for maintaining the web site doesn't have the knowledge.
- The known barriers are fixed in a one-off effort. But there are no quality processes in place so that the accessibility of the web site deteriorates rapidly because newly added content is still inaccessible.
- The benchmarking is carried out as one-off study, or indicators change frequently, so that progress can not be evaluated.

Local strategies for removing barriers have so far been limited to in-house guidelines [8] and best practices in user generated content [9]. The literature does not include actions to determine if the barriers are introduced by user generated content or if these are introduced by the content management systems, even though this is essential information when web accessibility barriers are to be removed.

Experience tells us that when web accessibility results are shown to web editors, they will blame the content management system. Similarly, the vendors will claim that the content authors are not using the system correctly.

3 The eGovMon Concept

In this section we present the eGovMon approach which aims to close the gap between high level benchmarking and accessibility improvements that are implemented as an isolated fix on a single web site by addressing the shortcomings outlined above. The concept is built upon several pillars: an on-line checker that provides detailed accessibility evaluations of single web pages; a community forum for web site maintainers from municipalities, web accessibility experts, and CMS vendors and developers; and finally the publication of regularly updated benchmarking reports, which allow the assessment of progress and improvements over time.

3.1 Detailed Test Results

The eGovMon project has developed an easy to use on-line tool that can check single web pages. The eAccessibility Checker[1] provides detailed information on the identified accessibility barriers and links to the potential solutions described in the eGovMon forum (see Section 3.2 for details).

[1] The eAccessibility Checker is available at `http://accessibility.egovmon.no`

The system contains 23 web accessibility tests, which are all derived from the *fully automatable* tests in the Unified Web Evaluation Methodology (UWEM) [10]. These tests are based on the Web Content Accessibility Guidelines (WCAG) [11]. Some restrictions apply when creating automatic measurements. Most significantly, many of the UWEM tests require human judgement. In fact only 26 of the 141 tests in UWEM are marked as automatable. As an example, automatic testing can find images without alternative text. However, to claim that an existing alternative text represents the corresponding image well, human judgement is needed. Thus, automatic evaluation can only be used to determine the existence of barriers, not to verify the absence of barriers needed to support and accessibility claim of a web page. Casado Martínez et al. [12] have shown that the automatic evaluation results can in some degree be used to predict manual evaluation results.

Figure 1 shows the result page of the eAccessibility checker with detailed background on a selected test. The results also include information on where in the HTML code the barrier was detected.

3.2 eGovMon Community Forum and Seminars

The municipalities participating in the eGovMon project have a lot in common: The organisations are often quite small without a full-time web site maintainer. They use one of a few CMS that are developed and marketed especially for municipalities in Norway. Therefore, it seems a natural step to invite them to a forum that enables the sharing and re-use of good practices, to make sure that isolated fixes can be applied by other users of the same system. Furthermore, the forum asks vendors and developers to provide examples of correct use of their software to produce accessible content.

The hints and tips are associated with the barrier messages of the eAccessibility Checker. It is also indicated if the solution is CMS-specific and which parts of the systems (usually some kind of template file) must be updated to remove a problem.

If a barrier is not caused by the template but was introduced by the web editor, the forum collects descriptions how to make sure that content added by web editors is accessible. For instance by documenting how alternative texts for images and other non-text content can be added in a specific CMS, or by explaining how to insert content as plain text to avoid that formatting instructions from word processing software affect the output of the CMS in an undesired way.

Template analysis. To get the forum started some CMS templates for different systems were analysed by web accessibility experts. The experts identified potential accessibility problems and described how to fix these within the functionality of the CMS.

Training seminars. To address the issue of missing accessibility competence of the staff, eGovMon is offering training seminars, which include an introduction to HTML and CSS, awareness raising for accessibility barriers, and techniques to improve accessibility.

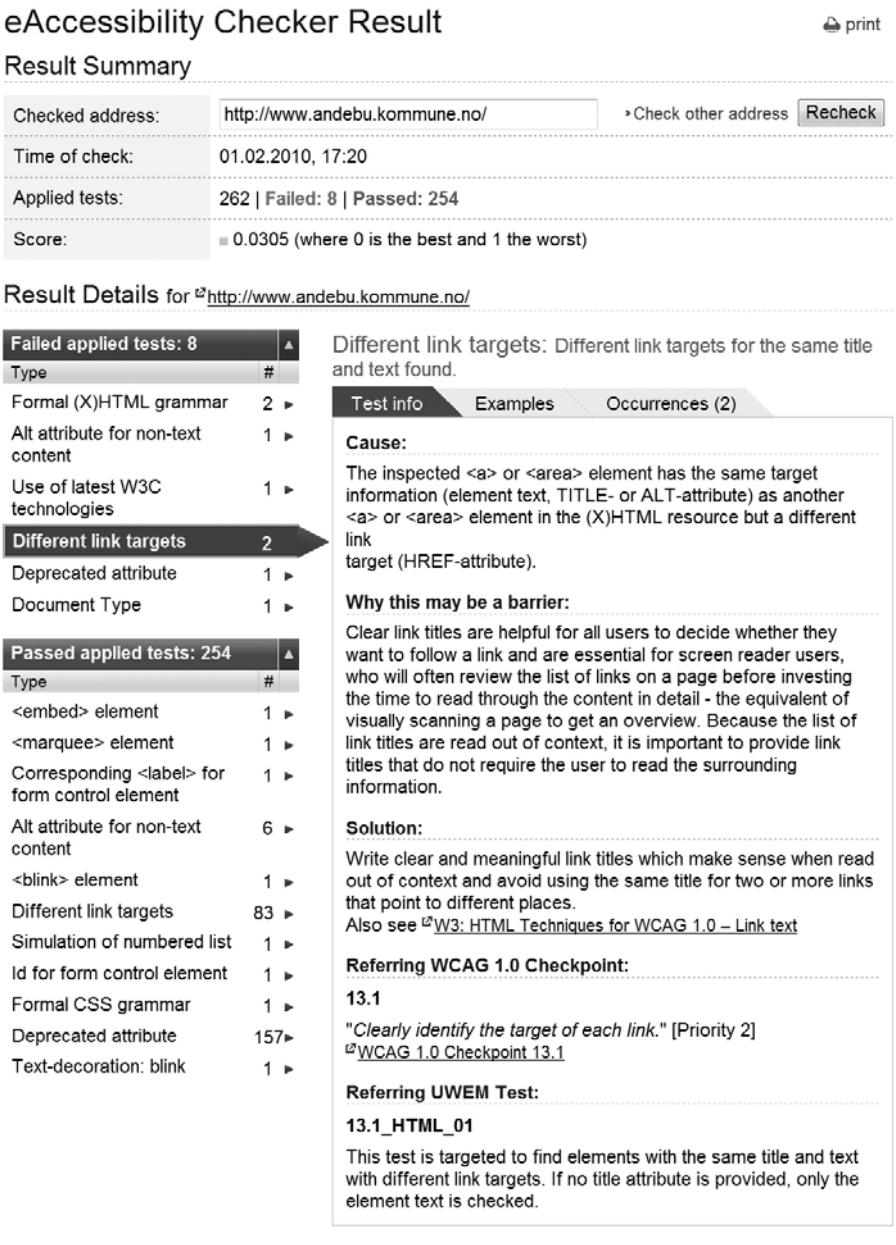

Fig. 1. Result page of the eAccessibility Checker

Quality processes. Web accessibility should be regarded as a process [13]. Therefore it is important to integrate it with the work flow of maintainers and web editors. eGovMon runs the on-line eAccessibility Checker that can be used

to check single pages at any time, and also supports the municipalities in setting up tools and quality processes.

3.3 Regular Benchmarks

The eGovMon project conducts bi-monthly benchmarks of all Norwegian municipality web sites. The evaluations are carried out automatically with the eGovMon tool which consists of the following main components:

- **Crawler:** explores and detects 6000 web pages from each web site. If a web site is smaller than 6000 pages, the web site is exhaustively scanned.
- **Sampler:** randomly schedules 600 of the detected web pages for evaluation.
- **Web Accessibility Metric:** evaluates the HTML and CSS of the scheduled web pages according to the UWEM tests.
- **Database:** stores URLs of the pages detected by the crawler, evaluated by the web accessibility metrics, as well as aggregated information such as most common barriers, results per county, etc.
- **Web user interface:** presents the stored results as tables and figures. Figure 2 shows the results from Vestfold county.

Additionally, the Norwegian municipalities participating in the eGovMon project can trigger an evaluation of their web site at any time using an on-line web interface. These evaluations are carried out exactly as the the bi-monthly evaluations except that the result are sent out as a report in PDF format by email when the evaluation is completed.

Vestfold, Norway Mean Score: 0.1136

Municipality	Score	Country Rank
Andebu	0.0612	5
Hof	0.1285	16
Holmestrand	0.1185	14
Horten	0.1157	13
Lardal	0.0550	3
Larvik	0.0834	10
Nøtterøy	0.1563	18
Re	0.1120	12
Sande	n.a.	
Sandefjord	0.1186	15
Stokke	0.0523	2
Svelvik	n.a	
Tjøme	0.2841	19
Tønsberg	0.0779	9

Fig. 2. Results from accessibility benchmarking of Norwegian municipality web sites. Example: Vestfold county (January 2010).

4 Impact

The first quality assured benchmarking results for the participating municipalities were published in December 2009. An on-line interface with enhanced visualisation and comparison features is currently under development.

All participating municipalities have reported that they use the eAccessibility Checker. Several of them use it frequently in their day-to-day work. At least three of them have engaged in a quality improvement dialogue with their vendors based on the results provided by eGovMon.

The eGovMon forum is organised in close collaboration with the Norwegian Agency for Public Management and eGovernment (Difi) to bring the relevant stakeholders together, to facilitate informal discussions on how measurements and reports are designed, and to enable further use of the results across all Norwegian municipalities.

5 Conclusion and Future Plans

The facilitation of a dialogue based on measurement results among the different stake holder groups involved in the quality improvement process is an essential outcome of the eGovMon approach. The different parts of the eGovMon approach address all of the shortcomings listed in Section 2.2.

In the future, we plan to encourage the use of the forum to turn it into a sustainable community. Another future development direction we intend to explore is the extension of activities to address also end users (citizens). Similar to the German "Abi Meldestelle"[2] and the Italian "Osservatorio per l'accessibilità dei servizi delle PA"[3] a service could be offered where end users can report accessibility barriers they encounter on public web sites. The complaints are analysed and forwarded to the web site responsible if they are found to be valid. Users can follow the status (were the web site owners contacted, have they replied, has the barrier been removed).

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