What is the current state of Web Accessibility?

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Abstract - **Two studies were conducted, focusing on the perceptions and current state of Web Accessibility. It found a strong trend towards Content Management Software, and considerable differences between how those who specialise in accessibility and those charged with web maintenance assess and perceive accessibility. Both studies also revealed that there is very little awareness of web accessibility issues and commitment of resources in many organisations. Recommendations are made for more training, especially for management.**

Index Terms — **web maintenance, engineering, web accessibility**

I. Introduction

It is now 7 years since the first Web Content Accessibility Guidelines (WCAG1.0) were approved by the World Wide Web Consortium (W3C). Since then the Web has grown in both terms of users and their usage. This growth has led many governments to pass laws ensuring those with the most to gain from online services (i.e. users with disabilities) are not discriminated against through poorly thought out and inaccessible design.

II. Web Accessibility

The Web has become one of the most important methods of communication in a very short period of time. In 2005 91% of Small to Medium Enterprises and 99% of large enterprises within the EU had internet connections [10]. Alongside this, nearly half (48%) of all EU households had access to the Internet. The number and range of online services has also increased considerably; banking, education, grocery shopping, and local government administration all now have online presences. As more services come online, it is those with disabilities that have the most to gain. Users with disabilities that make accessing physical services difficult should be able make full use of these new services to make their lives a little easier. But to do so, they may need to access the web through assistive technologies rather than more mainstream browsers such as Mozilla or Internet Explorer. However, if a web site is not designed to be flexible enough to work well with such technologies, then the services offered are inaccessible to users with disabilities. Just as a office on the 3rd floor of a building with no lift is inaccessible to wheelchair users, so too is a web site that relies solely on graphics for navigation inaccessible to a users with visual impairments. In this case, the over reliance on images is an accessibility barrier. Despite the efforts of the World Web Consortium (W3C) in promoting and creating guidelines[1] for Web Accessibility and various governments passing legislation (UK SENDA[5] and in the USA Section 508[4]) requiring Web Accessibility, a large percentage of web sites remain inaccessible[3]. Lazar believes the problem is that web maintainers do not value Web Accessibility as important[7], and attributes this partly to a lack of education noting that "Accessibility … is not a standard part of any national curriculum in Computer Science…or Information Technology"[7]. The authors have since become aware of efforts to develop a postgraduate course covering this topic.[9]

This paper reports the findings from two studies. The first is a qualitative analysis of individuals with Web Accessibility expertise who worked with organisations to improve accessibility (i.e. Web Accessibility specialists). Following this a quantitative survey of web maintainers from over 80 organisations that probes current accessibility practices. The study definitions and details of planning now follow.

III. Study definitions and planning

The research questions to be addressed are as follows;

A. What is the general perception of Web Accessibility amongst web maintainers?
B. When compared to the level of accessibility perceived by specialists, is the level of web accessibility perceived by web maintainers sufficient?
C. Do we need a more mature approach towards Web Accessibility?

As mentioned, two studies were carried out. Study One (**Specialist experiences**) surveyed the opinions and experiences of accessibility "specialists". These specialists are either accessibility consultants who advise organisations on accessibility issues, or individuals whose main responsibility within their organisation is ensuring good accessibility. The results from this study were used to design a second qualitative study - Study Two (**Organisational web practices**) which investigated if and how web accessibility is implemented by organisations. Web maintainer refers to those whose main

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responsibility is the management and updating of the organisation's web site.

A. Study One: Specialist experiences

A short questionnaire was published online. Topics covered were as follows;

- Accessibility guidelines and tools used to evaluate pages.
- Levels of organisational accessibility awareness.
- The motivation for organisations to employ an accessibility specialist.
- Web maintainer perceptions of accessibility.

The last topic was addressed through a free-text answer and hence provided a qualitative response. Such a qualitative approach was useful to explore potential perceptions amongst web maintainers. Of course this only revealed what the accessibility specialists believed. To build on this, the free-text responses were analysed and as the foundation for the questionnaire used in Study Two. Because Study One targeted a specific group of individuals (i.e. Web Accessibility specialists), achieving a large enough response was difficult. Two approaches were taken; firstly around 60 accessibility consultants were contacted via a personal email. This was considered to have a better chance of success than a mass email approach. Following this invitations to participate were posted on several Web Accessibility forums. In total 21 valid responses were collected. One pleasing aspect of the Study One was how many different countries participated. Table 1 shows that respondents came from 8 (mostly English speaking) countries.

Country	Respondents
USA	6
UK	5
Canada	4
Australia	2
New Zealand	1
Ireland	1
Germany	1
Denmark	1

Table 1 Country of Residence of Specialists

B. Study Two: Organisational web practices

Once the responses from the Study One were analysed the questionnaire for Study Two was designed. The purpose of this questionnaire was to survey web maintenance practices within organisations. Since Study One had already explored the issues surrounding web practices and organisational traits, the questionnaire was designed to be quantitative. It focused, in part, on the following;

- Whether specific traits / practices identified in Study One and also recommended by the W3C[2] were in place at that organisation.
- Level of organisational accessibility awareness.
- Accessibility guidelines and tools used to evaluate web pages.
- Whether accessibility training is offered, and if so to whom.

The questionnaire was again published online and because of the larger potential audience (i.e. any one who carried out some form of web maintenance) a mass email approach was used to solicit responses. To encourage participation, the offer of an accessibility evaluation for that organisation's website was made. In total over five hundred emails were sent, mostly to UK local government organisations. Originally, companies belonging to the UK FTSE-100 index were targeted. Unfortunately, this yielded very few responses. It was felt though, that because of recent criticism aimed public sector organisation's web sites they would be more willing to participate. In 2005, a government report[3] strongly criticised local governmental web sites' accessibility and hence accessibility has had a higher profile in the UK local government sector. Thus in total, 86 organisations expressed a willingness to participate and of these 79 organisations fully completed the requirements of the study. Of the 79 participating organisations 74 were from the UK local government sector. The other 5 were made up of 1 US university, 1 FTSE-100 company and 3 international research organisations.

Role	%
Project Management	12.89
Content Expertise	12.2
Accessibility Testing	12.2
Information Architect	10.45
Information Design	5.57
Content Development	15.33
Programming	12.54
Graphical Design	18.82

Table 2 Maintainer Roles in Study Two

Table 2 shows the percentage breakdown of roles taken by the web maintainers. Maintainers could list more than one role and two most popular roles in Study Two were graphical design and content development.

IV. Results

The results are now presented highlighting: the tools and guidelines used, the awareness of accessibility and the perceptions of specialists.

A. Guidelines and tools used

Guidelines	Specialists %	Maintainers %
WCAG1	86	55
WCAG2	50	48
Section 508	54	8
IBM Guidelines	18	6
Internal Guidelines	n/a	32

Table 3 Guidelines Used for Accessibility Evaluation (Specialists and Maintainers)

Table 3 shows that a majority of web maintainers (55%) and specialists used version 1.0 of the W3C Accessibility Guidelines (WCAG1). This was followed by version 2.0 (WCAG2). A much higher proportion of specialists used Section 508 and IBM's Guidelines than the web maintainers. Internal guidelines were used by 32% of the web maintainers. Such internal guidelines might include other organizational requirements such as branding and legal issues.

Tool Type	Maint. %	Special. %
Stand alone	15%	42%
Online	49%	0%
Both	13%	58%
Disabled Users	24%	n/a
Disability Sim.	14%	n/a

Table 4 Types of Automated Assessment Tools used by Maintainers and Specialists

Automated assessment tools assist those looking for potential accessibility barriers. Currently, due to the subjective nature of many accessibility guidelines, there are no tools available that fully assess a web site for conformance[12]. These tools form two main types, those which are available online, where web page URLs are submitted to a server-side application and tools that run on the machine of the individual carrying out the assessment. Online tools were by more popular amongst web maintainers than specialists. Table 4 shows that 49% of maintainers relied completely on online tools to assess web accessibility. None of the specialists relied entirely on online tools and mainly used standalone versions. Feedback from this question in Study One resulted in the addition of two new categories of tools in Survey Two, the use of users with disabilities and software that simulates a disability (e.g. hand tremors or low vision). Nearly a quarter of the maintainers stated they used some form of disabled user testing. What exactly this involved might be interesting for further research.

B. Awareness of accessibility

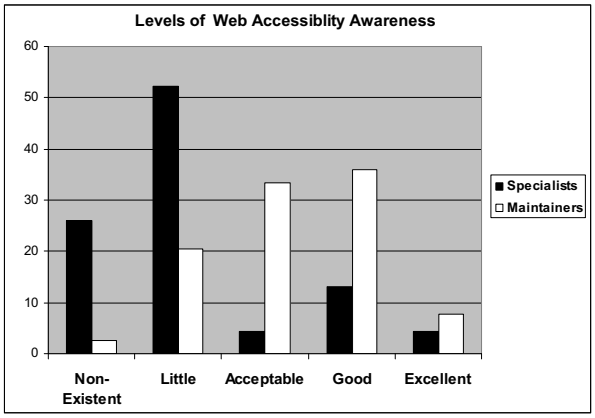

Figure 1 Accessibility Awareness within Organisations

Figure 1 clearly shows a difference between how specialists perceive the awareness of accessibility within organisations and how maintainers within their own organisation view the situation. Over 75% of the specialists said there was little or no initial awareness within the organisations they come across. In contrast, approximately 68% of web maintainers, rated accessibility awareness in their organisation as good or acceptable. Both groups agreed that few organisations had an excellent awareness of accessibility.

C. Accessibility training

Maintainers were asked who in their organisations received accessibility training. Table 5 shows the roles within an organisation and the percentage of organisations who offered accessibility training for these roles. It is clear that most of those involved in content creation and editing were most likely to receive training. Programmers and staff involved with the user interface also were quite likely to receive training. Very few information architects and project managers receive accessibility training only 9% of the organisations provided training for those responsible the information hierarchy of a webpage.

Role	%
Project Manager	11
Content Expert	25
Accessibility Tester	10
Information Architect	9
User Interface Designer	14
Content Developer	35
Programmer	27
Graphic Designer	15
Content Editor	6

Table 5 Roles which received accessibility training

D. How specialists perceive maintainer's attitudes

The responses to free-text answers from Study One "In your experience, how is accessibility perceived by web designers?" were categorised. Results are presented in Table 6.

Category	%
Ignorant	9.52
Extremely Negative	4.76
Negative	61.9
Accepting	4.76
Enthusiastic	9.52
Proactive	9.52

Table 6 Maintainers' Attitudes towards Accessibility

Amongst those surveyed in Study One, there was a general consensus that web developers have a negative interpretation of what accessibility meant to their workload. Common terms that were used were, "roadblock", "boring" and "restrictive".

Even those who offered more positive experiences included some qualification such as "amongst standard based designers", "it's getting better" and finally one respondent after stating that most of their experiences were with maintainers who were "passionate" about Web Accessibility, went on to add "but I think that is unusual".

E. Why specialists believe they were consulted

Specialists were asked "Why were you really hired / charged with accessibility evaluation?" Again the aim was to uncover what the specialists really felt the real reason why an organisation had invested in accessibility. The question had 5 set responses, of which respondents could select more than one. Table 7 contains both the set responses available and the percentage of times they were chosen. Included in the question was a free-text "other, please describe" option.

Reason for being hired	%
As a response to customer feedback	0
To gain competitive advantage	10
Legal requirement	19
To meet internal guidelines	66
Social conscience	33

Table 7 Reasons for hiring an Accessibility Specialist

Surprisingly, none of the specialists were hired in response to customer feedback. The majority of specialists (66%) were hired because of internal guidelines and 33% of the specialists had been hired through the social conscience of an organisation. Very few organisations (10%) apparently felt that accessibility would give them a competitive advantage over others. Another unexpected result was the relatively few specialists who were hired to ensure web sites conformed to legal requirements.

V. Discussion

There will now follow a discussion of the results from the two studies.

A. How accessibility is assessed

All the accessibility specialists used either WCAG1 or the WCAG2 as a reference to assess accessibility with the majority of specialists using WCAG1. This was not the case amongst the web maintainers where only 55% of those questioned referred to the WCAG1 and 48% to the WCAG2. However, a very high proportion 92% of the web maintainers reported that they evaluate their site using one of the W3C's guidelines. Forty one percent of the web maintainers in study two reported that they used standards other than those set out by the W3C or in Section 508. These included; State of Illinois Accessibility Standards[8], RNIB See It Right pack[11], the IBM Web accessibility checklist[6] and internal or corporate guidelines. Many of these are combinations of and additions to the W3C or Section 508 guidelines. For example, the Illinois Accessibility Standards aim to "incorporate a combination of the two (*W3C and Section 508*) creating a standard well suited to serve the users of Illinois web sites."[8]. The development of these extra guidelines based on current standards indicates that some organisations are taking a more proactive approach to accessibility. By basing their internal guidelines on internationally recognised standards they ensure that their websites meet the required accessibility levels. Because the organisations have more control on the content of their websites they are able to add further accessibility requirements.

1) Standalone and online tools

There were differences too between the tools used by the two groups. The majority of specialists used standalone tools, whereas amongst web maintainers the most popular approach to accessibility evaluation was to use an online service. One explanation for this difference is that as professionals specialising in accessibility, they require reliable tools they can take with them to organisations and will work efficiently, regardless of internet traffic or connection speed. Another reason is limited resources. Only 6% of the organisations in Study Two had a specific accessibility budget. Standalone tools are usually more customisable and can be changed easily to suit the specific needs of each project. Such tools also usually have more features such as more detailed reporting of results. All these advantages will help organisations get the best value for the money they have spent on hiring a specialist. If they have budgeted for a specialist's time, it is logical that they would provide them with tools that will achieve their task more efficiently. For the web maintainers, their focus is not exclusively on accessibility; they have other responsibilities and so use the evaluation tools on a page by page basis (i.e. one page is assessed at a time and not as part of a batch). As such, online tools are perfectly adequate for their needs. They are free and quickly highlight areas that definitely need attention. One barrier detection method that was not first considered in Study One was the use of users with disabilities to assess web pages. However, after conducting Study One the authors were contacted by a specialist who used a team of users with disabilities as testers. This technique will obviously provide a realistic and comprehensive test, but has several disadvantages. User testing is time intensive and expensive; it is also difficult to find users with a wide range of disabilities.

B. Accessibility awareness and perceptions

There was a significant difference between how specialists perceived accessibility awareness within organisations and how the web maintainers surveyed perceived it. The specialists were largely pessimistic about the state of accessibility, whereas the web maintainers themselves held a more optimistic and positive perception. There are several explanations for this divergence. Firstly, accessibility specialists are employed by companies when things are going wrong or require attention. An organisation that has addressed this issue and has staff, competent in dealing with and aware of accessibility issues is less likely to employ a specialist. So, it is more likely that when a specialist is employed, it is to an organisation whose overall accessibility awareness is poor and

requires improvement. This might explain why only 17% of specialists reported acceptable or good awareness within organisations. Secondly, an accessibility specialist's main focus is accessibility and so in comparison to their awareness of accessibility; a web maintainer's awareness is likely to be poor. Such specialists also have a vested interest in ensuring that they have a job. If there were no accessibility problems, they would not be employed. Finally, since the Web's popularity and usage has grown, the individuals charged with maintaining pages have come from a broad spectrum of expertise.

C. *Diversifying web maintenance community*

Maintainers from a non-technical background may be less aware of requirements of and motivations behind Web Accessibility. Many organisations reported that they have started to use Content Management Systems (over 75% of those surveyed in Study Two), such systems make it possible to deskill and standardise web maintenance. One maintainer bemoaned the fact that although they could ensure web page templates were accessible, because the content authoring was devolved, little could be done to prevent the habitual misuse of HTML tags in the web page content. This implies poor awareness of accessibility issues at the content creation level.

Not only must web maintainers be aware of accessibility issues, but if they are to address it effectively, they have to appreciate the benefits of good accessibility.

D. *Web maintainer perceptions*

Overall, the specialists surveyed felt that web maintainers held very negative perceptions of accessibility. Of course, this is linked to the perceived ignorance the specialists found upon commencement of a consultation. If a web maintainer is unaware of the problems caused by poor accessibility or the ancillary benefits offered by more accessible sites then they are likely to perceive the new rules as a "*roadblock*" or obstacle to getting their job done. It is understandable that some web maintainers might take a skeptical view on accessibility; the concept is still quite novel to most in the web community. This obstacle can become reality if organisations, panicked by the prospect of a potential prosecution, focus too much only on accessibility, thus diverting time from the development of content or functionality. Hence, if organisations do not invest time in developing an effective accessibility strategy, followed by appropriate training for staff, then any new measures imposed on maintainers will be seen as restrictive and unnecessary.

E. *Accessibility training*

Study Two revealed a lack of training for both project managers and information architects. Both these roles have a significant influence in the overall strategy of a web site and hence their understanding of this issue is crucial to the organisation. Managers without the correct level of awareness will not allocate sufficient time or resources to ensure accessibility and hence make the task of content developers harder.

F. *User feedback tracking*

An unexpected result from Study One was that none of the specialists attributed their employment to a response to user feedback. If we assume that the organisations in question had accessibility problems and hence required the help of the specialists, then there are two possible explanations. Either organisations do not track user feedback from the web site or users are unaware of accessibility issues and so fail to report them. This raises an interesting question; do organisations react to the needs of their users? Of the 79 organisations in Study Two, 67% had a process for tracking user feedback. From this it appears that organisations have started to monitor user feedback, so perhaps there is a lack of constructive feedback from affected user groups.

VI. CONCLUSIONS

A. *Perceptions*

There appears to be diverse range of perceptions towards web accessibility. Study One revealed that the accessibility specialists found that most of the web maintainers they encountered held a negative perception of accessibility. Study Two shows that there are a good proportion of web maintainers who are carrying out good accessibility work and from responses their attitude towards their work appears very positive.

B. *General levels of awareness*

Both studies revealed poor awareness of web accessibility within organisations, which as the web expands to include content and input from individuals with a non-technical background, could mean that with each update to a web site, accessibility problems are continually introduced.

C. *Current maturity of approach*

This lack of awareness and the dearth of training at the strategic level indicate the need for a mature approach. Part of this is to ensure web project managers are adequately trained in accessibility and related issues. Employing accessibility specialists to advise of improving a site once is not enough. Neither is merely producing accessible web page templates or installing an accessible Content Management System. If those adding content or creating pages include HTML which, while valid, inserts accessibility barriers, then content will continue to be inaccessible to certain users. Specialists should rather be employed at a strategic level, to help organisations integrate web accessibility into their web publishing lifecycle. Specialists involved in defining policy must be aware of all issues (such as internationalisation or branding) that might impact on accessibility and so can tailor their recommendations to accommodate these.

VII. Further Work

Further work is required in capturing and building on the experiences of web maintainers and accessibility specialists. Study Two surveyed those with a more general view of their web sites; however more investigation is required into how those responsible for only updating content understand accessibility. More research is also needed into why organisations develop their own accessibility guidelines and if these are of value to a wider audience. Guidelines are also required to help organisations stay aware of best practice for capturing and efficiently responding to user feedback. Finally a standardised taxonomy of web roles is required. The term "web maintainer" is a broad term that covers a wide range of skill sets and activities.

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