Redefining Assumptions: Accessibility and Its Stakeholders

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Abstract. Accessibility is becoming more and more relevant in Information technologies, such as the Web and software applications, particularly due to the push on legislation to make public services accessible to everyone. While most accessibility issues are envisioned by the developer-user dichotomy, several stakeholders are responsible for the successful implementation of accessible software and services for all users.
In this paper we present an exploratory study on the current state of accessibility as perceived by its main stakeholders: developers, service providers, public bodies, accessibility assessors, and elderly and people with disabilities. By surveying more than 400 individuals, we have confirmed some of the expectations and results from other surveys, such as the perception about the lack of understanding and application of Web accessibility guidelines. We have found that this issue gets even worse outside the scope of the Web, for all stakeholders. Another eye-opening finding is that all stakeholders are welcome to the simulation of assistive technologies, in order to widen the perception and involvement of accessibility in the software development process.

Key words: Accessibility, Stakeholders, Survey

1 Introduction

Information and communication technologies (ICT) have profoundly changed people's lives. With the worldwide massification of technology, the user diversity landscape has widen, with more abilities and preferences to be taken into account. Thus, ideally, technology should be tailored to each one's needs [8, 7]. While ICT products and services are *good enough* for the average user, people with mild or severe disabilities are hindered behind the inadequacy to their particular necessities, putting these users' goals at stake when interacting with them [8].

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To overcome these issues it is necessary first to grasp the understanding of accessibility by its stakeholders. While developers and people with disabilities are at the core of this issue, other user groups contribute to this situation [5]. In this paper we present our findings based on a survey conducted to 5 key stakeholders on accessibility issues – *Developers*, *Service Providers*, *Public Bodies*, *Accessibility Assessors*, and *Elderly and People with Disabilities* –, and discuss potential directions on accessibility research and outreach.

2 Related Work

Surveying the state of accessibility is not a novel task. With the increasing relevance of accessibility, some studies focus on understanding the perception of accessibility by its stakeholders. Lazar et. al [6] provide one of the first insights on the relationship of webmasters with accessibility. They cite project management issues and lack of time as the main reasons for poor Web accessibility support, and that only governmental websites tend to be accessible due to law enforcement. Accessibility-dependent end-users have also been the target of studies [9], citing accessible Web design as a critical need for the improvement of user interfaces.

On the developers' side, Freire et. al [4] confirmed that, for Web technologies, accessibility is seldom considered at project planning stages, mostly due to the lack of knowledge and communication among its stakeholders. Later work [3] surveyed academy, government, and industry, finding out that law knowledge and abidance is low due to the lack of training.

From what we could tell, surveys are mostly centred on Web technologies (most probably due to its pervasiveness). Consequently, they provide a limited picture of the general state of accessibility. Also, these surveys have insufficient, tangible goals to improve the state of accessibility. We propose to complete this with an umbrella view of accessibility for all stakeholders, with accompanying solutions. Next, we detail the methodology conducted in our survey.

3 Methodology

We created a specific methodology for the definition of questionnaires, by taking into account the particularities of stakeholders, as well as their relationships. As a starting point, we defined a specific rational on selecting the stakeholders with regards to this survey:

- *Developers* (software developers and designers) that will use tools for the development and testing of accessible software applications;
- *Accessibility Assessors* who are involved in assessing existing software solutions, and the accessibility of its user interfaces;
- *Public Bodies/Governmental Agencies* who are involved in policy making and provide the basis for future policies;

- *Service Providers* (public and private enterprises and organisations responsible for the content and graphic layout of Web products) who set (commercial) objectives and are key decision makers in Web accessibility development;
- *Elderly and Disabled Users* who benefit from enhanced accessibility and are the actual end-users of all developed solutions.

These questionnaires were tailored to each user group, encompassing preferred mediums (*online* vs. *paper*) and corresponding answering method (*self-answered* vs. *face-to-face interviews*). All questionnaires were made available in 7 languages (Czech, English, French, German, Greek, Italian, and Portuguese).

Regarding the content of the questions, they were categorised as follows:

- *Demographic data*: Required to identify significant connections between age and IT needs. Such can especially matter with elderly and disabled users;
- *Comprehension of accessibility*: Required to identify similarities and differences on how accessibility knowledge is being conveyed;
- *Working with accessibility*: Required to collect information on existing know how and on the willingness to a steady learning of the topic;
- *Expectation of accessibility*: Required to identify user needs which people might not be aware of;
- *Information on employment*: Required to create correlation between work situations, e.g. teamwork, decision authority and user needs;
- *Information on user behaviour on the Internet and computers*: Relevant for a possible market analysis on already existing accessibility of Web presence, software, etc.

To ensure a higher willingness on stakeholders' participation, we arranged the questions according to a *rising action*: general questions came before particular ones; familiar issues were addressed first than those that might be unfamiliar; difficult issues came after familiar (i.e., *simple*) issues; and any individual/personal issues were addressed only at the end.

Questions were presented sequentially with dichotomous and multiple response options. Additional half-open and open-field questions were used where it was believed that the answer categories were incomplete. *Don't know* answers were included for all questions. Nominal-scaled questions and ordinal-scaled questions were used to survey personal opinions and requirements.

4 Results and Discussion

The survey took place from April 2009 through July 2009 via both online submission forms and face-to-face interviews. It was agreed for interviews with developer and service providers to take place online, and to some extent also with public bodies and accessibility assessors. Interviews with elderly and people with disabilities were mostly undertaken face-to-face. The questionnaires were disseminated throughout different channels, such as specialised forums and conferences, in order to obtain a significant quantity of answers and as diverse as possible. A total of 408 individuals were surveyed (76.2% male).

4.1 Developers

254 development-related users participated in the survey. 25% were directors of a software division, while 65% were developers, and the rest either assistants or students. Around 30% of all those surveyed were acquainted with individuals who have a disability, either in the private (80%) or professional (20%) sphere. The meaning of accessibility for students is more heterogeneous than for individuals having an employment position. Students connect accessibility mainly to design for all (almost 90%) and platform independence (almost 50%). We hypothesise that this discrepancy is linked to the professional tasks developers and directors undertake on a daily basis, while students get faced with accessibility in a rather general manner.

Almost half of these indicated it did affect their daily work, acknowledging that they were already involved in accessibility related projects. Overall however, developers expressed the need for more knowledge about (combined) disabilities, functional limitations, and assistive devices (32%). There is awareness about accessibility standards and guidelines (40%), however this is more in a passive format.

A majority (85%) indicated a need for advanced education in the area of accessibility, especially for Web and mobile accessibility, accessible user interface aspects and (assistive) devices. The preferred type of advanced training and education was by working in project groups (67%), by participating in dedicated workshops (53%) and online training (34%). This need for advanced education corresponds to the rather low awareness of national and international guidelines and standards regarding accessibility as shown in Table 1:

Guidelines, standards	Familiarity of students	Familiarity of directors, developers
WAI-ARIA	15%	65%
WCAG 1.0	65%	87%
WCAG 2.0	10%	45%
Section 508	4%	39%
ATAG	0%	7%

Table 1. Familiarity with standards and guidelines

It must be highlighted here that for those that are being aware of standards, does not mean they actually know the standards and can implement this. This was rather bluntly put by one interviewee who stated: *"[...] do have a shelf of books on WCAG 1.0 and 2.0 issues, but hardly any of us uses it as we lack the time. What we all seek for is an embedded validator in our day to day developing tools such as Microsoft Visual Studio, Visual Basic .NET, Bluefish, Eclipse and Anjuta [...]"*. This evidences of an indication that they wanted embedded validators in development tools. While Integrated Development Environment (IDEs) are used by almost half, it is shown that few are aware of any embedded accessibility features. Regarding the preference for accessibility development tools,

accessibility simulation and authoring tools were much preferred (70%), together with simulators of assistive technology. Still significantly wanted were accessibility assessment tools (48%). There was a clear preference (49%) to provide all tools online or as download.

4.2 Service Providers

A total of 41 individuals (of which 24 men) between 24 and 60 years of age were surveyed. They were primarily employed in the field of accessible website design and consulting, and mainly (over 90%) work in SMEs. 14 (34%) of the individuals surveyed have a disability. Since the early 2000s, accessibility guidelines have become more and more specialised, while an increasing demand (mainly from public institutions) has forced these providers to ensure they integrate accessibility within services. From the survey carried out, it looks like the individuals surveyed are fully aware of this (85%). They have a high awareness level of various accessibility standards and guidelines, especially WCAG 1.0 [2] (83%), with an interest towards WCAG 2.0 [1] (61%). While they have already access to various accessibility tools and methodologies, they are one of the most eager groups survey for further advancements in this area.

Surveyed individuals displayed a clear interest in further knowledge about Web (88%) and mobile accessibility (66%), and prefer to do so through real work in this area. Like developers, this user group prefers to be kept up-to-date on accessibility via online resources (83%). This is also the preferred channel to have access to new tools (93%).

All webmasters and designers indicated that their customers desire accessibility certification. However this is still limited to being, at most, W3C WAI-AAA compliant (90%).

They currently evaluate the accessibility of their developments mainly with assessment and simulation tools (66%), followed by the use of AT (32%) and the participation of potential users with disabilities (34%). They desired further usage of assessment and simulation tools (85%), both for accessibility and for AT.

4.3 Public Bodies

A total of 18 public servants and officials (aged 28 to 60, and 11 of them men) were surveyed. They work for public bodies and governmental agencies and corporations, such as public utility companies. While this sample is rather small, due in part to the difficulty in accessing the target group through the required official channels, it must be noted that accessibility of services provided by public bodies and governmental agencies is usually subject to European and national regulations. This means that obligations exist to make services such as websites, downloadable documents, and online forms accessible to all members of the general public. The individuals surveyed were all familiar with this aspect of accessibility, while over 75% associated accessibility also with making building constructions accessible.

Online access to information is also the main channel of accessibility knowledge (80%). This was the same for accessibility dissemination, despite most respondents being still keen on traditional printed media (50%). This has been an exception among all surveyed groups. We hypothesise that this might be based in a rather *traditional culture* that still survives in public bodies.

The unavailability of internal expertise was identified as being the main barrier regarding accessibility of delivered services (72%). Internal training were taking place (56%), but in most cases external expertise was still needed for assessments (50%). This also explains why the surveyed individuals were interested in accessibility related events and databases on accessibility experts to evaluate implementations.

Evaluation, assessment and simulation tools are the main support on ensuring accessibility of websites (67%), with hardly any involvement of end-users or AT. However, AT simulators were wanted by all of those involved in software development.

All indicated that the public bodies they work for do expect some kind of official accessibility certification of the services that they offer or develop (78%). If labels are applied, this is in most cases awarded by external assessors (organisations that were set up to test the accessibility of public websites), e.g., W3C AAA compliance labels.

4.4 Accessibility Assessors

The accessibility assessors user group encompasses advocators that intervene in all areas of society, in order to advance equal living conditions for people with disabilities. The questionnaire was completed by 37 individuals in this category (24 men and 11 women), between 23 and 54 years of age. As the accessibility assessors group does not correspond to a specific occupational group, the professional backgrounds of the individuals surveyed are distributed over a broad spectrum, from peer counsellors to university professors. Most (81%) have up to 12 years of work experience, and 9 of those surveyed have a disability (mobility and visual impairment). 11 individuals (among which are the 9 people with disabilities) are members of an organisation for people with disabilities.

They are highly aware of various accessibility standards and guidelines (81%), especially WCAG 1.0 since they often use a subset of it in the national guidelines. This group emphasised their active role in the accessibility assessment of Web (81%) and desktop applications (41%). As expected, they have shown a preference (90%) for online access to information to be kept up-to-date on accessibility issues.

Validators and simulation tools are mainly used to evaluate implementations, while there is strong interest in using disability (77%) and AT simulation (80%) tools. Equally, guidelines for the creation of accessible content (57%) and invitations to events about accessibility issues (63%) are of interest. The latter obviously as this is directly related with their role of accessibility advocators.

4.5 Elderly and People with Disabilities

A total of 67 individuals were surveyed (39 men and 28 women) between 19 and 75 years of age. Of this group, over 75% indicated they had a disability. We hypothesise that the remaining 25% accounts for elderly people.

All individuals 30 years of age indicated that they are disabled as did all individuals surveyed in the 40-49 age category. 91,7% of those individuals surveyed in the 30-39 age bracket indicated that they are disabled as did 84,6% in the 50-59 age bracket and 60% in the 60–69 age bracket.

It is however clear that these users are aware that the Web and increasingly also mobile applications are posing severe barriers to them (60%). Nevertheless, a majority uses the computer/laptop or mobile on an almost daily basis (75%). A wide variety of AT is used in order to access applications on both computer and mobile devices. Training is often taken for computer usage (60%), but proves to fall short of expectations. Users therefore often rely on friends to help them out (70%). This user group has expressively stated (73%) that the main improvement desired is the better compatibility between Assistive Technologies and Web pages.

5 Conclusions and Future Work

This paper presented a study on the current state of accessibility as perceived by its main stakeholders. Through the answers of more than 400 people surveyed, we have confirmed results from existing studies, such as the perception about the lack of understanding and application of Web accessibility guidelines. We have also confirmed the recurring need for assessment tools so that accessibility of Web, mobile and desktop interfaces can be assessed in an easier way. Summarising, the following set of recommendations for research and outreach for accessible software and services emerges from our study:

- There must be a higher spread of knowledge in what regards to WCAG 2.0, since most stakeholders are not sufficiently familiar with this new version of the guidelines;
- There is a willingness for more advancements on disability and AT simulation technologies;
- Developers desire for advanced IDE integration of accessibility assessment and simulation tools, instead of separate applications;
- Accessibility outside the scope of the Web is seldom taken into account, due to the shadowing of the extensive work on Web accessibility.

These results are playing a fundamental role on the definition of key use cases and requirements in the design and development of accessibility-aware software development tools in different application domains (Web, mobile, service description languages, etc.), the overarching goal of the EU FP7 ACCESSIBLE project.

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