

# Reflections and proposals to improve the efficiency of accessibility efforts

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**Abstract** This paper presents a critical analysis of the current socio-economic situation associated with the technology used by disabled people. It explains how companies, funding agencies, and users can promote good practices for overcoming existing barriers. In addition, the article discusses different considerations with the intention of forcing the reader to rethink of accessibility more as a philosophical change rather than a technological contribution.

**Keywords** Accessibility education · Social inclusion · Open software · Web accessibility

## 1 Introduction

Accessibility integration and improvements in the user experience for persons with disabilities are still inefficient [1]. Although there are many tools to improve universal access to technology, accessibility is still difficult due to existing shortcomings in education, information and lack of awareness among developers and content creators, as well

as because most end-users are not aware of current solutions. Additionally, users with special needs often experience comparative grievances in education and financial resources and are nearer to technology exclusion compared with mainstream users.

In this article, the authors share some thoughts and address some questions related to the field of digital accessibility, based on their experience as accessibility consultants and on lessons learned in their ongoing development of an open software screen magnifier [2] and of a content editor which communicates accessibility problems through empathy [3]. Society has the opportunity to change the prevailing technological mindset in order to reduce technology exclusion.

## 2 Review of existing problems

The origin of inefficiency in accessibility efforts is multiple and involves several stakeholders. The following section will analyze them from the point of view of end-users, developers, web managers and funding agencies.

### 2.1 End-users

When starting to use information technology (IT), everyone exerts a cognitive effort: the use of IT means learning to deal with specific equipment, understanding software logic and, finally, interacting with specific software applications or website interfaces. Additionally, users with disabilities often must learn how to use a technical aid and spend additional money to buy it. Financial expenses associated with disabilities could often be determinant for users to buy second-hand equipment with old—or even obsolete—hardware or software, or to keep old versions of

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technical aids without updating them on a regular basis. As a consequence, it often happens that a person interacts with the same application on different platforms, whether he or she uses it at work or at home.

Interaction with technology can be improved through the application of standards in development on both interface design (accessibility APIs, design guidelines, etc.) and architecture patterns (as suggested by the GPII project [4]). However, is there actually an interest in standardizing interaction? Breakaways can serve perfectly as a marketing strategy, and lack of standardization can respond to hidden industrial interests.

The lack of standardization in many tools raises language barriers and localization gaps such as errors in number or date formats. Users are often overwhelmed by such difficulties. Localization is a powerful tool for bringing users closer to technology in both written and pictographic messages, those required by plain language text or more specifically by augmentative and alternative communication. Nevertheless, do developers know the impact of localization and message customization for diverse users?

## 2.2 Application developers

Obsolete technologies cause new problems for application developers. Getting support for old technology or keeping up with new versions of operating systems is not easy for free- or low-cost software.

The lifecycle of an application, especially if it works with low-level features, is strongly affected by a change in the operating system. Accordingly, companies selling operating systems should offer new APIs to developers prior to the release of new versions and should ensure backward compatibility as far as they can. Such steps are even more important when accessibility is involved.

In 2012, the Windows 7 operating system had a 49.63 % market share [5] on desktop computers. Other operating systems had a much smaller platform of users, with Mac OSX, following with 7.63 % of the market share. Although Windows 8 appeared in 2013, Windows XP still dominates a 30 % of the market.

Nevertheless, support for Windows XP is expected to end in April 2014 [6]. At that time, will all individuals, organizations and the public sector have a computer with the new operating systems? Will small developers have had enough time and resources to adapt their solutions to the new platforms? As an example, Lecshare [18], a highly regarded tool for building accessibility onto PowerPoint slides has recently been discontinued; in the context of developing MaGUI [2] as a personal project the authors encountered many difficulties in getting advanced information about Windows 8 accessibility API, and when it

finally became possible to examine it, the changes were so major that it would have required re-developing the proposed magnifier from scratch, which was not possible.

On the other hand, one possible solution to scarce resources and the need to maintain software updated for new versions of operating systems is collaborative free software. It offers end-users the benefit of free software applications, and—if they have the technical skills—the opportunity to customize them to their specific needs. However:

- Do these development models really work? Programs such as NVDA [7] are a successful case of the free software philosophy, supported, however, by regular funding from Mozilla Foundation and Adobe Systems Inc.
- Do these development models really catch the attention of development firms or technical universities? Collaborative teams need to reach a common understanding, and the business world is full of conflicting interests; academics could be freed from these interests; however, the time invested in cooperation and coordination is not productive for individual advancement. Should collaboration be encouraged as a social corporate responsibility? Should new academic incentives for collaborative efforts be created?

## 2.3 Web managers

On the web, the greatest accessibility pressure is placed upon the web manager, rather than the developer, since WCAG is the only one of the three accessibility components [19] stipulated by law.

Theoretically, the three sets of accessibility guidelines developed by the World Wide Web Consortium (W3C), when taken together, grant access to the web to users with disabilities; nevertheless, the reality is that web browsers do not fully comply with these guidelines: authoring tools such as content management systems (CMS) do not follow them either and therefore generate non-accessible content; and content creators lack the training and knowledge to design perceivable and robust content. The authors' experience working with public sector content creators is that they are not familiar with existing guidelines nor are they aware of how people with disabilities use the web. Moreover, W3C guidelines are difficult to understand and too technical for Web 2.0 prosumers. There is a need to communicate accessibility barriers in a more affordable way. This is the motivation behind the development of a new content editor with better communication aids [3].

As a consequence, the web is often a hostile medium for people with disabilities, who feel insecure navigating, purchasing or even filling in forms and is not, as envisaged, a universal web open to everyone [8].

## 2.4 Funding agencies

Users experience difficulties in buying the latest versions of their assistive technologies or basic software; developers' efforts to maintain software and the lack of accessibility awareness on the part of the authors could be helped by the correct investments. Funding agencies, either governmental or non-profit, are essential to technological developments in the area of accessibility.

The diversity of interaction styles and users makes it difficult to mainstream accessible solutions and to have quick commercial benefits.

Taking into account the speed of systems evolution, funding agencies must consider the sustainability of projects. In any case, is the continuity among projects sufficiently promoted or, rather, is there a trend to constantly start new projects from scratch? If open source projects were promoted, would it not be easier to grant continuity free from copyright barriers?

Similarly, when defining a development project, target platforms should be identified, as it is important to clarify if the application will interact with current, old or even obsolete systems. Does it make sense to develop new programs targeting brand new systems, not yet adopted, while widespread systems are forgotten?

Although dissemination activities are now a prerequisite in many calls for EC-funded project proposals, are they sufficient? There are so many ways and different channels to disseminate information that end-users could easily get confused. Users would welcome widespread guidelines to describe existing tools in accessibility and a common architecture to support their dissemination. The architecture could be based on a digital repository and common harvesting protocols, a semantic web model and ontology, or an intelligent recommending agent, any of them constituting a one-stop-shop, usable and accessible to the end-users.

## 3 Good practices

Given the aforementioned difficulties, there are many initiatives, which could be spread as good practices in different accessibility areas. Some initiatives fill the gap between users and tools mentioned in Sect. 2.4. These attempt to facilitate finding interesting technical aids through the use of recommending tools [9], public tutoring services [10] or collections of accessibility solutions [11] [12]; others offer simple guidelines on how to create accessible information [13] by simplifying the technical level of accessibility guidelines, as mentioned in Sect. 2.3. Moreover, there are some workshops or seminars that act as a meeting point between developers and users [14], again facilitating the dissemination of small projects.

Additionally, some companies have published accessible design standards and made them available to developers [15, 16], promoting understanding and use of accessibility requirements and solutions. Those initiatives make life easier for end-users as recommended in point Sect. 2.1. There are also efforts to develop frameworks integrating accessibility into every technical aid [4], offering application developers a global API for every platform and solving the problems cited in Sect. 2.2. Similarly, some recent products have incorporated accessibility in mainstream products [17], drastically reducing end-users' economic effort when buying specific tools or content.

## 4 Conclusions

This paper has examined some of the possible causes of the reduced deployment of accessibility capabilities of tools and content.

Firstly, it was shown how financial factors associated with users with disabilities make it hard for users to have the latest technology available. It has been commented that end-users have trouble discovering existing solutions and some one-stop-shop approaches for solving them were suggested. Also related to end-users, it was stated that the use of assistive technology introduced additional cognitive demands. In this context, the use of standards, architecture patterns and personalization and localization features in accessibility tools has been suggested as a means to decrease the users' cognitive load.

Secondly, it has been illustrated how coordination shortcomings between groups and companies working in the area of accessibility contribute to resource waste; resources are especially scarce for keeping existing products updated. Altogether, these facts make the accessibility market very inefficient. This market will benefit from developments supporting both new and old platforms, from collaborative work and from standard protocols in dissemination.

Thirdly, from the perspective of web authors, the interdependency of authoring tools, user agents and content, together with the unequal legislative treatment of the three accessibility components add to the difficulties in understanding accessibility guidelines and hinder their applicability by Web 2.0 users. Raising awareness and increasing learn ability of guidelines will contribute to an all-to-all accessibility environment.

Finally, a few good practices have been cited and suggested that analyzing and extending those as well as others could benefit all stakeholders: companies, public sector developers, funding entities, disability organizations, education centers and end-users.

As an overall summary, it is concluded that accessibility is in need of a change of mindset.

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