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EDITORIAL

Rethinking universal accessibility: a broader approach considering the digital gap

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Abstract The universal accessibility concept is usually formulated in terms that ignore the socioeconomic and sociopolitical contexts. Therefore, it has impact only on a small fraction of the global population of people with disabilities. This issue raises the need for a comprehensive approach that takes into account issues related to literacy, availability of technology, digital literacy, the use of minority languages, etc.

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1 Rationale

"Universal accessibility" aims at including all people with disabilities in the target population for user-centred design. However, a large segment of the population with disabilities can experience exclusion also due to socioeconomic or geopolitical issues. The universal accessibility concept looks insufficient to face this broader exclusion. This "special section" aims at rethinking the concept of universal accessibility in order to find ways to integrate all disabled people whatever the sources of the exclusion are.

Universal accessibility is a design philosophy developed in the last decades trying to avoid the exclusion of people with disabilities from the use of information and communication technologies (ICTs). Its use allowed important advancements in this field: numerous devices, applications and services have been designed in a way that avoids or minimizes the barriers for people with disabilities to access them. In addition to methodological advancements, it has contributed to legislation on universal inclusion in a number of countries. An interesting experience can be found in the progress achieved with regard to Web accessibility. Guidelines and tools provided by the Web Accessibility Initiative (WAI/W3C) made possible the design of fully accessible websites, even if there is still a long way to go to universalize their application to the whole Web.

Nevertheless, it appears that this philosophy frequently takes for granted some socioeconomic circumstances, such as the availability of advanced technological infrastructure, computer training, literacy, use of a language other than the official one. A great number of people with disabilities may not have access to these facilities or opportunities, therefore combining the lack of accessibility with the digital exclusion experienced by disfavoured segments of the world population.

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2 The digital divide

Initially, this problem was studied under the prism of the so-called "digital divide", which affects mainly the developing countries that lack the technical and financial means necessary to ensure access to information and communication technologies (ICTs) to all citizens. However, there are also "islands" of digital exclusion in poorer or less integrated communities located in developed countries. For instance, immigrants often have less access to ICTs than other citizens due to a range of language and cultural differences. People with disabilities belonging to these communities usually also find economic and linguistic restrictions in addition to accessibility barriers (see [3]).

Sharing resources, as an alternative to private ownership of the technology, can be very helpful when assistive technology is based on software applications, such as text-to-speech converters to be used as screen readers, as these can reside in repositories accessible through the Internet (in the cloud). They can be freely downloaded or used online (if suitable network service is available). See for instance the proposal by Vanderheiden and Treviranus [4].

However, people with disabilities may require special equipments—buttons, special keyboards, joysticks, mouthsticks, screen readers, Braille displays, etc.—to access mainstream devices used by the rest of the population. Unfortunately, when assistive technology is primarily based on hardware devices, something like the cloud is not a feasible solution. For this case, it is necessary to provide an efficient and cheap distribution and maintenance system.

Another interesting approach to compensating for the lack of assistive technology is the use of mobile phones. In recent years, mobile phones have proved to be a means of access to ICTs with great potential. Countries such as India stand out for their innovative and imaginative designs, for example, language teaching systems, machine translation, remote branch offices, that are completely supported by mobile phone technology. However, this requires reducing the cost of intelligent mobile terminals (smartphones) and affordable rates for the use of the data network (see [1]).

Accessibility to the Web poses specific problems. First, the Web is an inexpensive option that many administrations adopted for the provision of local services. Services such as performing administration, information sharing, distance learning may be more efficient and cheaper when they are conveniently delivered over the Web. Furthermore, in some countries, access to civil rights, such as voting, is provided through the Web. Therefore, to avoid any discrimination, the administration should ensure that these services are accessible to all users regardless of their physical, sensory or cognitive abilities, language or equipment used, and so on. Second, the Web provides access to content that is not controlled by the administration, and this information can be very convenient for all people, including those with a disability. There are important initiatives, such as WAI/W3C, to promote accessible Web content. However, the guarantee of accessibility is only mandatory in countries with inclusive legislation (and in many cases only for a limited set of public websites). In any case, the current accessibility guidelines do not specifically include aspects of the problems mentioned above, as one can see in Abascal and Nicolle [2]. Therefore, universal accessibility to the Web still requires a coordinated international effort.

3 Beyond the digital divide

The digital divide concept proved not enough to frame all issues affecting the lack of accessibility for people with disabilities (see [5]). In addition to the availability of suitable technology, other important issues must be taken into account such as education, digital training and social integration.

Even if people have access to the technology, some basic knowledge is required to use it. The use of many of the services provided by ICT requires basic training, such as literacy, which should be extended to the entire population regardless of physical, sensory or cognitive restrictions. In return, ICTs can be successfully used to ensure access to basic education to marginalized sectors of the population. In addition, digital training is required. Currently, access to ICTs requires certain basic skills, such as using a browser to access the Web, which can be more complex when one wishes to use more advanced applications. Full integration requires action programmes to ensure this knowledge to all people, including those who have any kind of restriction.

Finally, the social context cannot be ignored when it comes to applying these solutions. For example, it is necessary to consider the inaccessibility of the social context where the disabled person lives. For many, the right to access cannot be achieved until the community reaches at least a minimum level of access to digital technology. However, delaying the assumption of universal accessibility often leads to dead ends. When conditions are well established for the general population, they often include serious accessibility problems that are virtually impossible to eradicate without a complete redesign of the system. It is therefore necessary to address universal accessibility at the same time as addressing digital exclusion.

In summary, a comprehensive approach requires incorporating universal accessibility measures including: new

methods for shared access to ICTs; tolerance to technology (networks and processors) and applications which are obsolete or underperforming; simple, inexpensive technology which is easy to maintain; facilities for the use of non-official languages.

4 The workshop

A 1-day workshop explored the concept of universal accessibility, in order to find ways to avoid the exclusion of any person with disability. It was organized by J. Abascal, S. D. J. Barbosa, A. Joshi, D. Orwa Ochieng and G. Weber on behalf of the IFIP WG 13.3 "HCI and Disability". It was held within the INTERACT 2013 Conference, on 2 September 2013, in Cape Town (South Africa).

The main objective of this workshop was to discuss the possibility of broadening the universal accessibility concept to include geopolitical and economical circumstances. To this end, attendees tried to agree answers to key questions:

- Can the aim and scope of the universal accessibility philosophy be extended in order to include people with disabilities also affected by other barriers such as poverty, illiteracy, lack of access to advanced technology, etc.?
- Is it possible to create accessibility guidelines that consider affordable devices, old-fashioned deprecated technology, cultural issues and illiteracy?
- Is it possible to separate the accessibility for people with disabilities from the accessibility of the rest of the population?

Its rationale was based on the conviction that the universal accessibility concept requires a new approach. Digital products and services may be inaccessible to some people with disabilities because of financial, technological or cultural barriers, due to the requirements of complex equipment, advanced network environments or high level of computer training.

Many countries prioritize other issues considered more urgent than providing people with disabilities with access to ICTs (which can also be unavailable to other large sectors of the population). In addition to financial problems, they may have to deal with limitations in technology deployment and illiteracy. This situation is also becoming increasingly common in developed countries where poverty and emigration are frequently associated with barriers to access to assistive technologies and services. Consequently, Design for All may become designing for a small sector of the world population having access to expensive technology (or to efficient public procurement schemes),

living in highly "technologized" environments and having experience in computer use.

Nine position papers were presented and discussed in the workshop. In addition to introducing the diverse points of view of the participants, they were used as a starting point for the discussions, reaching consensus on the following points:

- Accessibility policies should address other players in addition to the disabled person: the teacher, the technology provider, the buyer, etc.
- Customization in mainstream software is a key issue for accessibility because guidelines can conflict (e.g. contrast for low vision and dyslexia).
- Smartphone automation can help end-users, including elderly people and people with disabilities, to carry out frequent tasks with fewer interaction issues.
- Text simplification is an important task in universal accessibility.

In addition, the workshop raised a number of questions that can also have an impact on universal accessibility:

- Given the rise in mobile services and the decrease in prices, should accessibility recommendations concentrate on Mobile HCI?
- How could speech-to-text systems be useful to everyone, in addition to people who are deaf?
- Is universal accessibility possible for people with dyslexia in mainstream text communications?
- How can we use what we know about helping people with dyslexia to help people with lower literacy?
- Can illiteracy be considered within accessibility guidelines for cognitive disabilities?
- Should the International Classification of Functioning, Disability and Health be used to help define user groups for accessibility?

The conclusion of the workshop can be summarized in the following: overcoming the digital divide of people with disabilities around the world requires a joint approach, not separated from the struggle to eliminate other sources of social exclusions.

5 A special contribution to universal accessibility

In order to expand the discussion and to involve more people with diverse backgrounds, experiences and ideas, the publication of a "special section" of the Universal Access in the Information Society Journal was agreed. After the workshop, an open call for contributions to a special issue was issued; however, insight into broadening the universal accessibility concept can be quite elusive and

required a reputed pioneer in this field to provide focus and direction. Mark Warschauer (see for instance Warschauer [5]) was invited to contribute. His paper, co-authored with Veronica Newhart, is entitled: "Broadening our Concepts of Universal Access". The authors provide a panorama of the main factors implied by universal access: "the physical, digital, human and social resources that contribute to the capacity to access and use technology effectively and seek to design solutions suitable to diverse local contexts". It was concluded that "a key goal of universal design is to develop flexible approaches that can be customized and adjusted for individual needs".

The contribution which emerged from the workshop position papers is authored by Tim Barlott, Kim Adams and Al Cook and entitled "Increasing participation in the information society by people with disabilities and their families in lower-income countries using mainstream technologies". This paper provides a theoretical and practical approach to the topic and describes how to use mainstream ICTs as assistive technology in lower-income countries. A case study demonstrates where mobile phones and SMS were used by people with disabilities and their caregivers to access information in a resource-limited community for addressing the information exclusion of people with disabilities and caregivers.

This Editorial, followed by two focused papers on universal accessibility, provides an initial vehicle to explore and invite further creative thinking on this concept. As part of this discussion and future issues of UAIS, the Guest Editors welcome attempts to answer the questions raised at this workshop that can have an impact on universal accessibility.

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