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# Developing a Participatory Approach to Accessible Design

María Inés Laitano

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# Table of Contents

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### Special Issue of Embracing Diversity with Help of Technology and Participatory Design

#### Guest Editorial Preface

- v Barbara Rita Barricelli, Department of Computer Science, Università degli Studi di Milano, Milan, Italy  
Ines Di Loreto, Tech-CICO, Université de Technologie de Troyes, Troyes, France

#### Research Articles

- 1 **Developing a Participatory Approach to Accessible Design**  
María Inés Laitano, LabSic, Université Paris 13, Villetaneuse, France
- 12 **Applications to Improve Quality of Life**  
Arminda Guerra Lopes, Instituto Politecnico de Castelo Branco, Castelo Branco, Portugal & Madeira Interactive Technologies Institute, Funchal, Portugal
- 28 **From Human-Centered Design to Disabled User & Ecosystem Centered Design in Case of Assistive Interactive Systems**  
Marine Guffroy, CREN, Le Mans University, Le Mans, France  
Vigouroux Nadine, IRIT, Paul Sabatier University, Toulouse, France  
Christophe Kolski, LAMIIH, Valenciennes and Hainaut-Cambrésis University, Valenciennes, France  
Frédéric Vella, IRIT, Paul Sabatier University, Toulouse, France  
Philippe Teutsch, CREN, Le Mans Université, Le Mans, France
- 43 **A Participatory Design Approach with Visually Impaired People for the Design of an Art Exhibition**  
Karine Lan HingTing, UTT- Université de Technologie de Troyes, ICD (CNRS, UMR 6281), Troyes, France  
Ines Di Loreto, UTT- Université de Technologie de Troyes, ICD (CNRS, UMR 6281), Troyes, France

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# Developing a Participatory Approach to Accessible Design

María Inés Laitano, LabSic, Université Paris 13, Villetaneuse, France

## ABSTRACT

This article describes how accessibility to ICTs is understood as conformity to standards, which usually ends in designs that do not consider the singularities of people. This article delves into a participatory approach to accessible design, as an alternative to design guided simply by standards. It first defines a relevant network of stakeholders for accessible participatory design, based on the expertise that each of them can provide. It then discusses the issue of consensus among stakeholders, necessary to make design decisions when there are conflicting views. Finally, it addresses the question of non-technological outcomes and methodological concerns of Participatory Design that should inspire the accessible design agenda.

## KEYWORDS

Accessible Design, Accessible Participatory Design, Disability, Human-centered Design, Inclusive Design, Participatory Design, Socio-technical Systems, WCAG

## INTRODUCTION

Although accessibility to Information and Communication Technologies (ICTs) has been promoted for more than ten years as a fundamental human right of people with disabilities (United Nations, 2006), as an unprecedented opportunity for communication and autonomy, many communities remain excluded. The reasons for this situation of relegation are many and diverse (economic, technical, cultural, political, geographical, etc.) but a major cause is the standardized design of mainstream ICTs. Standardized or normalized design implies certain norms, like young, white, male, heterosexual, Western, middle-class, non-disabled, and marginalizes individual identities (Lewthwaite, 2014). As postulated by the social model of disability (World Health Organization, 2001), exclusion is generated by the environment in which the person lives, by the normalized design of mainstream technologies, and not by their personal attributes.

In the accessibility arena itself, there is a generalized understanding of accessibility to ICTs as conformity with norms. Several countries granted law status to Web Content Accessibility Guidelines (W3C, 2008), promoting web design projects based exclusively on accessibility standards. These guidelines are lists of verification criteria, designed more to evaluate existing websites than to address new design projects. It was shown empirically, by user test, that accessibility guidelines do not cover all the problems encountered by people with disabilities when they browse the Web (Power, Freire, Petrie, & Swallow, 2012; Rømen & Svanæs, 2011). Guidelines define accessibility as a property of the digital content and not as a property of the relationship between the user and the content in a context of use (Cooper, Sloan, Kelly, & Lewthwaite, 2012), as a property of the user experience. The W3C Accessibility Guidelines Working Group, aware of these limitations, is currently working on a next major version for 2020 that hopes to expand the scope beyond content and beyond the Web (Lauriat

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& Spellman, 2017). One of the goals in this elaboration process is to involve more stakeholders by doing user research with people who use the standard.

This paper delves into a participatory approach to accessible design, as an alternative to design guided simply by standards. Participatory design calls for democratization and stakeholder involvement in the design process, for empower relevant stakeholders rather than being restrict them to a prescribed way of interacting (Fischer, 2002), for emancipate specially “groups of people whose views, opinions and needs might be the most ignored by mainstream society.” (Vines, Clarke, Wright, McCarthy, & Olivier, 2013). At least two rationales, one moral and one pragmatic, support participatory design. The first is that the people most directly affected by the design result have the right to judge that result. The pragmatic reason is that directly including users will increase the chances of a successful design result because they are the ones who will need to adopt and to adapt to the design result (Carroll & Rosson, 2007).

The three main goals of the participatory design philosophy—sharing expertise, sharing control and inspiring change (Vines et al., 2013)—are explored in the context of accessible design. The author outlines opinions developed through experience and loosely guided by these three goals. She took part as a researcher/designer in a series of technology design projects for social inclusion carried out in the city of Rosario (Argentina), the majority of them within a public program of accessible tourism.

Thus, the objectives of the article are three. First, to identify who are the relevant stakeholders, based on the expertise needed to design an accessible artifact. Second, to discuss the issue of consensus among stakeholders, necessary to make design decisions when there are conflicting views. Thirdly, to address the question of the outcome of an accessible participatory design project and the outcome aspects that should concern the accessibility research agenda.

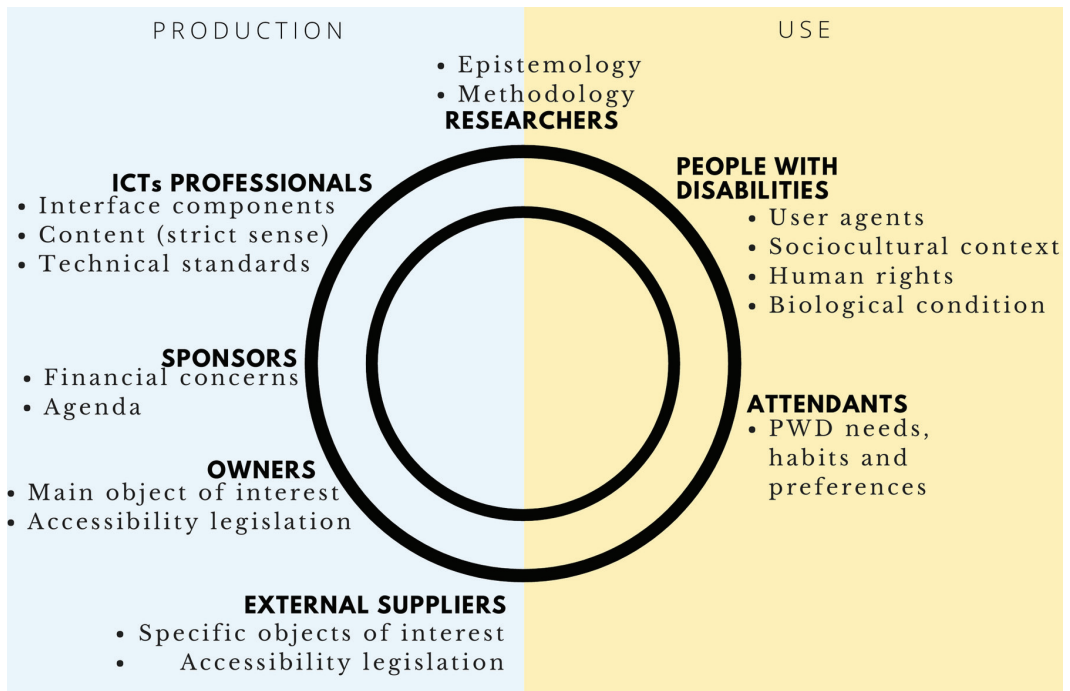
The contributions are not intended to be a formal or reproducible methodology for the accessible design of ICTs. The socio-technical systems “involving humans and technology contain far too much variability to be reproducible in any straightforward way” (Brown, Reeves, & Sherwood, 2011). The proposed suggestions are only intended to motivate and inspire more reflections on accessible participatory design. It is up to each designer or researcher to adapt, via re-signification and non-mechanical dissemination (Thomas, Juarez, & Picabea, 2015), these proposals to other local contexts.

## SHARING VIEWS ON ACCESSIBLE DESIGN

Participatory design conceives design as a process of inscribing knowledge in material forms (Karasti, 2014). This knowledge is not owned by a single person but possessed by different stakeholders in an asymmetric and often controversial way (Fischer, 2000). Relevant stakeholders for accessible participatory design are all those people with some knowledge of accessibility, capable of share their points of view and produce new ideas and artifacts. This definition extends the classic triad developers-content-users of the W3C’s Web Accessibility Initiative (Chisholm & Henry, 2005) to a wider network conformed by: ICTs professionals, sponsors, owners and external suppliers on the production side; people with disabilities and attendants on the use side; as well as researchers. Figure 1 synthesizes the stakeholders’ network proposed for accessible participatory design and the expertise contributed by each of them. Names in uppercase define the stakeholders. Expertise of each stakeholder appear in bullets. The light blue background identifies the production side while the orange background identifies the use side.

People with disabilities –or end users– consult and interact with the content through user agents: web browsers, media players and assistive technologies<sup>1</sup>. They have different levels of competence in the use of user agents and configure them in very different ways. For example, an expert screen reader user knows multiple keyboard shortcuts that a novice user may not know. But user agents represent only one –the technological one– of the multiple dimensions that make up the disabled experience (Frauenberger, 2015) and from which people with disabilities can give testimony. There is knowledge derived from biological condition. For instance, within the collective of people with

Figure 1. Stakeholders and their expertise for accessible participatory design (Source: Laitano, 2017)



visual impairments, blindness is not the same as low vision nor blind deafness, birth blindness is not the same as acquired blindness. There is knowledge intrinsically cultural. For example, sign language is the language of a deaf culture. Contemporary conceptualizations of disability, which go beyond the dichotomy between the biological model and the social model, give the pattern of multiple knowledge that people with disabilities can contribute to accessible design (Frauenberger, 2015).

Attendants of people with disabilities (family, colleagues, teachers, caregivers and others) are also key informants in accessible participatory design. As outlined in the “Support and relationships” chapter of the International Classification of Functioning, Disability and Health (World Health Organization, 2001), people with disabilities receive practical physical and emotional support from their attendants as well as support in various aspects of their daily activities. Because of this, their attendants have a deep knowledge about the disabled experience, about their needs, their habits and their preferences. Attendants are not only informants but can also play the role of mediators. As mediators they can, for example, take part as interpreters of deaf people whose native language is the sign language.

By delving into the common definition of content<sup>2</sup>, it can be seen as the conjunction of three elements belonging to different stakeholder’s expertise of the production side: interface components, content (in the strict sense) and objects of interest. The difference between interface and content is a classic distinction in computer science: an interface component is a part of the artifact that is perceived by users as a single control for a distinct function while a content is an information or a sensory experience communicated to users with a certain structure and presentation format (W3C, 2008). Participatory Design has already pointed out that the design of interface components and the design of the content are intertwined. (Fischer & Herrmann, 2011) and this is especially true in accessible design where a barrier in either of the two makes inaccessible the whole. Whether a button does not support operation by keyboard (interface) as if important information is only in non-textual format (content) the entire artifact is inaccessible.

The object of interest is a concept that derives from the Activity Theory applied to the Human Computer Interaction. The interaction between people and technological artifacts occurs in the broader context of a human activity (Rabardel, 1995). People does not interact with technological artifacts but with an object of the world through technology. The technological artifact only mediates the relationship between the human and this object of the world that interests him (Bødker, 2011). For example, when someone looks up an accessible sightseeing tour on the Web, his attention is not placed on the format of the content but on the tour sights and its accessibility features. So, if tour sights are not accessible or if nothing is said about accessibility features, even if the interface and the content are accessible, the technological artifact does not fulfill its mission, the experience as a whole is inaccessible.

Developers –who can be named more generally as ICT professionals because they include designers, QA professionals and others– are experts in the design of interface components and content in the strict sense. They use –and are experts in the use of– authoring tools such as development environments, content management systems, blog applications, etc. and evaluation tools to check the content syntax and accessibility.

In addition, there are “owners” of the design solution, i.e. those who initiate, promote, edit and keep alive the design solution over time (Laitano, 2016). To illustrate, if the Tourist Office turned to the University to design a tourism solution accessible to tourists with disabilities, the Tourist Office fulfills the role of the owners of the design solution and the University fulfills the role of the ICT professionals. Owners are experts in the purpose or main service of the designed artifact that in the example would be the tourist offer of the city and that can be named as main object of interest.

There are also those stakeholders who are referred to in the content but who are not owners, their role is rather that of external suppliers of content. Local hoteliers and gastronomes are external suppliers in the case of a tourism design solution. External providers have knowledge about the specific services they provide (specific objects of interest) and are responsible for their accessibility. Also on the production side there are sponsors, stakeholders who understand the financial aspect of the project and normally control the project’s agenda. Sponsors may or may not coincide with owners. In the case of a tourism design solution, the municipal government or the tourism ministry can be the sponsors of the project.

All production stakeholders have –or should have– knowledge about the standards that an accessible design solution will have to respect. As proposed by Kelly et al. (2009), the extent to which artifacts are accessible will be influenced by how all the production stakeholders respond to these external drivers for accessibility which are the standards. Developers know technical standards on digital accessibility, standards that establish how to show audiovisual content, among others. Owners and external providers know the legislation on accessibility and disability that applies to their own service or domain of expertise.

Researchers are also relevant stakeholders for an accessible participatory design project, located in a meta-position that encompasses both production and use (see Figure 1). This does not mean that they control the process from outside but ‘inside the loop’ (Brown et al., 2011). The knowledge provided by the researchers is above all methodological and epistemological. Methodological because researchers establish ways for shared, communicated and embodied the stakeholders’ knowledge (Vines et al., 2013). Epistemological because they observe, analyze and transform a process in which they themselves take part. Recognizing the researcher as part of the design process is recognizing that the designed artifact is also linked to the researcher’s culture<sup>3</sup>.

## **LOOKING FOR CONSENSUS AMONG STAKEHOLDERS**

Co-design a socio-technological solution is a complex challenge in which multiple points of view can take place. Stakeholders are not homogeneous and the particular characteristics and singularity of participants can lead to very different design process. Different process, run in different ways, can end

up with very different outcomes even if the technological artifact that is being built is exactly the same (Brown et al., 2011). Moreover, this suggests that the idea of recruiting representative stakeholders (Newell, Gregor, Morgan, Pullin, & Macaulay, 2011) is quite a while idealistic. Finding the point of consensus is therefore a topic of interest in the Participatory Design literature. Some authors propose a participatory result “as one that shows evidence of democratic ideals by increasing the agency of its users and giving them a voice in matters they did not have before.” (Bratteteig & Wagner, 2016). Participatory design insists on the tolerance of different perspectives, on the passionate commitment that brings together the stakeholders, on transform conflict between enemies into constructive controversies among adversaries who have opposing interests but are capable of legitimizing visions different from their own (Björqvinnsson, Ehn, & Hillgren, 2010).

In the case of accessible design, controversies appear at multiple levels. Just to mention a few:

- Within the same collective of users: essential features for one user with low vision may not be important for another. Many of them use the browser zoom to read the Web while others navigate with screen reader to avoid visual fatigue. For the former, a good color contrast is essential, while for the latter, a well-written HTML is more important.
- Between different collectives of users: People in the deaf community prefer that the size of the sign language interpreter in a video be very large while people who do not understand sign language will tend to prefer a small size.
- Between ICTs professionals and users: In surveys to screen reader users (WebAIM, 2009), when users are consulted about web images that seek to generate some emotion or sensation, most indicate that they prefer images described by their screen reader. This result is clearly opposed to the accessibility guideline that recommends not describing decorative images and therefore opposed to what any ICTs professional would tend to do.

How to deal with these conflicting preferences is a subject still little explored in the field of accessible design. Accessibility standards are not normative in terms of participation and involvement of stakeholders, although the Website Accessibility Conformance Evaluation Methodology (W3C, 2014) indicates the intervention of people with disabilities as an *optional* requirement. Scientific works on Participatory Design with people with disabilities developed so far (Brock et al., 2010; Metatla, Bryan-Kinns, Stockman, & Martin, 2015) are more focused on the forms of communication between producers and users (accessible scenarios, accessible prototypes, etc.) and less in the forms of agreement. There is, on the other hand, a widespread idea of design for all or universal design that has implied dangerous implications such as thinking that a design could satisfy the preferences or views of any individual. If it is already difficult enough to find consensus among the members of a participatory design project, “it can become impossible if the characteristics for which one is designing, in terms of physical, sensory, motor and cognitive abilities, to say nothing of culture, knowledge and motivation, are suggested to include those of the whole population” (Newell et al., 2011).

If the disadvantages of the standards-guided design exposed at the beginning of this paper are considered, a path of possible agreement for an accessible participatory design would be to prioritize the voices that come from the experience of stakeholders over the voices that are based on the accessibility standards. In this way, singularities of the people directly involved will be prioritized over the norm, which is ultimately established by people unconnected to the project. Likewise, a path of possible agreement is to take advantage of the creative potential that has bringing different points of view together and trying to create a shared understanding among all stakeholders (Fischer, 2000) to imagine solutions that solve apparently opposite needs. This last idea approaches that of Bødker and Zander (2015) for whom it is about identifying win-win situations. That is, instead of simply respecting the voice of the majority, redouble the creative effort to arrive at solutions that respond to heterogeneous needs.

## INSPIRING THE ACCESSIBLE DESIGN AGENDA

The balance between the technological concern and the methodological concern is another point of discussion in the field of Participatory Design. Participatory Design mainly focuses its efforts on identifying “novel ways of deploying existing technologies in ways that are useful to users” (Dunckley, Camara, Abdelnour-Nocera, & Waema, 2009) and in designing “improvements over existing technologies as they are more sensitive to the needs and desires of specific user groups” (Vines et al., 2013). These reuses and adaptations of existing technologies put the focus on design processes and methods, and are usually accompanied by a lack of interest in the technological research concern. Korsgaard, Klokmose and Bødker (2016) consider that the cause of this technological conservatism is the stability of mainstream technologies and draw attention to the risk for Participatory Design. The perpetuation of operating systems like Windows, Mac, iOS or Android, and applications that has matured for decades (Microsoft Word, Excel, etc.) has led to a standardization of both the design of user interfaces and the training of researchers and practitioners in the field of software design. “If technologies are chosen based on the researchers’ (and users’) taken-for-grantedness, familiarity and/or convenience, and later result in recommendations for, or, a finished system, it must be implicitly assumed that our current technologies are adequate for local practices.” (Korsgaard, Klokmose and Bødker, 2016, p. 73).

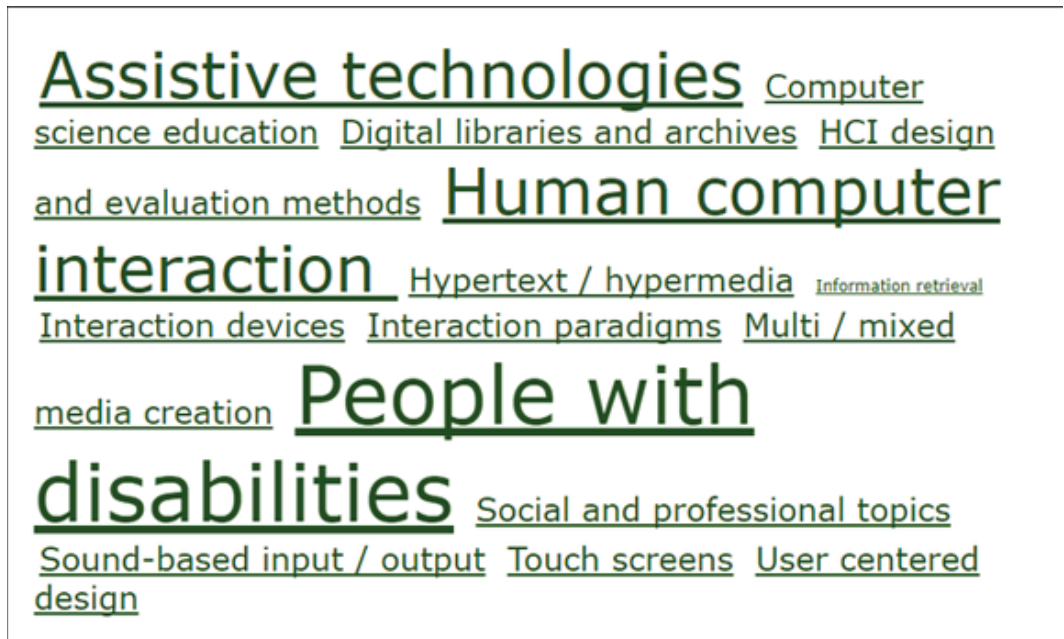
The opposite seems to happen in the field of Accessibility. The scientific community has a predilection for the technological research concern, as illustrated by the prominent subjects in the Accessibility and Computing literature (Figure 2): while only two themes make reference to design processes and methods –user centered design, HCI design and evaluation methods–, several topics are related to technologies –assistive technologies, interaction devices, interaction paradigms, sound based I/O, touch screens, etc. Following the same reasoning as before, the inclination for the technological concern may be a consequence of a certain platform instability, of the existence of many and heterogeneous toolkits and platforms. Assistive technologies vary completely from one disability situation to the other as well as within the same disability situation. For instance, assistive technology for visually impairment include screen readers, screen magnifiers, Braille embossers, voice recognition, navigation assistance, wearable technology, among many others. But addressing only the technological aspect also involves a risk, already mentioned above: assuming that a technology can be a universal solution, which can satisfy any subject with a certain disability.

Integrating the methodological concerns of Participatory Design into the accessible design agenda could then lead to a better balance between methodological and technological aspects, to a socio-technical approach of accessible design and to a real socio-technical outcome. Integrating the methodological concerns means starting from the local knowledge of people with disabilities and other stakeholders for questioning the conditions under which technologies are designed and introduced.

Finally, the technological artifact is not the only outcome in a participatory design project. New knowledge and competencies, new collaborations and networks are other possible outcomes of the collaborative work among stakeholders (Bratteteig & Wagner, 2016). The knowledge about the disability experience is usually very asymmetric in an accessible design project, very limited in the case of the production stakeholders. Producers are probably the ones who take the most in terms of new knowledge and competencies. For their part, people with disabilities encounter daily so many barriers in ICTs that they are particularly motivated to exchange in design processes. They accept the challenge because the problems addressed are personally meaningful problems (Fischer, 2002) for them. Mutual learning, exchange and joint work to produce something new generate trust and bonds between stakeholders that endure over time. Accessible design research should value this knowledge as scientific knowledge, should transmit the skills acquired and can take advantage of collaborations and networks in future projects.



Figure 2. Prominent subjects in the Accessibility and Computing literature (Source: Special Interest Group on Accessibility and Computing <https://dl.acm.org/sig.cfm?id=SP1530>)



## CONCLUSION

This paper delves into a participatory approach to accessible design, as an alternative to design guided simply by standards. It analyzes three essential issues of participatory design in relation to accessibility: sharing expertise, sharing power and inspiring change in the accessible design agenda. In the first place, it defines a relevant network of stakeholders for accessible participatory design based on the expertise that each of them can provide. On the production side are the ICTs professionals, the owners, the sponsors and the external suppliers of the design solution. On the use side are the people with disabilities and their attendants. In a meta-position between production and use are the researchers. The article then raises the issue of consensus among stakeholders and proposes two possible scenarios for resolving controversies. The first is to prioritize the voices that come from the experience of stakeholders over the voices that are based on the accessibility standards. The second scenario consists in transforming controversies into creative potential, in redoubling the creative effort to arrive at solutions that respond to heterogeneous needs. Finally, the author exposes two qualities of Participatory Design of which the accessible design agenda could be inspired: to probe more deeply into the methodological concerns and to take advantage of the non-technological outcomes of the process, such as new knowledge, new competencies and new stakeholders' networks.

Bringing together the right stakeholders, prioritizing their knowledge over accessibility standards, attending to the methodology and to the non-technological outcomes of the process are some of the challenges for accessible design. More reflections and more designs in this sense remain to be carried out to take advantage of the communicative and emancipatory potential of ICTs for people with disabilities.

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## ENDNOTES

- <sup>1</sup> Assistive technologies are specific programs or peripherals that people with disabilities use to improve their interaction with the Web. For example, screen readers normally used by people with blindness are assistive technology.
- <sup>2</sup> The Web Accessibility Initiative defines the content as “the information that forms Web sites and Web applications: the code and markup that define the structure, presentation, and interaction, as well as text, images, and sounds that convey information to the end-user.” (Chisholm & Henry, 2005, p. 32)
- <sup>3</sup> It is also to inscribe participatory design as a practice of complex thinking and as a second-order epistemology. The concept of the meta-point of view of Morin (2005) is relevant to deepen this aspect.

