‘In My Shoes’ Interaction Sandbox for a Quest of Accessible Design: Teaching Sighted Students Accessible Design for Blind People

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Abstract. This paper examines current practices in motivating students to design accessible technologies, and proposes an additional method to promote a long-term, steadfast commitment to accessibility. We examine recent reports of teaching accessibility for blind users to sighted students, and we find three types of motivational devices: 1) a ‘web of arguments’ as to morality, legality, and usefulness, 2) empathy, and 3) framing accessibility through mainstreaming. We observe that the challenge of interactional malaise between sighted and blind people is often neglected, and we propose an ‘Interaction Sandbox’ to overcome it. We also put forward an additional way of framing accessible design, in order to position it as a work of autonomy, mastery, and purpose: the ‘Quest’ metaphor. Accessible design is thus introduced as the pursuit of a daring goal against widespread adversity, through mastery, in the company of powerful characters. The Quest is set in motion by bringing students to appreciate the technical wizardry of accessible design, its aesthetics, and the heroism of blind people as skilled navigators of a dangerous world.

Keywords: Accessibility, blindness, student motivation, interactional malaise, Quest.

1 Introduction

This paper reports our ongoing work of designing a course to introduce accessibility to Computer Science students in a European university. Specifically, we focus on introducing accessible design for blind users to sighted students.

The starting point of our work was an increased awareness that many IT companies place multiple, stringent priorities that compete with accessibility requirements. Professionals must balance the ideal of accessible technology with a plethora of economic, aesthetic, and technical counterclaims. Even when they believe that accessibility should be introduced, they have to face objections from team members and leaders (Putnam et al., 2012). This raises the following question: How can we teach

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accessible design so that students will feel inspired to pursue it, against considerable adversity and persistent indifference in their workplace, years after graduation? In brief: how can we turn accessibility into an energizing and unwavering professional orientation?

The paper is structured as follows: in the next section we review several articles on teaching accessibility to Computer Science students and we analyze their motivational approaches. We then propose two ways to strengthen students' commitments to accessible design:

1. We propose that a stumbling block in inspiring long term, persistent motivation for accessible design consists in the experienced and imagined **interactional malaise** when encountering or just thinking about impaired people – in this case, blind people. Starting from this analysis, we introduce the **'In My Shoes' Interaction Sandbox**, a gateway to online resources designed to support sighted students and teachers in imagining and making sense of interactions with blind people, thus transforming latent discomfort into a sense of clear thinking and mastery.
2. In order to frame accessibility-oriented work, we introduce a '**Quest of Accessible Design**' highlighting technical mastery, aesthetics, and empathy with heroic characters.

We finally discuss the risk of romanticizing blindness, and we conclude the paper.

2 Why Bother?

There is a significant thread of research dedicated to teaching accessible design to Computer Science students. Most authors, who report on their own teaching and curricular design, do not take accessibility to be a self-evident matter, and they offer reasons for engaging in accessible design. Articles frequently include a dedicated section for discussing pros and occasional cons (R. F. Cohen, Fairley, Gerry, & Lima, 2005; Harrison, 2005; Ludi, 2002; Rosmaita, 2006), thereby assembling a *web of arguments*. Authors also introduce two other motivational resources for teachers: *empathy* with blind users, and framing accessibility as normal, through *mainstreaming* it in the curriculum.

2.1 The Web of Arguments

The reviewed articles discuss many reasons for considering accessibility in design. To begin with, it is ethically correct (Wang, 2012) and socially responsible (Rosmaita, 2006). In many countries it is demanded by law (R. F. Cohen et al., 2005; Rosmaita, 2006; Wang, 2012); in these cases skills for accessible design are also valued by employers, becoming directly useful for graduates (R. F. Cohen et al., 2005; Ludi, 2002). Besides employability, appeals to interest (rather than ethics) also include the observation that blind (and otherwise impaired) users represent a significant proportion of customers and citizens. Moreover, they represent a segment of society that will likely include many of us, through our own or significant others' aging and other life

meanders (Ludi, 2002; Rosmaita, 2006). Last but not least, there are technical reasons: accessible design promotes interoperability and compliance with standards (Wang, 2012), and it helps unimpaired users use technology in what we could term 'impaired situations': "automobile drivers—who otherwise have normal vision—are blind with respect to the web while they are driving. Likewise, a person surfing the web on a small mobile handheld device is, for all intents and purposes, a low-vision person accessing the web" (Rosmaita, 2006).

In the flip side of these pros, one can read the implicit cons: that accessible design benefits only a minority, is costly, and hinders aesthetic design, stifling creativity (Waller, Hanson, & Sloan, 2009). Some authors do engage them explicitly; for example, accessibility can be 'lightweight' to introduce (R. F. Cohen et al., 2005), and definitely easier to plan from the beginning than to retrofit (R. F. Cohen et al., 2005; Rosmaita, 2006). The aesthetic issue is discussed in the literature on accessible design - see for example (Mbipom & Harper, 2011; Regan, 2004) but less so in the reviewed articles on teaching.

2.2 Empathy

The paramount method of cultivating sighted students' empathy with blind persons consists in face-to-face interaction (Harrison, 2005; Kurniawan, Arteaga, & Manduchi, 2010; Rosmaita, 2006; Waller et al., 2009). Some teachers invite blind persons in the classrooms, to talk about and demonstrate their practices of working with technology; courses that are dedicated to accessible design may also involve students in project-based collaboration with blind people. These experiences are coupled with students' own experiments with assistive technologies, for example by navigating the internet with the monitor turned off, through a screen reader (Freire, de Mattos Fortes, Barroso Paiva, & Santos Turine, 2007; Harrison, 2005; Rosmaita, 2006). Less frequently, teachers also introduce students to accounts of blindness from the scientific or autobiographical literature (Kurniawan et al., 2010; Rosmaita, 2006).

2.3 Interactional Malaise

We find that the literature on teaching accessibility pays virtually no attention to the interactional troubles between sighted and blind people and the negative emotions that such encounters can stir, such as disorientation, discomfort, frustration, anxiety, self-blaming, and fear (Coates, 2003; Hebl, Tickle, & Heatherton, 2000; Higgins, 1980; Titchkosky, 2008). By analyzing a set of online blind personas, we find a similar absence. A potentially stifling burden on engineers' thinking about blind people remains unaddressed.

We rely on psychological research reporting that positive imagined interactions with outgroup members decrease anxiety and improve one's emotional makeup for other contact occasions (Crisp & Turner, 2010; Giacobbe, Stukas, & Farhall, 2013; West, Holmes, & Hewstone, 2011). We propose a learning resource, the 'In My Shoes'

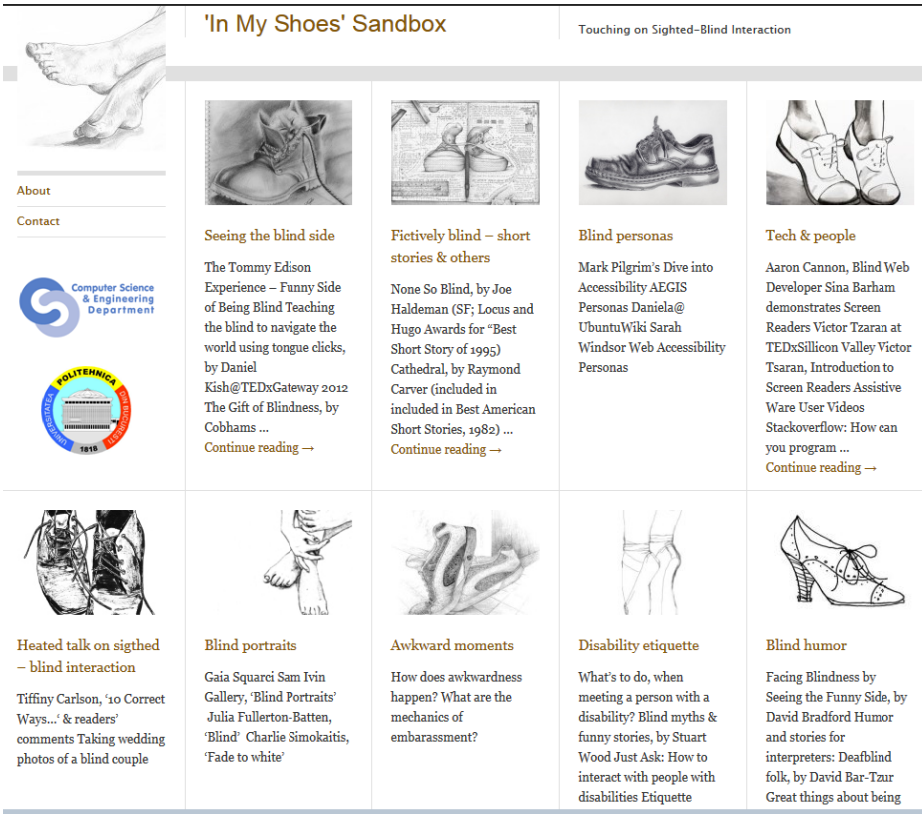

Fig. 1. 'In My Shoes' Interaction Sandbox – Gateway Architecture

Interactional Sandbox, which assists teachers and students not only in experiencing real and imagined positive interactions with blind people, but also in understanding the mechanics of discomfort and conceptualizing their ways out.

We design a gateway that invites sighted students to meet blind characters, real and fictive, and enables them to reflect on such encounters. There are two types of resources: some construct a conceptual framework, while others facilitate online encounters, mediated by text, image, or video.

The main entry points include (see Figure 1):

- Meeting blind people through short filmed accounts, chosen to illustrate interesting achievements or performances, with a focus on IT - such as (Edison, 2013; Kish, 2012);
- Meeting fictional blind people – either through short stories (Haldeman, 1995) (Carver, n.d.), experiments with simulated blindness (Ball, 2013), or specialized, design-oriented personas (Pilgrim, 2002; AEGIS, 2012);
- Observing artists' portraits of blind people, thus becoming de-familiarized and then re-familiarized with looking at faces that display signs of blindness (Fullerton-Batten, n.d.; Ivin, n.d.; Simokaitis, n.d.);

- Reading about interactions between sighted and blind people: analytical accounts from social research - 'Awkward moments' (Hebl et al., 2000; Titchkosky, 2008), guidelines - 'Disability etiquette' (Wood, 2008; Henry, 2007) and 'Heated talk' that illustrates the diversity of perspectives on what constitutes a meaningful interaction (Carlson, 2013; DP Review Contributors, 2012);
- Last but not least, humoristic perspectives on blindness as a way of life (Bradford, 2013).

Future developments will enable students to easily add content collaboratively through an academic wiki (Deaconescu & Matei, 2013), and to rank information thus modifying the order of elements on each entry point page.

2.4 Framing through Mainstreaming

We can organize resources for motivating students in a three-layered model. The '*web of arguments*' appeals to reason, and provides a much needed repertoire to argue for the necessity of accessible design, in dialogues with others or, for that matter, with oneself. The web of arguments is essentially a discursive, rhetorical resource for self- and other- persuasion. *Empathy* transforms this assemblage of reasons into a deeper, embodied experience: the reality of blind people's interests becomes vivid, the details of their experiences become memorable. Accessibility becomes a matter of human interest, rather than a matter of rhetoric. Also at this layer, the 'Interaction Sandbox' encourages students to overcome malaise in interacting with blind persons. A third layer involves *framing* the way in which students learn to make sense of the work of accessible design.

An important consideration of framing discussed in the reviewed articles refers to *mainstreaming* accessibility: that is, including topics of accessible design throughout a given course (Harrison, 2005; Ludi, 2002; Wang, 2012) and, preferably, throughout the curriculum (Waller et al., 2009), rather than marking it as a special, isolated topic. From a skill-based perspective, the advantage of mainstreaming accessibility is that it becomes a requirement in multiple hands-on assignments, and students learn to do it by practice. From a motivational perspective, its benefit consists in a 'routinization of concern': students learn to just do it, without too much examination and argumentation. This is how accessibility gets under the radar of competing priorities and considerations – avoiding a competition in which it often stands to lose.

2.5 Framing through a Quest of Accessible Design

We propose an additional way of framing accessible design – a way that, we argue, would support future professionals' unwavering motivation for promoting universal access, against considerable noise and adversity. This supplementary frame relies on the metaphor of a Quest of accessible design, and it involves getting students to recognize the value of *heroism* in their own work and in the lives of those who inspire it – in this case, blind persons. Such framing, relying on the gamification vocabulary (Rughiniş, 2013a, 2013b), would reposition the pursuit of accessibility from a domain

of mainly extrinsic motivation (legality, interest, social responsibility) to a domain of passion – or, following Pink's inspiring trichotomy, to life driven by autonomy, mastery and purpose (Pink, 2009). The metaphor of the Quest is well suited to capture this frame, not least because it is longingly familiar to many computer engineers, from digital gaming. A *Quest* involves *a pursuit of a daring goal, against widespread adversity, through mastery, in company of powerful characters*. Readers can probably already see that this description is a highly plausible representation of accessible design. In the next sections we sketch it in more detail and we illustrate some helpful online resources for this modus operandi.

Technical Mastery: Dare to Change the World

As we have seen in the 'web of arguments', there is a strong case to be made that accessible design is essentially a feat of technical excellence. An orientation towards accessibility is in effect an orientation towards usability in non-traditional environments and restricted situations, proving creativity and the ability to see beyond the status quo.

A stronger use of this formulation consists in the appraisal of accessible design as endeavoring to change the world – *our* world, nothing less. Engineers are well accustomed to appreciate the power of technology to create new realities out of old ones: distance, time, communication, thinking, feeling, perceiving – so many fundamental aspects of human existence have been thoroughly transformed through technology. The point to be made is that accessible design transforms *our* world – not a limited version of the world, the 'world of the blind'. It is important to convey the understanding that impaired and unimpaired people live in a shared environment and in a web of reciprocal interactions; it is this environment and social fabric that enable or, conversely, disable persons. The social model of disability is a powerful conceptual device to highlight our shared universe: "disability is the active and purposive social exclusion and disadvantaging of people with impairment (…); disability becomes a product and oppressive quality of the social relationships that exist between people who are socially marked as having impairment and those who are marked as physically, sensorially, and cognitively normal" (Thomas & Corker, 2002). Autonomy, for impaired and unimpaired people as well, is highly dependent on technology and the built environment, and on supportive social relations; after all, how would sighted students be *students,* were it not for the impressive infrastructure that supports their lives, professors' lives, and so on? This infrastructure remains invisible unless it fails, as it is often the case for impaired persons. Engineers are called upon to repair and expand the world, to inspect and restructure its hidden machinery.

The Beauty of Accessible Design

As Regan points out (Regan, 2004) there is a feeling, among IT professionals, that accessibility inhibits aesthetics, and that accessible technologies are rather dull. This implies that few designers work with accessibility in mind, because there are few works that they could take as inspiration. This is a serious obstacle in stirring a passion for accessible design: professionals aspire to create aesthetically beautiful or interesting objects. Back to the metaphor, a Quest advances at its best through beautiful equipment, in stunning landscapes.

There are several ways to point out the beauty of accessible design. At a conceptual level, it is useful to cultivate an appreciation of *minimalist design*: simple, clear, well organized interfaces can be uplifting (Thorlacius, 2007) – and they impose, on average, fewer hurdles by way of accessibility (Mbipom & Harper, 2011). At an emotional level, the beauty of accessible technologies can be directly experienced in contrast with inaccessible versions, by navigating them with assistive technologies. Students can thus directly perceive the vexing repetition of redundant navigation links, the cumbersome reading of URL's for images lacking an ALT caption, or the chaos of improperly organized content. By tagging such un-navigable systems as sloppy and amateurish, and by inviting students to display their own Halls of Fame and of Shame (Kurniawan et al., 2010), teachers can present a moral and aesthetic contrast that would hopefully function as a persisting benchmark for future professionals when evaluating their own and others' work.

In Company of Powerful Characters: Portraits of the Blind

What is the point of accessible design? What can justify standing up for it, when it is pushed down in the priority stack? We have highlighted the challenge of proving engineering mastery, and the beauty of accessible designs; still, the most forceful drive must reside in the appreciation of the company of blind persons. Accessible design is a means to enable us to readily go into relationships with blind people, and for them to join social spaces handily.

The most important challenge for framing accessible design as a Quest consists in highlighting blind people as able navigators of a troublesome, dangerous world – rather than as vulnerable and dependent characters. It is about understanding them as bearers of interests and skills, rather than as bearers of needs. This requires an empathic understanding of life in a world where vision is not an option, or at least not a pervasive, taken for granted property.

It is also important to observe that blindness is by no means the equivalent of a lack of vision. On the one hand, blind people often have some forms of vision, which they put to use to successfully navigate the 'sighted world'(R. L. Michalko, 1977); on the other hand, blindness is better understood as a way of being in the social and material world, rather than as a 'missing thing' (Titchkosky, 2002).

There is no shortage of portraits of blind people that present sighted readers with wisdom, enhanced abilities, arduous training and perseverance, sacrifice, and friendship. Sighted students can read memoirs and other accounts of blind people's lives – in online journals of general interest (A. Cohen, 2009; Robertson, 2004), on Quora's Q&A pages (Hartmann, 2013; Strange, 2013), in printed books (R. Michalko, 1998), documentaries (Stoble & Cole, 2004) and TED presentations of IT blind professionals (Tsaran, 2009), to name but a few. Reading about blind people also offers students the chance to see the humor of blindness as it is lived by the blind themselves, to relate through self-irony, as well as to recognize themselves in so many sketches of sighted-blind interaction.

The interaction between sighted and blind people is often painfully impeded by sighted people's discomfort and misdirected attention when seeing a blind face. Some visual familiarity, an equivalent of a sandbox for interaction, can be cultivated through looking at portraits of blind people, such as Gaia Squarci's exhibition (Gonzalez, 2013), Sam Ivin's photography (Ivin, n.d.), Julia Fullerton-Batten's 'Blind' series (Fullerton-Batten, n.d.), or Charlie Simokaitis' 'Fade to white' (Simokaitis, n.d.).

3 Romanticizing Blindness?

The risk of framing accessible design through the Quest metaphor is to romanticize blindness, and thus to ignore the *normality* of blind people's lives, as well as the many occasions of frustration and despair, and the experiences of loss for people who become blind. We propose the Quest frame as a tool for acquainting students with accessibility, in the hope that their understanding of blindness will be refined through repeated human interaction, trial and error, and reflection: that is, through engagement and learning. Therefore, the peril of romanticizing the blind is, we argue, a risk of a *productive misunderstanding*, to the extent that it upholds a stronger commitment to accessible design.

4 Conclusion

In this paper we propose two supplementary resources for teaching accessibility for blind users to sighted students. We aim for adamant, stubborn motivation to support accessible design in the years after graduation, when engineers confront concurrent priorities and massive indifference. At a practical level, we propose to address the interactional malaise between sighted and blind persons through an online 'Interaction Sandbox', in which students can gain familiarity with blind people without the hurdles of face-to-face encounters.

As regards the 'big picture' of accessibility work, we propose to frame accessible design with the metaphor of the Quest - the adventurous pursuit of a noble goal, defying enmity and hard times through mastery, in the company of forceful characters. By focusing on accessibility as a feat of engineering savvy, on the beauty of accessible technologies, and the heroism of blind characters encountered in various narrative and visual portrayals, students can recognize accessible design for what it is: an invitation to boost the invisible infrastructure of the sighted world.

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