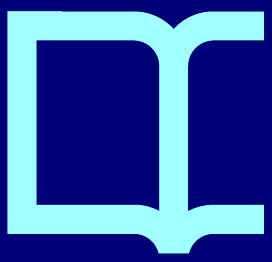

Urban accessibility issues

Techno-scientific democratizations at the documentation interface

Tomás Sánchez Criado and Marcos Cereceda Otárola

After many struggles from disability rights and independent-living advocates, urban accessibility has gradually become a concern for many urban planners across post-industrial countries. In this paper, based on ethnographic fieldwork studies in Barcelona working with urban accessibility professionals and activists, we argue for the importance of the 'documentation interfaces' created in their struggles: that is, the relational processes to collaboratively build multi-media accounts in a diversity of formats seeking to enforce different translations of bodily needs into specific urban accessibility arrangements. In discussion with the asymmetries that the ongoing expertization of accessibility might be opening up, we would like to foreground these apparently irrelevant practices as an interesting site to reflect on how urban accessibility struggles might allow us to rethink the project of technical democracy and its applications to urban issues. Two cases are analyzed: (1) the creation of Streets for All, a platform to contest and to sensitize technicians and citizens alike of the problems of 'shared streets' for the blind and partially sighted led by the Catalan Association for the Blind; and (2) the organization of the Tinkerthon, a DIY and open-source hardware workshop boosted by En torno a la silla *to facilitate the creation of a network of tinkerers seeking to self-manage accessibility infrastructures. These cases not only bring to the fore different takes on the democratization of the relations between technical professionals and disability rights advocates, but also offer different approaches to the politics of universals in the design of urban accessibility arrangements.*

Key words: urban accessibility, technical democracy, documentation interfaces, disability, universal design

Introduction

Until very recently, the urban exclusion suffered by people with disabilities has, to some authors, been losely related to the demise of bodily experiences in architecture (Edwards and Imrie 2003). This is despite the existence of human body canons dating from very ancient times (Padovan 1999) and slightly reworked in modernist architectural theories, such as Le Corbusier's or Neufert's reinterpretation of the Golden Section for the former's *Modulor* and the latter's *Bauentwurfslehre*, both seeking to rationalize and standardize built forms (Emmons and Mihalache 2013; Imrie 1999). The situation only started to change with the inclusion after World War II of typological and classificatory schemes deriving from statistical research on anthropometrical patterns (Lupton 2014; Williamson 2012).

Since the late 1960s, humanitarian and civil rights movements have vindicated 'more sensitive' architecture paradigms whose great challenge is to attentively address the diversity of bodies. Hence, they have sought to propose 'barrier-free' and more inclusive alternatives (Gilderbloom and Rosentraub 1990; Prince 2008) to the 'one size fits all' standards of the allegedly 'abled' human body, or the 'ocularcentrism'—that is, the

discriminatory domination of sight and the visual over other sensory forms—of most Western architecture and its Cartesian 'spectator theory of knowledge' (Pallasmaa 2012, 38–41), inscribed in many architectural and industrial design products. After many protests and activist work, regulatory institutions across the world have started to enact urban accessibility policies. The concomitant proliferation of accessibility laws, codes and standards has also fueled a rising industry and a burgeoning market of accessible public space infrastructures.

Over the past four years we have been working closely with disability rights' and urban accessibility advocates (technicians and activists), associations and institutions in Barcelona. Since 2013, Marcos has been collaborating ethnographically as a volunteer in the *ADVC-b1b2b3*[1] association. Out of this ethnographic involvement, he has engaged in many blind rights' activist endeavors, and has participated in different campaigns. Tomás has collaborated in the activist and open design collective *En torno a la silla* (ETS)[2] since its very inception in 2012, emerging out of the Spanish '15M movement' (also known as the *Indignados* uprisings) and seeking to intervene and politicize wheelchairs and their environments, forging new alliances, generating digitally mediated accounts of their practices and fostering open-source modes of documentation of prototypes, showcase events and codesign workshops.

In doing so, we have been trying to 'access' ethnographically what these struggles to transform urban ecologies to make them more hospitable for diverse bodies might imply in terms of regimes of knowledge production, articulating different and nuanced meanings of the very term of accessibility, as well as forging different idioms, be they related to the enforcement of rights and social justice, the need to code spatial design, or to implement different approaches to self-management and autonomy. Also, how do they materialize specific modes of 'urban democracy' (Loukaitou-Sideris and Ehrenfeucht 2011), revolving around the capabilities and entitlements of the disabled (a) to have access to public and private spaces, and (b) to control and supervise the work of experts and technical professionals in the creation of urban environments for that to happen?

Building from this work, in this paper we stress the importance of the 'documentation interfaces' created in their struggles:[3] that is, the relational processes to collaboratively build multi-media accounts in a diversity of formats seeking to enforce different translations of bodily needs into specific urban accessibility arrangements. In discussion with the asymmetries that the ongoing expertization of accessibility might be opening up, we would like to foreground these apparently irrelevant practices as an interesting site to reflect on how urban accessibility struggles might allow us to rethink the project of technical democracy and its applications to urban issues.

Documentation interfaces for urban accessibility and their democratic challenges

Since the 1970s, through public contestation and political struggle (Barnartt and Scotch 2001; Charlton 1998), using both institutional means and direct action or guerrilla communication tactics, urban accessibility advocates in many countries in the global North have sought (a) to create public concern around the ways in which urban design had virtually produced the 'disabled' status of such populations as a result of a mode of building, erected on 'discriminatory premises' (Imrie 1996); and (b) to articulate urban arrangement proposals to enforce 'universal access' to public and private spaces (Imrie and Luck 2014).

In the case of the city of Barcelona, the civic protests for the democratization of public institutions, before and after Franco's death, also had urban accessibility as a political target. In what has been known ever since as the 1977 *Rebelión de los cojos* [cripples' revolt] (Vilà 1994), diverse protests of different small associations (of the 'physically disabled', mostly)

started progressively uniting to hold public demonstrations demanding 'a city for all'. Wheelchair protestors chained themselves to underground station gates, conducted sit-ins in front of buses and occupied municipal institutions for weeks. Many official accounts claim that these protests before democratically elected municipal representatives paved the way for the creation of a municipal institution—jointly managed by politicians, technical staff and elected representatives from the whole population of people with disabilities in the city—governing accessibility and other disabilityrelated matters in the 1980s (IMPD 2009).

Many of these developments have entailed the invention of what we wish to call 'documentation interfaces': institutionalized, professional, grassroots or activist situations for the relational elicitation and articulation of bodily diversity and singularities, as well as the more or less systematic documentation of such embodied knowledge in a variegated range of formats and genres so as to make it available for the design of 'more universal' urban arrangements. Particular documentation interfaces have been put to work by disability rights activists in attempts to record and describe 'the ancillary processes of being a living body as becoming sensitive, embodying atmospheres, somatically judging environments, or becoming corporeally aware of nonhumans' (Shapiro 2015, 369), such as inaccessible urban environments, to foster the understanding and the sensitization of institutional or corporate architects and designers in order to have more control or choice in the process.

These practices should not necessarily involve very sophisticated rationalizations nor authoritative knowledge constructions, such as the ones needed by 'functionalist' and 'participatory' architecture methods interested in designing according to 'uses' (Cupers 2013), but could include 'less nameable and more diffuse sensory practices' (Shapiro 2015, 375) constituting forms of embodied knowledge. Raymond Lifchez's initiatives in Berkeley's Architecture school are, indeed, classical references of this: take, for instance, his use of first-person videocamera recordings of everyday life in the street to train Architecture students to the specifics of wheelchair use (Lifchez and Winslow 1979); or his pedagogical interventions in Architecture graduate courses (Lifchez 1986), where members of the independent-living movement acted as 'design consultants' for student project teams, not as 'end users' requiring specific adaptations.

Obviously, the approaches to these documentation interfaces have not remained static. In the case of Barcelona, consistent with what is happening in other locales, there has been a transition from 'physical barrier elimination' in the 1980s (IMPD 2009) to the 'cities for all' (Aragall 2002) philosophy in the 1990s, connected to 'universal design' (Williamson 2012). Newer approaches seek, indeed, to produce situations that might 'enable the multi-sensory nature of the body to be apprehended in ways whereby non-reductive, stereotypical, conceptions of the body are avoided' (Imrie and Luck 2014, 1317). However, as Imrie and Luck (2014) state:

> 'Universalism is not an easy or straightforward term to understand, and there is much debate as to its meaning, and different ways in which it can be used to shape practice. In universal design, what values are being universalised and what are the claims advanced in relation to the status of disabled people in society? One appeal of universalism is in shifting emphasis from a focus on disability, and differing capabilities, to what is held in common by people. But there is the danger that the definition of the universal is no more than the normate body.' (1316)

One of the ways to tackle these ambiguities has been to foster the development of an expert culture around accessibility addressed at technical professionals that tends to privilege standardized and depoliticized approaches in the search for more universal urban arrangements (Imrie and Hall 2001). Such arrangements include city regulations and code manuals or handbooks with ready-made charts to design for diverse population types, easily translatable into blueprints. Though these developments make it easier for universal arrangements to be built and supervised, such an approach puts in place a particular 'regime

of perceptibility' populating 'our world with some objects and not others [. . .] allow[ing] certain actions to be performed on those objects' (Murphy 2006, 24).

Indeed, most of these ready-made and commoditized templates: (1) lack an adequate and updated statistical representation of non-normative bodies (Williamson 2012); (2) are oriented towards ergonomics, volumetric calculations and functionality (hence, avoiding until very recently references to sensory arrangements); (3) are not easily accessible for non-professionals or low-income people (such as the population they address) since many of the issuing bodies (national standards organizations, professional associations and state or regional administrations) charge for access to publications such as accessibility regulation codes; and (4) usually imply a certain abstraction from the users' experiences or measurements out of which they emerged, since the 'goal in creating a standard system of measure [. . .] constantly comes up against human particularity' (Lupton 2014, 26).

Reflecting on this situation, and considering that most architects, designers and engineers usually do not receive proper training in these topics prior to the use of these codes and measurements, it is easy to understand that these potentially 'technocratic' and 'asymmetrical' moves in accessible urban planning (Imrie 1996) might produce the paradoxical effect of segregating and disempowering the very collectives they seek to bring social justice and equity to.

What forms of techno-scientific democratizations emerge in accessibility issues?

Science and Technology Studies scholars have indeed addressed the democratic challenges of expert/lay divides in urban processes (Farías 2011). Growing concerns over the democratic deficit that expert knowledge might bring about have involved creating or adapting different participatory methods and devices to foster citizens' engagement in such technoscientific affairs (Callon 1999). In many cases this has entailed seeking to go beyond their consideration as mere laypeople—in need of training to be able to speak about such complex matters—and enforcing the creation of forms of 'co-production' (Jasanoff 2004) between experts and non-experts. One of the most elaborate registers for this has been, as this special feature well shows, the articulation of the 'technical democracy' (TD) program by Callon, Lascoumes, and Barthe (2011), whose main claim is that:

> '[. . .] when uncertainties about possible states of the world and the constitution of the collective are dominant, the procedures of delegative democracy are shown to be unable to take the measure of the overflows provoked by science and technology. Other procedures of consultation and mobilization must be devised; other modes of decisionmaking must be invented.' (225)

To do so, they build on the important TD innovations put forward by affected and concerned groups, such as the modes of counter-expertise and expert collaboration to intervene in disputed techno-scientific affairs (Callon and Rabeharisoa 2008). However, the purpose of Callon et al. is to formalize these experiences. This is done through two main operations. First, they treat them as 'hybrid forums'—that is, as collective-learning formats for the joint exploration of 'who we are' and 'what is happening to us'. In such hybrid forums experts and non-experts work together to go beyond modern democracies' representational divides and their distributions of tasks (experts being in charge of representing the world, political representatives or spokespeople in charge of representing the people). Second, they articulate a set of procedural criteria defining a 'good' hybrid form. The good here, which stands as 'more democratic', is defined 'in terms of its degree of dialogism, that is to say, in terms of its greater or lesser ability to facilitate and organize an

intense, open, high-quality public debate' (Callon, Lascoumes, and Barthe 2011, 178). In such a debate experts and spokespeople should not impose their criteria but create joint explorations.

Despite TD's impact and resonance, there have been some critical voices pointing at some problems in these deliberative and somewhat consensus-based approaches: (a) the knowledge of the experts is still treated somewhat asymmetrically with regards to others; and (b) the participation of already articulate spokespeople is slightly favored. Focusing on a broader understanding of the inventions of groups and users contesting expert knowledge production (Murphy 2006; Parthasarathy 2010), one of the most interesting critical appraisals of the TD program has been that of Nortje Marres (2007). Drawing on pragmatist philosophy ideas, she points out that TD's approach tends to favor a not well-discussed democratic ideal, applied as a procedure irrespective of the topic at hand. Instead, she believes that we should be analyzing in greater depth what modes of the political and democracy might emerge in relation to the materiality of techno-scientific *issues* themselves that, as she contends, 'differ in crucial respects from the abstract, general entity—the common good—celebrated in classic and modern republican theories' (Marres 2007, 764), such as the slightly state-centric and proceduralist notions underpinning the TD project.

An attention to techno-scientific issues and what forms of democracy and the political they might foster should lead us to inquire about:

> '[. . .] how objects, devices, settings and materials, not just subjects, acquire explicit political capacities, capacities that are themselves the object of public struggle and contestation, and serve to enact distinctive ideals of citizenship and participation'. (Marres and Lezaun 2011, 491)

Indeed, as we see them, the documentation interfaces being created in urban accessibility issues might be interesting empirical sites to understand the relevant epistemic and political transformations 'in and through which technoscientific objects are rendered affective and amenable to effective political interrogation' (Braun and Whatmore 2010, xxvii). Thus, in the remainder of the paper we will analyze two cases: (1) the creation of *Streets for All*, a platform to protest and to sensitize technicians and citizens alike of the problems of 'shared streets' for the blind and partially sighted led by ACIC (Catalan Association for the Integration of the Blind); and (2) the organization of the *Tinkerthon*, a do-it-yourself (DIY) and open-source hardware workshop boosted by ETS to facilitate the creation of a network of tinkerers seeking to self-manage accessibility infrastructures.

Our intention in describing these two cases is to understand the relevant forms of technoscientific democratization being explored at the documentation interface. In a way, whilst Callon, Lascoumes, and Barthe (2011, 253) were trying to understand and vindicate the practices of '[. . .] those who, by inventing technical democracy, reinvent democracy', the modest aim of this paper is to address two cases where documentation interfaces might help us understand particular forms of techno-scientific democratization, paying attention to the materiality of accessibility issues they seek to capture and circulate.

These cases not only bring to the fore different positions regarding the democratization of the relations between technical professionals and disability rights advocates, but also seek to advance different materialist approaches to the 'universality' of urban accessibility arrangements (Hamraie 2012). Hence, two versions of techno-scientific democratization are identified in our cases:

(a) in the first case, a politics of 'universal singulars', forging sensory-oriented documents and demonstrations to sensitize technical professionals to the problems suffered by the blind, raising the case of the need for urban spaces to be designed 'for all'; and (b) in the second case, a politics of the 'singular universal', creating a web-supported open mode of

documentation to share ideas, redistribute skills and provide technical support in someone's process of tinkering and fabricating tailor-made gadgets addressing the singular needs of diverse bodies.

The Passeig de Gràcia 'shared street' dispute: The articulation of the 'Streets for All' platform

In April 2014, there was word on the street that Barcelona's City Hall was refurbishing the well-known Passeig de Gràcia. On 16 April, Marcos accompanied Ricard (a blind person, member of b1b2b3) to check. Doing this is regular practice in the blind rights' associations to check whether urban accessibility measures are well implemented in new projects. That day work was still underway, and some areas were blocked. Despite the deafening sound of machines Ricard unfolded his cane and started groping around. 'The tactile paths are quite ok', he said. But something was not right: 'where is the distinction between the car-lane and the sidewalk?' Indeed they seemed to be at the same level but both Marcos and Ricard assumed that this might mean that they had taken out the car lane. Ricard indeed argued that this was great, but the space was 'too open wide' to help him orient (blind people use sounds, echoes, sidewalk borders and the façades of buildings to move in case there are no tactile paths to guide them). In the course of their exploration they trespassed by mistake into the working area: 'Ricard, there are traffic lights here!', Marcos said. 'So, there will be cars using this space?' Ricard was astonished, 'How could they? We have to tell ACIC!'[4]

Their worst fears were confirmed: for the new Passeig de Gràcia, City Hall was using a version of the 'shared street' type (see Imrie 2012), quickly spreading over Europe. This is the latest universal design trend that many European blind associations are fighting against. Their main issue is the lack of either appropriate tactile guides or visual differentiation on the ground, part of a more general refusal by the designers of those 'pedestrianized' public spaces to strictly zone usages for different vehicles and pedestrians. The will of those designers is that in doing so motor vehicles should negotiate the use of space with pedestrians and bikers, who are considered the preeminent users of such street configurations. However, many blind associations at a European level have indeed reported that it is not working for them, and they claim that their accident rate has skyrocketed. A few days later, Ricard and Marcos emailed the people from ACIC with a report on their findings. They received a reply: they were aware of the problem. Indeed, as ACIC communicated, they had already met with representatives of the *Municipal Institute of People with Disabilities* (IMPD[5]) to inform them of the dangers of shared streets, but no results had been derived from that meeting. As the people from ACIC stated in that very email, they feared that they would only be invited to test the new urban configuration once everything was finished.

Nothing changed until 8 August 2014. That day ACIC sent a message through their mailing list informing that on 21 July they had attended a showcase demonstration of the new Passeig de Gràcia. They had put together a report with several remarks signaling the main problems that the municipality's technicians should address. The text started with a remark: ACIC was regretting that this had happened when their first contacts with the municipality had been established in March. In that document, the use of a pedestrianizing arrangement was praised but, 'sensory accessibility should always be taken into account'. Giving great technical detail, their main issues were the following: even though the new arrangement was not a fully pedestrianized dropped sidewalk arrangement—since it included use demarcations for cars—it did not have 'clear walking references'; and despite the fact that some tactile references had been included there was a problem with the crossings and the underground station exits, since they were separated from the main pedestrianized sidewalk by a bike/car lane. The very act of going out of the

underground or seeking to cross, or so they stated, put them in danger. With that document they urged City Hall to take action to ensure the application of sensory accessibility measures before the official inauguration of the Passeig de Gràcia next November. In the mail ACIC also made a strong case for the need for better and more stable means of participation in a special workgroup at the municipality to ensure that sensory accessibility arrangements are always implemented. But they were unsure about the future prospects: 'If they don't listen—the most probable thing—we will have to plan some action for November', they concluded.

And that was, indeed, what happened. No action was taken by the municipality and in November 2014 ACIC started preparing to protest right before the inauguration. Given that one of ACIC's main members, Meritxell Aymerich, is a professional journalist and communication consultant, they decided to create a protest video. She had professional contacts who could produce it, and the members of ACIC had written a script. Marcos was recruited as an assistant volunteer in the shooting of the video. He had to help stage the opening scene, in which a blind man exits the Passeig de Gràcia's underground station and is almost struck by bikers, being rescued by a bystander (Marcos) shouting, 'Mister, you are in the car lane!' The video, uploaded a few weeks later to YouTube, consists of several re-enacted scenes of blind people's problems as they try to find their way groping and scanning with their canes in the new 'shared street' Passeig de Gràcia. The narrator's voice-over conveys (with different scenes exemplifying what is being stated) ACIC's evaluation of the situation:

> 'The tactile walking paths from the buildings front line indicate the location of crossings. They have also included acoustic traffic lights in all crossings […] [However] since we blind people cannot detect the sidewalk's step [the main demarcation in zone uses for them] and there is no clear danger floor-mark, we might think we are on the sidewalk [when we are in the car lane].'[6]

The voice-over is sometimes interrupted by inserts of re-enacted testimonies of a blind tourist, a blind dog user, a partially sighted older woman and blind cane user. They explain their inability to detect warning floor-marks and distinguishing urban zones properly. Apart from the problematic aspects, the explanatory voice-over offers alternatives, whilst images of a blind couple empowered by proper universal design are shown: 'Experiences solving similar issues should be taken into account. The central boulevard of the Rambla of Terrassa is an interesting example of a shared street where adequate tactile signals have been used.' The video closes with a call for more participation of accessibility representatives from the very beginning of urban projects, whilst images of a street diagram summarizing the main problems to be taken into account are shown. As Meritxell stated in an interview seeking to know more on the communication strategy sought with the video:

> 'In the video we sought, and we don't know if we succeeded, to reach everybody [citizens, professionals and the people in charge], because if you use a too technical language you only reach a technical public, if you say "blind people, beware with that … " you as non-blind watchers might stop the video in less than 30 seconds. It had to be something very global in scope.' (Interview excerpt with Meritxell Aymerich, ACIC, 28 March 2015)

The video started to circulate slowly. However, in December 2014 the new Passeig de Gràcia had not yet been inaugurated. ACIC had heard rumors that the Mayor was going to show up at an evening event at Passeig de Gràcia. For this, they quickly prepared another protest action. They designed and produced a flyer (Figure 1) to give to the attendees with the idea of protesting outside of the event. It was a simple flyer with the following text printed in ink and in Braille: 'The new Passeig de Gràcia is no fun for us!—Why can't blind

people walk with ease of mind?—Watch this video (3 min duration).' The flyer also included a QR code with a link to YouTube. Unfortunately, that night the Mayor did not show up. However, the flyer was regularly distributed in all the subsequent actions ACIC organized.

Figure 1 ACIC's flyer. Collected and scanned by Marcos Cereceda.

Right after the failed protest action, ACIC started contacting other associations of blind people—such as b1b2b3 or *Assemblea per a la Diversitat* (Assembly for Diversity)—as well as ECOM (the biggest Catalan confederation of associations of 'the physically disabled') to create a united front of different disability rights organizations demanding accessible solutions for all—what would be from that moment on called the 'Streets for All' platform (*Plataforma 'Carrers per a tothom'*). As Meritxell described in the interview, this was a way to prevent the issue from being understood as 'a blind people's thing', dismantling from the start any 'divide and conquer tactics' that would seek to present the new zero level Passeig de Gràcia as a good solution for wheelchair users, and hence avoiding any fights between different disability rights advocates. The first action conceived by the platform was a demonstration that took place on the rainy morning of 14 March 2015, that Marcos helped to organize as a volunteer of one of the associations.

Shouting out in the street rhythmically '*Carrers per a tothom, carrers per a tothom* [Streets for All]' and using whistles to demand the bystanders' attention, a group of around 200 people marched along the segment of the Passeig de Gràcia (from the corner of Gran Via to the Diagonal) where the shared street arrangement had been installed. A few wheelchair users headed the march carrying a 2 m banner, with the slogan '*El nou Passeig de Gràcia no ens fa cap gràcia . . .* ' ('The new Passeig de Gràcia is no fun for us', 'gràcia' being Catalan for both 'fun' and 'grace'); following them a human chain of blind people, some walking together with their arms intertwined, others walking alone with the assistance of their volunteers, others in flocks, lines and groups of three. Many TV networks' cameramen and

journalists to whom the organizers had sent a press note documented the march. As well, many of the marchers recorded with their smartphones audio pieces and live-tweeted the event using the #carrersxtothom hashtag.[7] After the parade Paquita García, from ACIC, read out loud the manifesto, passing her finger over the Braille-printed sheet, whilst Marcos was holding the megaphone and an umbrella for her. The manifesto reproduced and expanded, in a more enraged tone, the same ideas already present in the letters and the video. Once she was done the protest was disbanded.

Several days before the protest a blog of the platform had been published,[8] embedding the manifesto and the video. Later on that day sound podcasts, videos, live-tweets and media coverage of the protest were added. The video and the protest indeed had some impact in the local and national press. A few days after, Meritxell was radiant, and she told us that 'making everyone [most of blind as well as non-blind disability rights associations] agree on something had never happened'. 'Why now?', we asked.

> 'Because it is so palpable and dangerous [for blind people] […] All shared streets' designs are so dangerous, that none could oppose, not a single association, not a single blind person walking through them … That has mobilized many people without us noticing it.' (Interview excerpt with Meritxell Aymerich, ACIC, 28 March 2015)

Throughout 2015 the main task of the platform was to create a report with concrete proposals around 'shared streets' so as to engage in conversations with the municipality's architects and social professionals in charge of tackling the situation. Titled *Volem uns carrers que siguin veritablement per a tothom!* (We want streets that are really for all!), it was circulated and made freely downloadable in December 2015.[9] The report not only documents with pictures and quotes the issues of members of the different sensory and physical disability associations that take part in the platform, but it also—thanks to the technical expertise of ECOM's accessibility division, composed of activists with design skills and extensive experience in legal fights—seeks to offer design proposals of alternative urban accessibility arrangements for the different shared streets that they have been documenting, providing very sophisticated technical and legal detail and seeking to speak to technicians in their own language.

Making accessibility issues tangible and 'sensitizing' to bodily diversity: technoscientific democratizations through a politics of 'singular universals'

In the articulation of this urban accessibility issue, the organizations united in the Streets for All platform sought to raise awareness about the importance of creating 'more universal' design arrangements. In constantly performing and documenting neighborhood explorations of new urban accessibility arrangements (e.g. 'shared streets') these disability rights associations remain open to permanently engage in articulating knowledge about what certain technical arrangements do to their diverse bodies, exploring bodily exclusions and putting them at the center of a fight for more participatory modes of urban standard design. Interestingly, in the Streets for All platform blind associations united with other disability rights advocates to articulate a common front offering alternatives to the shared street design, pushing for 'more universal' solutions 'for all'. This in a way is consistent with universal design tenets seeking to consider singular bodily needs—a highly demanding effort, since it calls for addressing particular situations that everyone could suffer at a given moment of one's life (Winance 2014)—in order to build ever more accessible arrangements, rather than designs for a segregated group (Williamson 2012).

One way to interpret this is to say that through their protests 'Streets for All' challenged

the municipality's 'not very democratic process' of building shared streets without counting on them: the municipality's IMPD being indeed 'called into order' (Callon, Lascoumes, and Barthe 2011, 88) as an institutionalized hybrid forum of sorts in a protest organized by an 'orphan' concerned group (cf. Callon and Rabeharisoa 2008, 246 – 248) suffering from the externalities of a particular urban arrangement—in other words, seeking to include in a participatory and iterative fashion those weeded out by such arrangements. But beyond a proceduralist fight for 'democratic inclusion' in the decision-making of the design process, we believe that ACIC and Streets for All's documentation interfaces might indeed be doing much more than just creating the conditions for a more participatory dialogue with experts in conditions of uncertainty. Their documentation interfaces articulate:

> '[…] a difference over the sensible, a disagreement over the very data of a situation, over the objects and subjects included in the community and over the modes of their inclusion'. (Rancière 2005, 55; our translation)

They do so by inventively translating those sensibilities for the non-blind into materials that contain indexes to the blind people's embodied experience, that 'make the issue tangible' by seeking to bring to the fore those sensibilities through a video that shows the experience of the blind, or making palpable the need to think from the haptic in an embossed and ink-printed flyer joining together the protest mottos and the link to the video. In a way the Braille features of the flyer, addressed to the non-blind, seek to make noticeable the sensory specificities that should be taken into account to produce 'more universal' urban accessibility arrangements.

While they might be interested in winning professional experts for their cause (much in the same vein of 'popular epidemiology' initiatives, see Murphy 2006, 95 – 107) with their report offering concrete design proposals, ACIC's and Streets for All's aim is not mainly to engage in a counter-expertise battle against the municipality and the IMPD's technicians. Much to the contrary, their will is to open up an exploration on the forms of participation in accessibility

politics. This is aptly displayed in their documents, in their demonstrations and in their proposals. In order to work towards that end, they need to engage in many practices 'sensitizing' professionals and laypeople alike to highlight and raise awareness, fostering a politics of '*singular universals*': a sensibility so that urban arrangements might be sought 'for all'. This category remains always underspecified as the problematic to address through permanent explorations. And for that purpose their documentation interfaces might, then, be treated as 'devices of affectedness' (Marres 2010, 204) allowing not only the materialization of the knowledge process of becoming affected to these new shared streets, but also the materialization of that affection to sensitize and raise public awareness over the need to design addressing bodily diversity.

The Tinkerthon (*Cacharratón*): a collaborative DIY marathon workshop of accessibility prototypes

Organizing and documenting the Tinkerthon

Starting in 2012, *En torno a la silla* (ETS) began operating as a design collective experimenting with different forms of open-source and DIY fabrication in a context of harsh spending cuts affecting not only wheelchair users but also the craftspeople and designers that take part in the project. In such conditions of a certain 'precariousness of means' between 2012 and 2014 ETS managed to create an open design wheelchair kit—

including a portable wheelchair ramp, an armrest briefcase and a folding table— with the aim of intervening in the inaccessibility of spaces in a more self-managed fashion (Sánchez Criado, Rodríguez-Giralt, and Mencaroni 2016; Sánchez Criado and Rodríguez-Giralt, 2016). Thanks to the role played by a set of documentation interfaces (an open blog displaying audiovisual documentation of the fabrication activities of the collective, construction and assemblage drawings or tutorials, together with more conceptual and political texts) the project had increasingly grown interested in reflecting on the conditions of fabrication activities. Slowly but steadily an idea started to grow in many conversations within the collective: hosting an event where different people and collectives doing the same or similar things could present their work and, maybe, forge new alliances to find mutual support for their tasks or start doing things together.

After many negotiations and preparatory meetings on 7 June 2014, ETS, together with other collectives, hosted an event called 'Tinkering Spring' (*Primavera Cacharrera*[10]) at the auditorium of Can Batlló .[11] In the previous weeks an online call for self-fabrication projects and self-managed accessibility solutions had been circulated. The projects would be presented in public. In the Tinkering Spring 17 projects were shown with an audience of around 60 people on a vibrant day. This led to the idea of organizing a 'Tinkering Network' (#*redcacharrera*[12]) uniting these different projects in the final assembly of the meeting; indeed, throughout that day many people expressed the need to think of viable ways to create a self-managed workshop of technical aids within Can Batlló's Mobility Workshop (seeking to foster self-repair learning activities with different vehicles). In that very same assembly ETS, with the help of Can Batlló's Mobility Workshop, agreed to lead the way. It was argued that the network should operate simply through a mail list moderated by ETS, and would seek to join together professionals, users and amateur craftspeople to self-manage the production of personal and urban accessibility arrangements, as well as to openly document and share the collective creations not only to allow their replication but also to incite others to do so as well. But the specifics of its organization and its potential events and activities had yet to be defined.

Shortly after, on 22 June 2014, ETS shared a stand at Barcelona's *Mini Maker Faire*. There they met Lluís Sabadell, the founder of the CoCreable digital platform,[13] who makes a living fostering co-creation methodologies and workshops. He had heard of the Tinkering Spring and they both thought that it could be great to do something together. In the following weeks different discussions started to take place in the mailing list, and ETS made the proposal that in order to help activate the Tinkering Network project a co-creation event could be useful. Hence, on 23 July 2014 and after many conversations and preparatory work, the group of people interested in articulating the Tinkering Network met with CoCreable in Can Batlló (Figure 2). Lluís explained the methodology: first we should name the event, debate its scope and choose a date. Later on, and using his open-source digital platform we would suggest and vote 'design challenges' that should then turn into 'ideas' to be built collectively in a one-day co-creative marathon. Initially a date in September was suggested, but no concrete decision was made. Later on the group went on to name the event, since Lluís needed to prepare the website where we would exchange ideas during the month of August. The people present proposed several names that we wrote down on Post-its, which we later stuck on the whiteboard, and voted. The most voted option was to name the event *Cacharratón* (after *cacharreo* or tinkering and marathon; from now on Tinkerthon).

Figure 2. First meeting of the Cacharratón. Compiled by *En torno a la silla*.

Some distribution of roles was also discussed: Tomás agreed to write minutes of the meetings and the organizing process would be documented in ETS's blog, also including the links to CoCreable's platform.[14]

On 17 September 2014, the organizing group met again to make pressing decisions, since the participation in CoCreable's platform during August had been low. Hence the group decided to push the deadlines a bit further. Due to that a new date for the workshop was agreed upon: 11 October. That day the group explored the proposals uploaded and discussed on CoCreable's platform and decided on four of them to be built during that day: (1) an autonomous urine bag voiding system for wheelchair users; (2) a wheelchair's rain and sun protecting device; (3) forms of accessible clothing; and (4) an accessible spaces workshop exploring how the Tinkering Network might be placed in Can Batlló's facilities and what would be needed. As discussed in the meeting, the decision was made to foster projects entailing variegated levels of difficulty and implying different material, organizational and design challenges, hence requiring an exploration of different aspects of what the Tinkering Network could be making together as a collective. As was also discussed, all the ideas needed to be thought with a concrete flesh-and-bones user in mind. The main rationale for this, as debated in that meeting, was ETS's experience with fabrication that Alida, ETS's architect, had well summarized in a conference in July 2014:

> 'we always work [in the collective] focusing on the concrete needs of singular bodies that very often have very articulate, accurate, and very well defined design requirements … and with these objects we are in search of a good enough result, and also to create [alternative] possibilities of relating to the environment'.[15]

On 7 October 2014, the organizing group met again to give the last touches and think

about the practicalities of the event at Can Batlló Can Batlló's Mobility Workshop would provide not only the space but also the tools and the necessary infrastructure (hammers, screwdrivers, saws, power plugs, tables and chairs, etc.). Since there was no proper funding for the event and both ETS and the people from the feminist space *La Electrodoméstica* had covered the expenses so far, the organizing committee agreed on two main things: a E5 donation would be suggested to all participants to cover breakfast and basic sketching and fabrication materials; people would also be asked to bring recycled materials to build their prototypes. This, together with a list with suggestions of materials and tools, and practical info would be later circulated through the mailing list. Also the group agreed on the different roles that team members should take. To end, an agreement was reached to print the material from the digital platform for the easy access of the ideas and knowledge already shared by the groups.

On the day of the event (11 October 2014) the organizing committee arrived at 8:30 to set up the space. A recycling point was established where everyone arriving could leave stuff, either new or reused materials, to prototype or test ideas. That place would later on be full of things: a nearly broken baby buggy, suitcases with old clothes, a couple of broken umbrellas, planks of all sizes and wood types, and three broken wheelchairs (one of them motor propelled). The people from *MakerConvent* (a fablab space) brought a 3D printer and started plugging it in and warming it up.

Lluís opened the event. 'Today, he stated, there are four groups, which will have at least three people on the minimum with three distinct roles for which they will have to wear a sticker: "master builder" (in charge of the continuity of the prototyping), "host" (in charge of explaining the state of project to whoever might approach), and "gossip" (in charge of visually documenting the design process with his or her smartphone) . . . Everyone else can move around projects.' 'There will be', he explained, 'a small round of presentations of the first ideas before lunch and then, at 19:00 before closing and celebrating we could do a full presentation of all four prototypes.' 'The idea', he clarified, 'is not necessarily to have a final or working solution, but each group will have to show their prototype.' He also remembered that, as agreed, Arianna (ETS's video-maker) was going to shoot footage to produce a video-documentation of the event. After this, the 30 people present, coming from Barcelona and Madrid, had to choose one of the groups. For instance, Marcos and Nacho (from Madrid's 15M Functional Diversity commission) joined Marga and Rai (ETS members) to discuss and sketch different ideas to create a rain/sun protecting device to be attached to a wheelchair (Figure 3).

As Marga would tell Arianna for the video-documentation:

> 'The challenge of the umbrella/sun protector was . . . Sheltering from the rain, the wind and sun. Also not suffocating, being able to transpire . . . Having in mind the waterproofness and transparency of the materials . . . Allowing us to look right, left and up front . . . Covering the chair, the joystick, the batteries and the body, legs and chest . . .'[16]

Later, they debated at great length on the pros and cons of having a permanent canopy (a 'claustrophobic' solution for some) or using a folding one (which would require for some of them to include an automated folding system), on how different solutions might create difficulties since they would make the wheelchair expand its height or width. They also explored the problem that each wheelchair's measurements are different. Besides, Marga, Marcos and Nacho, all three wheelchair users, all move differently. Hence, they would not be able to reach a universal solution.

Figure 3 Sketching a wheelchair's rain and sun protecting device. Compiled by *En torno a la silla*.

Despite the complexities, Rai suggested creating a mock-up using one of the broken wheelchairs to meet the following competing requirements to complete a prototype for the workshop: 'the rain asks you to focus on covering the front and upper parts, and the sun would only require a shelter for the upper part'.[17] He developed the idea for the folding mechanism using the materials at hand: together with Marga and her personal assistant Rai disassembled a broken umbrella, extracting its metal rods to create the skeleton of the folding canopy; later they found a circular plastic cap of 15 cm diameter and started carving holes in it so as to test the folding method; and they would later use the buggy's plastic cover as the canopy itself. After all the projects' presentations ended, and right before celebrating, the pictures taken by each group were compiled by ETS and CoCreable. In the following days all of those pictures were catalogued and uploaded to an open album in ETS's social media. Nearly a year later, Arianna's video-documentation report marked the closure of the process.[18] Unfortunately, the idea of the Tinkering Network was discontinued shortly after—due to diverse organizational issues and the rampant precariousness of means of the people gathered in the mailing list—but all the documentation of the process (minutes, videos, mails, posters, etc.) is still available on ETS's blog.

Redistributing skills, exploring tailor-made solutions: techno-scientific democratizations through a politics of the 'singular universal'

Though the Tinkering Network might still be an ideal, such an aspiration is materialized by ETS in the complex and not always coherent and sequential documentation interfaces of its activities, such as the Tinkerthon workshop. The aim guiding their activities is to

'democratize' urban accessibility infrastructures: that is, to create the conditions for anyone interested to access, control and openly engage in explorations with them. The open documentation 'ecology' (cf. Corsín, Estalella, and Zoohaus 2014) put forward to do so allows sharing knowledge both on the needs and singularities of the bodies with whom they work and on some of the ideas found out to search for design solutions, and to engage in sharing information on building techniques, tools and the search for materials for their use in processes of collaborative and open-source creation of accessibility infrastructures (Sánchez Criado, Rodríguez-Giralt, and Mencaroni 2016), seeking: (1) to encourage and maintain collective efforts to tinker and explore different self-care and personal autonomy arrangements; and (2) to explore and arrange alternative collaborative, DIY and self-managed accessibility markets working at the margins of the state, however frail and precarious they might be.

What differentiates ETS explorations and efforts to put together the Tinkering Network, seen from their documentation interfaces, might be that instead of working with attempts at creating solutions for all or engaging in a politics of 'universal singulars'—such as in ACIC's Streets for All platform—their work seems to revolve around the creation of a politics of the '*singular universal*': the creation of decentralized and collaborative (which does not mean devoid of asymmetries) networks of people and stuff, to politicize the epistemic and infrastructural aspects of accessibility arrangements, creating situations such as the Tinkerthon where, as the philosopher Amador Fernández-Savater described the Spanish Occupy movement: 'The "universal" is not constructed bracketing the particular (situated, singular) but *deepening in* and *intensifying* the particular itself' (Fernández Savater 2015a; our translation). That is, where the intention is to learn from the specificities, collecting and sharing information within a network whose 'universal' purpose would be to address collaboratively and through particular technical arrangements, any singular bodily needs, despite the overwhelming complexities of those processes.

The 'universal' aim of these activities is an aspiration to create open, collaborative and self-managed processes that might provide each singular person with resources to engage in the fabrication of a tailor-made gadget for his or her needs or the articulation of a peculiar arrangement to ensure that such a person might take part in collective activities. This aim is materialized in many exploratory documentation interfaces, through workshops such as the Tinkerthon. Such documentation explorations might help us trace an expansion of 'technical democracy' registers. This is a form of enacting techno-scientific democratizations that revolve around 'fragile', 'evental' and 'temporary' collaborative material explorations and their documentation (Sánchez Criado and Rodríguez-Giralt 2016), rather than stable, iterative procedures of dialogue such as the ones entailed by the TD program. That is, in doing these things, ETS and the other people and collectives at the Tinkerthon wished to redistribute the modes of technical knowledge engaged in the production of alternative forms of accessibility arrangements and non-state-centric forms of democracy: democratizing the access to knowledge, the control of prototyping infrastructures and the political experimentation with them (Corsín 2014) to articulate 'regimes for coping with unruly bodies in the everyday' (Murphy 2006, 157).

In the process of putting together independent-living advocates, free culture activists and design professionals with the prospect of a non-hierarchical Tinkering Network, the main aim of the Tinkerthon was to engage in joint learning processes, so as to create and maintain a frail self-managed network of open-source tinkerers devoted to perpetually considering the singularities of each body in specific design projects. Indeed, as many other contemporary spaces for technical learning through open-source tinkering—such as hacklabs or prototyping workshops—, there might be operating: 'A redistribution of

knowledge that doesn't necessarily take the form of "everyone expert in everything" — something impossible and certainly undesirable —, but that of alliances, contaminations and connections' (Fernández Savater 2015b; our translation). This might be better described not as an alliance of wheelchair users with professionals in TD explorations, but as a form of techno-scientific democratization where technical practitioners and disability rights advocates are:

> '[…] gathered together by a "common", that is to say, by a cause: they are engaged by a type of achievement proper to each field the eventuality of which obliges those who belong to this field, forces them to think, to act, to invent, to object, that is to say, to work together, depending on one another'. (Stengers 2015, 91)

Afterword: urban accessibility's documentation interfaces and the exploration of modes of techno-scientific democratization

In this paper we have sought to address whether accessibility issues might allow us to rethink the project of technical democracy. Particular attention has been paid to two cases in Barcelona entailing the low cost and fragile innovation of what we have called 'documentation interfaces' (relational productions of bodily related narratives, personal measurements or multi-media recordings assembled in order to articulate bodily knowledge, protest and circulate their needs to urban planners) in processes seeking to expand the range of bodies addressed and the forms of addressing them in urban arenas for the design of more accessible cities, bringing with them radically new forms of more sensible technical democratizations.

Specifically, we have focused on: (1) a description of ACIC's protest and demands for further participation in 'shared streets' designs as well as their efforts in sensitizing and raising awareness — through different materials and events — of the sensory and material specificities of the bodies weeded out of the participatory process of designing those arrangements; and (2) ETS's attempts at organizing an open-source Tinkering Network to self-manage accessibility arrangements to live by, especially through the articulation of digital platforms to document, select and archive the relevant specifications in order to build concrete projects for the Tinkerthon workshop.

Indeed, as part of a more general struggle for an international disability rights movement (Charlton 1998), the task of engaging in documentation interfacing challenges our approaches to the common good around universals. Indeed, building an accessible city has always been a matter of engaging in a politics of universals (Prince 2008). However,

> 'The challenge for universal design discourse is how to articulate a universal human ethic that is simultaneously responsive to the specific, situated, nature of human subjectivities […] the tricky question remains, how is universal recognition to be practically enacted, both as a political project and practical way of doing things responsive to the differentiated "needs of all"?' (Imrie and Luck 2014, 1316)

As we have seen through our cases there are different versions of this, and this does not necessarily mean a normative, standardized and static propagation of the singularity of a given group into the design of urban space, but rather a universal will that singularities should be addressed, exploring different material, normative and knowledge repertoires to do so. Both cases, indeed, show different approaches to how the relation between singularity and universality is addressed, engaging in distinct arts 'of the local and singular construction of cases of universality' (Rancière 1999, 138).

We have sought to describe the different takes on techno-scientific democratization that these documentation interfaces might bring: on the one hand, a politics of 'singular universals' in ACIC's Streets for All struggles, articulating bodily diversity beyond language, and permanently sensitizing professionals and laypeople alike through textual and non-textual means to make perceptible what displaced or nonaccounted bodies might be suffering from, so that they could be brought back to the design desk in the ongoing iterations; and, on the other hand, the political and epistemic interventions developed through ETS's opensource interventions to engage in the creation of the Tinkering Network as a 'universal singular', that is, in ensuring a temporary, fragile and 'evental' network helping disability rights advocates and their technical counterparts to join in a material exploration of how accessibility arrangements could be opened up and to redistribute the skills needed to create tailor-made accessibility infrastructures.

However, the cases exposed here show only a very limited range of the rich and complex, and sometimes clashing articulations of universals and singularity, sensory experiences and bodily reasoning that urban accessibility disputes might entail (Winance 2014). A research program could be developed to address the different sorts of documentation interfaces that might be invented to address other even more complex situations, as well as the concrete aspirations to democratize techno-scientific issues they might bring to the fore so that we could explore other materializations of urban democracy addressing bodily diversity.

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Notes

1. Catalan Association for the Blind and Partially Sighted (http://www.b1b2b3.org) has, since 1993, been one of the most active blind rights associations in the city, whose affiliates have a strong record of protests and campaigns for personal autonomy and urban accessibility since the 1970s.
2. Emerging from the friendships developed in Barcelona's 15M 'Functional Diversity' commissions the group developed out of a concern for the accessibility needs of many common and public spaces, and began to produce concrete hacks and open design interventions. The collective's name is a wordplay in Spanish pointing at the importance of focusing on the wheelchair's environment as a means and object of relevant design interventions. Its current membership consists of an architect, two craftspeople, three wheelchair user independentliving advocates and two people (one of them being one of the authors) in charge of managing the audiovisual documentation through the digital platform: https://entornoalasilla.wordpress.com. For a more in-depth account see Sánchez Criado, Rodr´ıguez-Giralt, and Mencaroni (2016).
3. For a similar use of the term interface, see Ascensao (2016, this issue).
4. ACIC is the acronym for *Catalan Association for the Integration of the Blind*. It is 'a small group of people who, blind or not, are interested in working [on a voluntary basis] on aspects related to the integration of people with

impaired vision (blind or partially sighted) into society' as they state in their website: http://www.webacic.cat/en/index.php (accessed 1 December 2014).

5. In charge of accessibility and other disability-related matters, whose council is jointly managed by appointed technical staff and elected representatives of different disability associations.
6. Translations of excerpts (0'40"–3'01") taken from https://www.youtube.com/watch?v= QxLQ4lqDZHs (accessed 1 December 2014).
7. See https://twitter.com/hashtag/carrersxtothom (accessed 1 May 2015).
8. See http://www.carrersperatothom.cat (accessed 3 May 2015).
9. See https://www.dropbox.com/s/gxschc84wk d6k4x/CAT_P.Carrers%20per%20a%20tothom_ Propostes%20carrers%20plataforma%20%C3% BAnica.pdf?dl=0 (accessed 15 January 2016).
10. See https://entornoalasilla.wordpress.com/primaveracacharrera/ (accessed 3 May 2015).
11. Property of the City Hall the complex had been slowly decaying since its decay in the 1980s. It was occupied in 2011 as part of the *Indignados* protests and, after many negotiations with the municipality, it is now a gigantic social center managed by the neighbor associations of Barcelona's Sants district. See https://canbatllo.wordpress.com (accessed 1 May 2015).
12. See https://redcacharrera.wordpress.com (accessed 3 May 2015).
13. See http://cocreable.cc (accessed 3 May 2015).
14. See https://entornoalasilla.wordpress.com/cacharraton/ (accessed 3 May 2015).
15. Video transcript (11'45" – 12'09") from https:// entornoalasilla.wordpress.com/2014/07/01/ 2014/ (accessed 1 November 2014).
16. Video transcript (3'26"–6'33") from https://www. youtube.com/watch?v=G7SavhPYAq8 (accessed 25 November 2015).
17. Video transcript (3'26"–6'33") from https://www. youtube.com/watch?v=G7SavhPYAq8 (accessed 25 November 2015).
18. See https://entornoalasilla.wordpress.com/ cacharraton/ (accessed 25 November 2015).

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