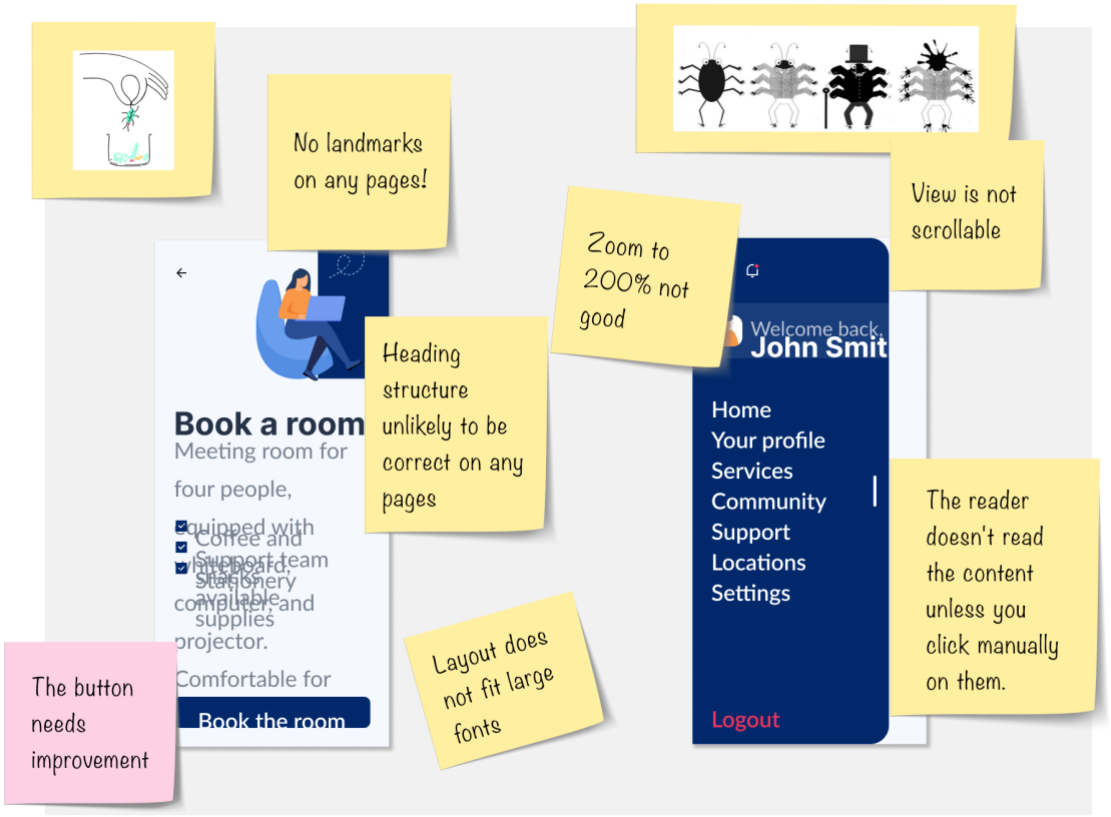
Digital Accessibility in the Making

Introducing new component parts into the assemblage of user experience design

By Luciana Hamamoto Terceiro



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Abstract

This thesis aims to investigate digital accessibility in the making through the theoretical lens of the assemblage theory. Digital accessibility is a characteristic of digital products and services like websites that allows people with disabilities to access and use them. Although its relevance, digital accessibility is not present in many technological objects. This work intends to describe the adoption of accessibility practices in developing projects and products, focusing mainly on design activities. My leading field site was a tech company located in Stockholm, Sweden, where I observed the "accessibility project" for almost three months, from October to December 2021. During this period, I followed how the company, particularly one of its teams, reacted to new environmental factors, the challenges they faced, and how the process of incorporating these new elements was, from not having accessibility presented in the produced artefacts to incorporating accessibility as a routine. In addition, the study also counted on the participation of Brazilian design practitioners through interviews. The methods were observant participation, semi-structured interviews, and oral accounts.

The main theoretical frameworks were the assemblage theory developed by Manuel DeLanda (2016) and the theory of affordances by Jenny L. Davis (2020). I attempt to analyse the organisation and its nested structures as assemblages, and the processes of changes in their parameters, creating new territory and new code through the adoption of accessibility repertoire. I furthermore analysed the relations between the affordances of technological objects produced by the company's assemblage, as well as the affordance of accessibility frameworks.

Keywords: digital accessibility, design, disabilities, assemblages, affordances

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Any faults in this thesis are entirely the author's fault.

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Cover image: a fragment of one of the virtual whiteboards used to map accessibility issues in the apps

Part I

Introduction

The year was 2021. It was a busy June preceding summer. In a tech company located in Stockholm, the teams responsible for the products and services were running against time, doing their best to finish the tasks before vacation. I was part of these teams, working as a designer in the company. Besides the projects, we were also trying to deal with everyday surprises. No matter how well-planned the projects were, there were always unexpected things. While working with technology, we have bugs, problems, things that stop working, and new urgent matters. Not everything within a company is predictable, and it seems even less likely in a technology company.

Meg, one of my co-workers, had worked on a large system update project with her team during the first semester of the year. When everyone thought the project was over and they could go peacefully on vacation, news arrived, and new updates were demanded. Meg's team was also down with a few contributors, which overloaded the rest of the group. Amid the already tiring and stressful routine, another project, this time about digital accessibility, became a priority with a short deadline. It was necessary to review all digital products, such as the company's websites and apps, and assess their level of digital accessibility. Furthermore, what does it mean to be accessible? Accessible for whom?

Meg could not believe that they needed to add a new project on top of all the tasks they already had planned. She was not the only one feeling that way. Like Meg, I was one of the company's employees that shared the same feeling. Through Slack, the digital communication tool we used, questions were raised, and the subtle feeling of panic was noticeable. The deadline, right after summer vacation, was tight for almost every team. The shared sentiment of "this is not the right way to define priorities" was in the air. The sense of being lost, of "what do we need to do?" was also evident. How could we accomplish the requirements? How could we ensure our projects were accessible?

After the initial state of surprise and apprehension, some questions came to my mind. We were talking about making our services better, filling gaps to provide a good service for people with

disabilities so that everyone could use the digital products without barriers. Who in their right minds would say it was not essential? Who would deliberately state they do not want people with disabilities to use our services? So, why were we discussing accessibility aspects? Although digital accessibility was not something new, the project showed that the matter was still unknown to many. I heard in an Ethics workshop, "accessibility is kind of old news, no?" However, it looked like many practitioners still had not known what it meant in practice. Was I experiencing a particular situation happening only in the company where I had worked, or was it a broader situation?

I have been working as a digital designer for more than twenty years, and for three of these years, I have worked in Sweden. To be more precise, I am a "user experience designer". As user experience designers, we are usually proud to be "the user's advocate", the practitioner responsible for designing easy-to-use services and products with friendly interfaces and interactions. Horton and Quesenbery define designs as not "simply about how it looks. A good design is visually appealing but also meets real needs, has substance and depth, and works well and intuitively" (Horton & Quesenbery 2013:2). Nevertheless, although the glossy definition, I was surprised that I have never worked in a place that had prioritised accessibility. I was also surprised that I found some hostility against the idea among my peers.

Assuming a certain feeling of shame and perplexity, I shared my impressions with a Brazilian designer quite experienced in the accessibility area. He said he was not surprised because it was a global scenario. In Brazil, only 1% of websites offer accessibility resources. Around the world, this number was similar. Only 2,5% of websites were compliant with accessibility guidelines. The numbers proved that the lack of knowledge was still substantial. It was a sign that companies have not taken accessibility as a serious and relevant topic.

What is the design's role in this matter? Design is not a lonely player in corporate decisions. Projects are planned in conjunction with other corporate entities such as business, finance, and technology, in a complex net of roles and goals within a company. Nevertheless, Monteiro (2019) highlights that all design decisions are political. What we design, how we design, what we choose to leave outside, and more importantly, who is considered the "audience" and the "users" are all political decisions and have impacts (Monteiro 2019:11). Technology is never neutral, as well as design.

Design practitioners seek to develop intuitive, easy-to-use interfaces, but who can define what fulfils these categories? Maj and Derda-Nowakowski (2010:27) describe how the interactions between human beings and computers are an acquired cultural competence. It relies on the user to learn and gain this expertise. This learning curve depends on the user's context and background, and technological object characteristics. If the object's characteristics present barriers or inappropriate usability, they will produce "virtual disabilities" by offering faulty interactions to everyone, not only people with disabilities.

Not only does design contributes to the invisibility of people with disabilities. Ginsburg and Rapp (2020:S4) point out that anthropology collaborates for it when neglecting people with disabilities' perspectives in anthropological research. Even when unintentional, "anthropology's genuine fascination with otherness" may not avoid some traps, such as treating disabilities as an exotic matter or marginalising disabled scholars at the academy (Kasnitz & Shuttleworth 2001). Disability perspectives, according to Ginsburg and Rapp (2020:S5), "can and should expand and transform anthropology in the widest sense" by adding a broader range of livings and experiences.

Expanding and transforming the design work through other experiences and perspectives is also my motivator in this thesis. Can the assemblage of a tech company assimilate other component parts and become more inclusive in their practices and results? And how? Which tools, processes, and methods could be used, and how effective are they? I place the study within disability studies motivated by the question of why an issue that affects so many people seems to be ignored by various fields like technology and design. My study focused on the practice of designers as producers of virtual disabilities and the hopes for a more inclusive approach. I chose to research the designers' perspective to avoid contributing to the invisibility of people with disabilities and not to fall into the risk of a colonising posture. I intend to narrate in this work the journey of a company and its teams in accepting changes, hoping that it may shed some light on why accessibility is still an unsolved issue in so many organisations.

Research questions

The thesis aimed to investigate digital accessibility in the making through the theoretical lens of the assemblage theory. The main theoretical frameworks used in this research are the assemblage theory developed by Manuel DeLanda (2016) and the theory of affordances by

Jenny L. Davis (2020). I look for analysing the systems and structures within the company as assemblages - compositions of heterogeneous components that coexist in symbioses and are producing objects and elements with affordances that reflect themselves.

The project aims to investigate:

- How is the digital design work assemblage affected by the intersection with the accessibility assemblage?
- What happens when new component parts are introduced in an assemblage?
- What are the challenges faced by an assemblage during its processes of changing parameters?
- What are the relations between affordances and assemblages?

The research was developed between October and December 2021. It consisted of fieldwork within a tech company located in Stockholm during the development of a digital accessibility project applied to their websites and mobile applications and complemented with interviews with Swedish and Brazilian design practitioners.

Outline of the thesis

This thesis is organised into three parts. Part I consists of introduction and research questions, where I present the initial context that motivated my research and the questions that I aimed to observe during it. It also includes the background, where I bring a general definition of digital accessibility, a summary of the global digital accessibility scenario, and accessibility regulations in Sweden and Brazil. Furthermore, it includes a presentation of previous research, theoretical framework, and methods. The previous research sums up the anthropological view on disabilities studies, with standpoints about society, normality and the "other", and technology and design relations to disabilities. The theoretical framework section presents the assemblage theory by Manuel DeLanda and the affordance theory by Jenny Davis. Fieldwork and methods sections introduce where the research was conducted, the characteristics of the fields, and the used methods, like participant observation, interviews, and oral accounts.

The focus of Part II is to describe the teams' journey through the process of adopting the accessibility frameworks. The chapters aim to describe how the assemblages of the company and teams reacted and adapted to the territory and coding parameters' changes through the

effects of the environmental factors brought by the intersection with the accessibility assemblage. Chapter 1 describes the first contact with the accessibility matter, the new component parts that were bought to the assemblages of the teams, how people reacted to them and the strategies to familiarise themselves with the unknown repertoire. In chapter 2, the accessibility journey went through a new stage. After the discussions and conversations, the teams started to organise themselves to identify the status of accessibility on the current products and map the issues that needed to be fixed. The assemblages of the teams started to accommodate the new component parts and analyse how they could incorporate these parts into their practice. Furthermore, in chapter 3, the teams were adequately working on the fixes, and some practitioners started questioning the next steps. In chapter 3, the changes in parameters started to appear more familiar, and the new component parts began to be put into practice.

Part III is composed of the conclusions related to the theoretical framework, revisiting the research questions. I attempt to connect to the previous research and summarise some relevant aspects that emerged during the fieldwork.

Background

Aspects of digital accessibility

Accessibility, the "ability to access", is defined by the Cambridge dictionary as "the quality or characteristic of something that makes it possible to approach, enter, or use it"[1]. In the physical world, accessibility could mean a curb cut on the sidewalk, a beep on a pedestrian traffic light, an elevator instead of stairs, and many other examples, that allow people with all abilities to be present in our society. Digital accessibility is the electronic correspondent, meaning when digital services and platforms are equipped with technical solutions and assistive technologies that help people with disabilities access and use them. Assistive technologies may be both hardware and software that somehow offer alternatives for using digital devices, like a voice feature that describes the visual elements on a website's page. As Kalbarg points out, "assistive technology is just another bridge between the user and their device" besides the default one, like visual elements (2017:13). Popular devices such as keyboards and mouses are considered assistive technologies. Others, maybe not so popular, are screen readers like Apple's VoiceOver or Android's TalkBack, to mention two. A blind person, for example, can use the screen reader

[1] https://dictionary.cambridge.org/dictionary/english/accessibility

or "voice assistant" in their mobile phone to perceive what is on the screen. Accessible solutions allow people with different disabilities to have a more independent life. These disabilities may be physical, learning and intellectual disabilities, and visual and hearing impairments.

Around one billion people, or 15% of the world population, have any impairment. Adding to that, the world is becoming more and more digital. In the last two decades, the proportion of people online in developing countries increased by around 45% (UN The Age of Digital Interdependence, 2018:11)[2]. The increase of digital services varies from country to country, but there are some significant trends. For example, governmental services are growing digital in many countries. It allows people from all places, like those who live far away from urban centres, to access health services, tax information, and retirement savings. However, when the website or mobile apps have accessibility issues, they can add obstacles to their use. Furthermore, even worst when the service is only accessible through digital means. Some fundamental aspects of society are becoming completely digital, like money and banking services in Sweden. Sweden is known as a "cashless" society, where the use of paper money is declining every year, being replaced by digital alternatives. However, part of the population still prefers cash due to difficulties using digital solutions. Arvidsson (2019:36) points out that older people, people with physical or cognitive disabilities and immigrants are part of this group in Sweden. Money, a public good that allows access to several other systems, should present a "smooth functioning that people only notice its absence, not its presence" (Peebles 2021:2). The same could be applied to other services, where the possibilities of use should be frictionless, but this is not what happens due to many factors. Although countless barriers need to be addressed, it is undeniable that technology can offer easier access to different structures, like public and governmental services, schools, work, shopping, communication, etc. A more inclusive technology could benefit many, but those who build and produce technology must rethink how technology is developed.

Digital technology has the potential to be a great equalizer when it is accessible (UN Disability and Development Report, 2019:46). According to the United Nations Convention on the Rights of Persons with disabilities[3], access to information and communication technologies is a human right. Accessibility is ensured by legal rights and laws in many countries as well. Although

[2] https://www.un.org/en/pdfs/DigitalCooperation-report-for%20web.pdf
[3] https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities/article-9-accessibility.html

accessibility is an important topic, has regulations and laws, and its importance is highly acknowledged among many digital and interaction designers, only 2,5% of the most popular websites' home pages are free from accessibility issues, according to WebAIM[4]. This number indicates a considerable gap between this acknowledgement and the adoption of accessibility practices in the design work. Geographically speaking, around 80% of people with disabilities live in the Global South (Ginsburg & Rapp 2013:58). This number is relevant as many large tech companies are found in the Global North, and they are responsible for creating and developing digital services used around the globe.

In Sweden, two laws ensure these rights: the Act concerning Support and Service for Persons with Certain Functional Disabilities (Lagen om Stöd och Service till Visa Funktionshindrade in Swedish, or LSS[5]), enforced in 1994, and the Swedish Discrimination Act[6] (Diskrimineringslag), from 2008. The Swedish Discrimination Act was elaborated to strengthen legal protection to help victims of discrimination in a more effective way. In 2015, the Act received amendments and included inadequate accessibility as one of its listed items. Inadequate accessibility is described in the Act as a situation of disadvantage for people with a specific disability compared to people without the same characteristic (Discrimination Act 2008:2). The Act also replaced the word “disability” with “impairment”.

In Brazil, the 1988 Brazilian Federal Constitution guaranteed the right to information access for everyone. Based on this premise, the Law Number 10.098 published in December 2000, set that “accessibility in the portals and electronic sites of the public administration on the worldwide web (internet) will be mandatory for the use of visually impaired people, guaranteeing them the full access to the available information”[7],[8]. It was a start but still limited to the visually impaired people, and it only applied to governmental websites. In 2015, a law with broader coverage was sanctioned. It was Law Number 13.146, known as the Brazilian Law on the Inclusion of People with Disabilities, or more commonly, the Brazilian Law of Inclusion (Lei Brasileira de Inclusão, LBI)[9],[10]. Law Nº 13.146 was designed to “ensure and promote,

[4] https://webaim.org/projects/million/
[5] https://sweden.se/life/equality/disability-policy and https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-1993387-om-stod-och-service-till-vissa_sfs-1993-387
[6] https://www.government.se/information-material/2015/09/discrimination-act-2008567/
[7] http://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2004/Decreto/D5296.htm
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[10] https://www.maragabrilli.com.br/wp-content/uploads/2016/03/Guia-sobre-a-LBI-digital.pdf

under conditions of equality, the exercise of fundamental rights and freedoms by people with disabilities, aiming at their social inclusion and citizenship". Among its topics, it defines that accessibility for people with disabilities is mandatory for all websites maintained by companies with headquarters or commercial representation in the country or government bodies, guaranteeing for all population access to information according to accessibility international best practices and guidelines. However, despite the law, the inspection of the websites is still not very regular. From the conversations with other Brazilian designers, the perception was that few companies received any notifications or fines.

Previous research in anthropology and disability studies

I present here a summary of previous research. It introduces some anthropological perspectives on disability in different contexts, concepts of normality and the otherness, and relations with technology and design. The previous research was carried out within the area of disability studies in anthropology to understand cultural and social relations to the disability and why it is an ignored and invisible matter in many social contexts.

Disabilities interpretations have changed over time and have had various approaches, from perceived as an individual issue to a socially constructed barrier. The physical and social barriers that people with disabilities have faced limited their social presence and interaction, ostracising and provoking their invisibility. People with disabilities were commonly perceived as bodies with "abnormalities" in the past, and physical impairments were often associated with cognitive and learning difficulties (Albrecht, Seelman, Bury 2001:518). Before the 60s and 70s, disability was a "matter of private problem" (Reid-Cunningham 2009:102). However, during these decades, the first disability rights movements and the independent living model sparked the interest of anthropologists (Reid-Cunningham 2009:101). In the 1980s, a paradigm shift started, moving from "the clinic to the community" (Devlieger 2018). Devlieger mentions the work of Joan Ablon, who is considered a pioneer for shifting the focus from individuals and their body differences to the community's social reactions as disabling, reframing "disability more in terms of identity and difference than in terms of ill health" (Devlieger 2018).

Normality and the concept of otherness

Defining disability is, per se, a challenging endeavour. There are several perspectives in place, and as Altman (2001:98) mentions, it is possible to deal with definitions from angles like medical, economic, socio-political, etc. The description of disabilities can vary according to

these contexts, and one characteristic considered a disability might not be seen in the same way in another context.

On the foundation of the disability perception, there is how each culture perceives "otherness". In disability studies, the "other" can be characterised by persons with some range of physical and behavioural differences that are recognised in societies (Kumar 2016:1893), and what is a "normal" characteristic and what is not is decided by cultural and social criteria. Reid-Cunningham mentions that people with disabilities are marked as "the Other" (2009:99), and separation between able and disabled people is built by creating these labels. Hogle also asks, "what is normal?" (2005:697). She highlights that the institution of "normal" is a relatively recent concept. This "normal" was institutionalised by measurements of individuals that were used to create data ranges to define "normal curves". The fact that most people find themselves in this standard curve only means that they are somewhere in the range, but it creates this "hypothetical statistically average person" (ibid., 698). Furthermore, many people that find themselves away from the curve are seen as outliers. "The norm becomes the way we ought to be" (ibid., p.699).

Many authors highlight how the social and cultural lenses are responsible for how disability is perceived. Reid-Cunningham (2009:99), for example, refers to cultural relativity, where the lens of culture is relevant to defining disability and how cultural norms and values influence the concept. Clara Devlieger (2018) points out how society may be responsible for disabling people when she affirms that "disability is a form of difference that is created when social participation of someone with an impairment is 'dis-abled' by normative expectations and material conditions". Shakespeare and Watson (2001:10) reinforce the idea, adding that it is necessary to differentiate "the impairments that people have, and the oppression they experience". Similar to Ginsburg and Rapp (2013:53), when they describe the concept of disability as not something exclusively from the body, but how the social and material conditions "dis-able" the full social participation of those considered atypical. Goldin and Scheer (1995:1443) quote Robert Murphy when he says that disability is "a disease of social relations no less real than the paralysis of the body".

Ginsburg and Rapp point out that disability results from negative interactions between a person with an impairment and their environment (2013:54). Impairment would be the embodied limitations, and disability is a form of otherness caused by these limitations (Devlieger 2018).

It is not an impairment that creates a disability but rather the incompatibility of impaired bodies with social norms and material environments determined by the able-bodied majority and the discrimination that frequently follows (Devlinger 2018).

Technology, design, and "normality" in digital environments

In digital realms, the platforms and systems are also built over what is considered "normal" abilities, creating barriers to people with different characteristics. Boellstorff presents how virtuality could offer options to new embodiments but also impose some barriers through the lack of accessibility on devices and interfaces, and even creating "virtual disabilities" (2008:136), a consequence of the inability to perform an action, or the inability of performing it in the most optimised way. Two examples of the "virtual disabilities" that technology may create are small fonts that impose barriers to reading and flashing effects that may provoke seizures. Ginsburg (2012:102) also highlights how the accessibility of technology may enhance or obstruct one's possibilities to interact and communicate with the world. Technology enhances people when offered adequate resources, but it may "disable" potential users with a range of impairments in vision, hearing, or fine motor coordination due to inequalities in *access* (ibid. 2012:103).

When technology and design are properly prepared for a range of different abilities, it empowers its users. Hartblay points out that digital platforms may act as enhancers, allowing people with disabilities to perform actions and express themselves similarly to other people (Hartblay 2015). One of Hartblay's interviewees, a man in his 30s with a traumatic brain injury acquired in his childhood, described that the moment he could be his true self happened when he was online, and he could have more control over his interactions. The enhancement allowed him to extend himself in digital time and space. On the other hand, when technology *dis-ables* people and fails to offer proper interactions, it demands that people find alternatives. Dokumaci (2019:S97) presents the concept of "people as affordances" to describe when people with disabilities interact with another person in a symbiosis of care. In these relations, socialities or the interactions with closest ones allow people with disabilities to perform all kinds of actions. One of Dokumaci's interviewees described how this relationship could happen:

> […] my dad helped me. He carried me in his arms. Because it was a village road, and the school was a bit far, about one and a half country bus stops (durak) away. They call it a footpath (patika), but it was a rough country road. Because it was rough, my dad would carry me to school in his arms and then go back. At the end of the day, he would come back to pick me up. (Dokumaci 2019:S97)

Donald Norman points out that “a major role of new technology should be to make tasks simpler” (Ingold 2012:20). But Ingold (2012:20) questions if design - and technology - has failed and, according to him, if it “failed so spectacularly” in its purpose to simplify our lives. On the reverse idea of simplifying our life, he asks if the real goal of the design was to set obstacles for us and challenge our capacity to overcome them. Ingold provokes that “every object of design sets a trap by presenting a problem in the form of what appears to be its solution”. Should the designed objects exist to solve problems, or are they here to dictate how people perform their actions? Ingold questions if it is possible to plan ideal things in a continuously under-construction world, where the forms arise from the engagement of forces and materials within the ongoing process of life (ibid., p.29).

Despite the barriers, Ingold presents some glimpses of hope by affirming that design is about imagining the future, but in an open-ended manner. Moreover, he finishes his article by highlighting that one of the main questions for design anthropology is seeking approaches that avoid the false notion of the “user-centred” design that still treats people as consumers of objects (2012:32).

The literature on design and disability has also highlighted the fact that designing for a broader and diverse spectrum benefits the whole society. One of the best-known examples is the “curb-cut effect” (Blackwell, 2017:28). In the decade of 1970, thanks to a movement promoted by disabilities activists, the city of Berkeley (California, USA) started building several curb cuts on the sidewalks. A consequence that nobody predicted: the curb cuts not only benefited people with movement impairments but also others like parents pushing strollers, people pushing heavy carts or luggage, runners, skaters, and cyclists. Blackwell (2017:28) mentions research that pointed out that nine out of ten “unencumbered people” prefer to use a curb cut when there is one (2017:28). In digital spheres, technology has the potency to augment the capacity and functions of human bodies. As Hogle (2005:696) points out, the human body is imperfect, variable, and in a state of constant degeneration and in need of repair, along with the cultural assumptions of what is “deficient” or “normal”. Miller, in his turn, points out how a digital platform can enhance an ageing body whose increased disability affects socialising (2011:170). Technology stands in between hiding disabilities as something that people must be ashamed of or overcome by enhancing the organic body.

Ginsburg and Rapp (2015) highlight the importance of building new social imaginaries to show the horizons of possibilities for people with disabilities. An accessible future where the inclusion of disability should be not an exceptional act but a regular one. As Ginsburg and Rapp state, resignifying the hegemonic frame requires visionary activism to create an inclusive future vision and rethink disability. Tomás Criado adds the existing calling for anthropology to participate in the materialisation processes of alternative forms of world-making (2020:50). Anthropology may perform "beyond the text" and in multimodal settings (2020:51) for opening to a plurality of worlds, in conjunction with the debates on decolonising design.

The visionary activism and new forms of world-making open space for a multitude of disciplines' intersections. Ventura and Gunn, professors of design anthropology with research on medical products, affirm that the dialogue between anthropology and design benefits the latter, allowing it to gather a broader perspective beyond the techno-practice realms (2017:45). Bloch (2007:87) also highlights that disability studies are an interdisciplinary field that includes researchers and scholars from many areas like history, social sciences, and education, among others. Finally, Jenny Davis underlines that solving design problems in our increasing environment of needs (2020:xi) requires groups of people with skills from several disciplines in addition to skills of collaboration, listening and learning from each other as they solve problems (Davis 2020:xii). On the same line pointed out by the authors mentioned above, the collaboration between anthropologists, designers, and other tech practitioners can enhance the possibility of building a more accessible future for all.

Theoretical framework and concepts

I resorted to two theoretical frameworks in this study to analyse the dynamics between design practitioners and the making of digital accessibility. The first one is the assemblage theory proposed by Manuel DeLanda, and the second is the affordance theory based on Jenny L. Davis' work.

The assemblage theory

When observing how a company or an organisation operate, we perceive that they are not homogeneous places, considering their different departments, teams, and professionals. A company comprises many individuals equipped with their tools, tasks, responsibilities, and assignments. Some groups of individuals within the company are more similar than others. For example, individuals who compose the marketing department share their specificities, which

probably differ from the legal or financial departments. Despite these peculiarities, all the employees of the same company play along on a reasonable common ground towards shared goals. These individuals share similar vocabulary, expressive elements, and signs, and presumably have uniform values, opinions, and biases. They express with pride the feeling of belonging to these places by showing off their "swag" - the free merchandise employees receive, like water bottles, sweaters, and mugs with the company's brand or by using corporate nicknames like "Googlers", a nickname that identifies a person that works for Google. It all composes the "company's culture", a shared set of meanings and understandings, represented by linguistic and physical symbols (Garsten 1994:43) and sometimes reinforced by the message "that we are after all one big family" (Garsten 1994:123). According to DeLanda, it is possible to affirm that they share a familiar territory and language.

A company is one example of assemblage. When Manuel DeLanda describes an army member, it is possible to identify many similarities:

> The whole composed of a human being, a fast riding horse, and a missile-throwing weapon like the bow is the best-known example of an assemblage of heterogeneous elements, cutting as it does across entirely different realms of reality: the personal, the biological, and the technological. This emergent whole can itself be composed into larger assemblages, like a nomad army made up of mobile cavalry formations in which warriors could fight alone or coalesce into teams, variably adjusting to the conditions of the battlefield. (DeLanda, 2016:74)

A direct parallel can emerge from this description. A warrior is an assemblage of heterogeneous elements as personal, biological, and technological component parts. An employee in a tech company resembles a lot by bringing together personal skills and knowledge, biological presence, and technological structure materialised as computers, technical devices, and software. A set of employees may be arranged into assemblages of departments and teams. Larger assemblages are usually composed of smaller ones (DeLanda 2016:29) until finally constituting the company's assemblage, and they are composed of these heterogeneous component parts (ibid., p.29). An assemblage, in theory, is a fully contingent historical identity, and each one is an individual entity, like an individual person, an individual community, or an individual organisation (DeLanda 2016:28).

DeLanda presents the concept of assemblage as derived from the work developed by Gilles Deleuze and Félix Guattari. According to Deleuze and Guattari, an assemblage is:

> … a multiplicity which is made up of many heterogeneous terms and which establishes liaisons, relations between them, across ages, sexes and reigns – different natures. Thus, the assemblage's only unity is that of a co-functioning: it is a symbiosis, a 'sympathy'. It is never filiations which are important, but alliances, alloys; these are not successions, lines of descent, but contagions, epidemics, the wind. (DeLanda, 2016:11)

From this definition, DeLanda highlights two main aspects: the parts that fit together are not uniform, and the assemblage connects these different elements by establishing relationships between them (DeLanda 2016:11).

Although the foundational conceptualisations are based on Deleuze and Guattari's work, DeLanda lets us know that he gives his own definitions of their concepts and sometimes uses different theoretical resources to develop them (DeLanda, 2006:3).

One relevant aspect of DeLanda's theory is that the assemblage's values can be altered. Parameters represent these values, and similar to "control knobs", they can be changed and affected by environmental factors (2016:28).

> The term 'parameter' comes from scientific models of physical processes. In these models, variables specify the different ways in which the phenomenon being studied can change, while parameters specify the environmental factors that affect the phenomenon. [...] Parameters are normally kept constant in a laboratory to study an object under repeatable circumstances, but they can also be allowed to vary, causing drastic changes in the phenomenon under study: while for many values of a parameter like temperature only a quantitative change will be produced, at critical points a body of water will spontaneously change qualitatively, abruptly transforming from a liquid to a solid, or from a liquid to a gas. (DeLanda, 2016:28)

The change in parameters would allow the assemblage to reach different phases, where it is even possible to coexist distinct mixtures or states simultaneously. DeLanda highlights two different parameters for assemblages: the degree of territorialisation and deterritorialisation and the degree of coding and decoding. When territorialisation is highly valued, the assemblage shows a "high degree of stasis, fixity, homogeneity, normalisation, and self-replication" (Ball, 2018:243). The higher the territorialisation, the higher the homogenisation (DeLanda, 2016:13). On the opposite side, the assemblage would show a high degree of mobility, heterogeneity, destabilisation, novelty, and a loss of unity (ibid., p.13). A process of deterritorialisation would take the subject back to a state when there were no fixed associations between ideas (DeLanda, 2016:36). Habits, according to DeLanda, are the main form of territorialisation, as a process that defines and maintains boundaries through time (DeLanda, 2016:36). Territorialisation is performed by social conventions that shape and give clear delimitations in space and time (DeLanda, 2016:37).

Regarding coding and decoding, a high level of coding means that linguistic and expressive entities reinforce mechanisms to maintain homogeneity and conformity to the standard norms. When deterritorialisation is on a high level, decoding functions as a way to break down rigid social codes (Ball, 2018:244). The parameters are also analogous: territorialisation is to coding as deterritorialisation is to decoding. In the ethnographic chapters, I will look to describe the attempts to change these parameters to pursue a new territory and coding, one that could include a new normalisation, new expressive entities, and habits.

Assemblages emerge from the interactions between their parts, as mentioned previously. The homogeneity provides a whole. Therefore, it may emerge in a bottom-up way but can also have a top-down influence, as the assemblage acts both providing limitations and opportunities for its components (DeLanda, 2016:30).

> When a community is densely connected, we can expect a reduction of personal differences and an increased degree of conformity. However, in normal circumstances, this mild degree of territorialisation may be compatible with the acceptance of personal differences. (DeLanda, 2016:31)

The homogenisation and the high level of territorialisation make the assemblage more hostile against what contradicts or is not according to its norms, habits, and standards. According to DeLanda, “the distinction between ‘us’ and ‘them’ will sharpen, and any small deviation from local norms will be noticed and punished” (2016:31).

In synthesis, it is important to highlight that an assemblage is an arrangement of heterogeneous elements that interact between them for mutual benefit. Minor assemblages may be placed together, increasing the level of beneficial exchanges. The shared ground between these assemblages, like language, signs, and values, optimises exchanges and interactions. The assemblages hold more similarities than differences despite the heterogeneous parts, creating a homogeneous environment. The more homogeneous, the stronger the level of territorialisation, and usually, it is higher the hostility against what contradicts its norms. However, DeLanda points out that parameters are not static. They can be changed, modifying the assemblage temporarily or shifting it to a new one. In this thesis, I aimed to describe how the assemblages of the company and teams reacted to the intersection with another assemblage, the accessibility, facing the changes in parameters provoked by environmental factors and the new component parts that are introduced.

The affordance theory

The second theoretical framework refers to affordances from the perspective of the sociologist Jenny L. Davis. The concept initially was created by the ecological psychologist James J. Gibson in the 1960s and 1970s, and it had spread and branched into variations in different fields like communication, studies, education, and design.

It is a commonplace to say that everything in our world is a result of design. From the simplest things we use in our daily life to the most impressive works of humanity, someone was responsible for planning, projecting, designing, and building them. All designed elements in our built world result from human decisions and, like that, are imbued with values that reflect the world vision of the decision-maker and have the capacity to shape or reinforce social, political, and economic relations (Davis 2020:5).

> Technologies are designed, implemented, and used through webs of choices. Some of these choices are explicit and reflect a clear intention for the technology to affect human action in some specific way. Other choices are implicit and may not ever enter the conscious minds of designers, distributors, or end-users. Each choice—explicit or implicit—reflects and affects value orientations, sociostructural arrangements, and social dynamics. (Davis, 2020:14)

Davis reinforces that values are not neutral and tend to reinforce power and status structures (Davis 2020:14). Technology may be developed to protect or empower oppressed groups, but as Davis highlights, if it is left unchecked, technology will favour privilege and normality (ibid., p.14). "Technology, by default, reflect and reinforce existing inequalities" (Davis 2020:15). Humans and technologies are co-constitutive and intrinsically relational (Davis 2020:45). Although they usually construct each other, Davis points out that this relation is asymmetric as the weight of responsibility lies on people's side (Davis 2020:46).

For Davis, affordance is defined as "the 'multifaceted relational structure' between an object/technology and the use that enables or constrains potential behavioural outcomes in a particular context" (Davis 2020:6). She highlights that technologies do not make people do things (ibid., p.6), instead, it encourages or discourages human actions.

A simplistic view about affordances, and source of many critiques, affirms that affordance is a binary construct. According to this view, either object has an affordance that allows people to realise some action or not (Davis 2020:8). Commonly, affordance analysis describes these relations in a static and monolithic fashion instead of the dynamic object-subject relation it is

constituted (Davis 2020:40). Davis emphasises that affordances are neither determinations nor uniform (Davis 2020:8) and suggests that technological objects operate in a system beyond the binary "afford or not afford" relation. Her framework understands that things offer degrees in the relationship with human beings. Davis describes six different categories of relations. The first two originate from technological objects, like *request* and *demand*. The following categories lay on the answers technological objects give back to users, like *encourage*, *discourage*, and *refuse*. Furthermore, *allow*, the last one, may belong both as a characteristic of the technological object or its response to the user interaction (Davis, 2020:65).

According to Davis, a *request* occurs when a technological object requests something from the user by emphasising some types of actions to the detriment of others (Davis 2020:66). In its turn, a *demand* employs a more substantial degree of force when compared to requests (Davis 2020:68). Demand intends to primarily lead the user towards specific actions without leaving much freedom for individual choices. When the relation with the object relies on the category of *encouragement*, it facilitates the continuity of actions. When it lies in *discouragement*, the technological object will offer barriers to prevent users from proceeding with their actions. In the case of *refuse*, the technological object will clearly state that progress is not possible (Davis 2020:77). *Allow*, the last category, has the particularity of being multidirectional (Davis 2020:79). This category manifests when the technological object presents options that users may or may not choose.

The categories are not rigid, and their relations with the user may differ according to the person's context and background. For example, a tech-savvy user may easily bypass a technological object refusal. A supposedly easy-to-use visual interface may present many obstacles for a person with visual impairment. "A strong discouragement may also be read as refusal, just as a weak demand may be read as a request" (Davis 2020: 65). The mechanisms of affordance are about *how* the object affords. The conditions of affordance are *for whom* and under *what* circumstances the affordances happen (Davis, 2020:88). These conditions are *perception*, *dexterity*, and *cultural and institutional legitimacy*. Perception is how subjects interpret an object's material affordances (Davis 2020:90). Dexterity is about the capacity of a subject to enact the object's functions (Davis 2020:94). Cultural and institutional legitimacy is how cultural norms and institutional codes reflect and shape social dynamics, consequently defining the way people and technologies can relate (Davis 2020:97).

If technological objects are subject to people, both those who produce them and those who use them, I suggest connecting the two authors and affirming that affordances are the results of an assemblage. With its homogeneous territory and coding, an assemblage will most probably create and produce technological objects that reflect their own repertoire. The stronger their parameters are, the higher the probabilities of the products' affordances reflecting the same characteristics of those who produce them, leaving out those not presented in the composition. Davis previously stated that if left unchecked, technology will favour privilege and normality, power and privilege (Davis 2020:81). "Left unchecked, producers are likely to make products for users who are just like themselves" (Davis 2020:120).

Fieldsites

This research contemplated two different fields over almost three months. One was circumscribed to designers working for Swedish companies, primarily practitioners based in Stockholm. The other field was circumscribed to Brazilian designers, mainly working and living in Brazil. I believe that I do not bring news to those with anthropological research experience when I say that my fieldwork had adapted over the research period due to external circumstances. While the Coronavirus pandemic affected the initial plans of my ethnographic research within the tech company, it opened other doors where I could also investigate the relations between Brazilian designers and the accessibility matter.

Digital fieldsites

When someone thinks about a fieldsite, I understand the most natural is to think about a physical space where you can be in person. As Boellstorff et al. (2012:59) point out, the traditional fieldsite of anthropology in the past was usually geographically defined, a recognisable place with a name and clear boundaries. However, I found out that field sites may be not so clearly limited and that it is also possible to be in a place - or many places - without being there physically. Our lives are no longer restricted to physical spaces, and my presence also expands to virtual environments, with all the social network websites, social media, and communication apps. Technologies nowadays expand our notion of what constitutes a field (Hammersley & Atkinson 2019:142). A fieldsite may, in this way, be understood as an assemblage of actors, places, practices, and artefacts in both physical and virtual spaces (Taylor 2009:332). Digital fieldsites play a central role in my research. From my observations within the tech company to my conversations with my Brazilian peers, the possibilities brought by digital platforms were

many. Digital fieldwork allowed my research not to be constrained by time and travel (Hammersley & Atkinson 2019:143). Also, organisational ethnography is not confined to face-to-face interactions in physical offices only, but it is also necessary to consider the digitally mediated encounters (Akemu & Abdelnour 2020:296). If this was the scenario before the corona pandemic, it has become stronger in the last two years with the "working from home" situation.

Considering digital fieldsites is fundamental to organisational ethnography. Digital technologies allow organisation's members to conduct work in different modes (Akemu & Abdelnour 2020:297), contributing to organisational experience in distinct ways (Akemu & Abdelnour 2020:299), and without being in these different platforms, it is almost impossible to grasp the interactions and workflows. During my research, the overlapping happened not only between the digital and physical but also with various digital platforms and software at the same time, which allowed employees to participate in many organisational "places" simultaneously (ibid., p.299). I could observe the workers at the researched company interacting through video calls and message systems, documents, project management software, and design software, among others, and sometimes two or more of these platforms simultaneously. This patchwork of systems may be related to the multi-sited research described by Marcus (1995:105), where I observed the "chains, paths, threads, conjunctions, or juxtapositions of locations" (and in this case, primarily digital locations) and their associations and connections.

However, I cannot ignore the disadvantages. The interactions scattered among so many platforms conjugated a highly fragmented field - "Essentially the workspace for remote collaborators is fragmented" (Hindmarsh 2017:464). These "fragmented mediatised domains of activity" demand from the researcher a more active role in constructing the field (Hine 2017:408). The absence of face-to-face interaction was also a limiting factor (Hammersley & Atkinson 2019:143), as the total or partial deprivation of some senses like touch, smell, and limited vision restricted what I could perceive.

The Swedish field

The decision on Stockholm-based professionals was made because the city has a relevant number of tech companies and the possibility of doing participant observation in person. My initial focus was the company I worked for, a financial tech Stockholm-based company. The focus was to explore the relationship between the design practitioners with the accessibility subject.

What does it mean to research within a company? What does fieldwork within a company consist of? The initial image that we have when we talk about conducting research within a company is that we will be physically there. It is partially true. The company has a physical office, but it was closed for the most significant part of the study period due to covid-19. However, even when the offices are open, the relationships between the company's employees do not just take place in face-to-face situations. The company has offices in different countries worldwide, and part of the employees are distributed in other parts of the globe. The team I followed most closely, for example, had three members in other European countries.

As the research was mainly conducted through digital platforms, I may consider these platforms as fields, similar to a physical office where the action takes place. In this manner, widely used communication tools were a fundamental part of my fieldwork. These tools were used to connect employees in different teams, offices, cities, and countries. I considered Microsoft Teams, the video call software, the most relevant platform for communication. It was our virtual meeting room. In the impossibility of talking in person with team members, videoconferencing meets the need for human contact and facilitates communication that would require many written messages.

Beyond the virtual meeting rooms, we also use Slack, a messaging tool that allows people to create conversation "channels" and exchange asynchronous text messages. Slack could also be considered one of the most relevant parts of the field. The conversations that did not take place on video calls were made through messages in Slack. For the accessibility project, a particular channel was created, #accessibility-channel, where everyone involved could share information, questions, updates, and encouraging words.

I was also in the physical office for some days, for two weeks. It allowed me to have conversations with the designers in a more relaxed way - I found out that it is hard to have

casual conversations on video calls, for example. But in the office, with the possibility of having a coffee together, we could chat about the challenges of the accessibility project.

Interviews with four designers complemented the company's participant observation. The designers I had the opportunity to talk to came from countries like Brazil, Iran, and Sweden, with different experience levels. Three of them have been working for ten to fifteen years in the area, and one has been working in the field for around four years. As a complement, I interviewed three designers based in Stockholm who work for other companies to have a broader outlook on the subject, and I attended a workshop about ethics and design in December 2021.

The Brazilian field

Two significant reasons made me extend my fieldwork to Brazil. The first was the barriers I had to meet professionals in Stockholm and conciliate the work calendars due to the end-of-the-year deadlines. The second reason was that I noticed an effervescent scenario regarding accessibility in Brazil, with many professionals sharing information and messages about the subject on many social platforms. Accessibility appeared as a hot topic on WhatsApp channels, LinkedIn posts, and YouTube lives. I found many passionate people advocating for accessibility and digital inclusion in this "Brazilian digital territory", which encouraged me to start conversations with my Brazilian peers. By exploring this other field, I grasped what these practitioners were experiencing, what they discussed, and their feelings and thoughts through various digital channels.

I also found similar points to what I was experiencing within the company. While the circumstances and social context were naturally different between the two countries, we were experiencing this one central point in common: the struggles to adopt an accessible culture at work. Would the difficulties be the same? Would there be any exchange of practices that could collaborate in any of the fields? I was hoping that these conversations would bring some clarity to what I was experiencing.

These conversations started in November 2021. Like my peers in Sweden, all Brazilian practitioners I talked to were working from home due to the corona pandemic. If from one side,

the restrictions were imposing limitations on travelling and meeting people in person, from another perspective, it would allow my informants to talk in a more casual, relaxed environment - their homes. It was a mix of professional topics and the home atmosphere. While we were exploring corporations' culture and processes, I could also have some domestic sneak peeks, like babies, pets, shelves full of books, and a lovely sun coming through the windows. I intended to let people feel comfortable, interviewing them in their space, allowing them to organize the context in the way they wished, and respect their schedule (Hammersley & Atkinson 2019:121). The interviews from home suited this intention well. The conversations took place on Google Meet.

This part of the fieldwork consisted mainly of semi-structured interviews. I had the opportunity to talk to fifteen professionals. Thirteen of them were designers, and three of them were software developers. Among the interviewed professionals, there was a mix of backgrounds. They are based in different parts of the country, eleven in the southeast - states of São Paulo and Minas Gerais, one in the northeast - state of Pernambuco, and two in the south - state of Rio Grande do Sul. From their level of experience, eight of them have between ten and twenty years of experience in the field, four designers have been working from five to ten years, and three professionals have less than five years of experience. Regarding gender, nine identify themselves as female, and six as male. In addition, it was interesting to be able to talk to designers with disabilities - one of the interviewed designers was deaf and another quadriplegic.

Method

The methods used in this research were participant observations realized on-site and in virtual environments, semi-structured interviews, oral accounts, and data collected from other sources like written documents and other artefacts. Following Hammersley and Atkinson (2019:3), I looked to collect data from people's actions in everyday, regular contexts instead of "laboratory conditions". For this purpose, I participated in the daily routine of a specific team in the researched company during the development of the accessibility project. I chose to observe only one team due to time restrictions and because focusing on a few individuals and situations on a small scale could provide a more in-depth investigation.

Participant observation was one of the most used methods during my research. Due to the nature of my ethnography, which was mostly performed in digital environments, *meeting ethnography* (Sandler & Thedvall 2017) was a considerable part of it. While in-person, there is a wider variety of encounters and interactions, like the coffee moment, the lunch, and the *fika*, among others. In a digital environment, this variety is much less diverse. There were some spontaneous conversations on digital, like when a team member asked another for a "quick call", but these interactions were often scheduled.

As mentioned, the participant observation was primarily performed during virtual meetings. In this case, participants, including me, occupied two separate interactional spaces (Wasson 2006:108), one being the physical space and the second one, the digital or virtual meeting space. The virtual encounters encourage some (anti-)communication behaviours like working on other matters and sometimes not fully paying attention to what is happening, which compromises the quality of observation. Also, the lack of attention frequently was a result of too many meetings online, known as "Zoom fatigue", defined as "somatic and cognitive exhaustion that is caused by the intensive and inappropriate use of videoconferencing tools" (Riedl 2021).

As Hammersley and Atkinson (2019:3) point out, participant observation and informal conversations are the most valuable sources, but data can come from many other sources. For this reason, I have not restricted myself to observing the live interactions but also followed what was happening on other media used by these practitioners, including me. The authors also highlight that "unstructured" is a characteristic of the data collection act (ibid., p.3), and in the mixed scenario I found myself, the unstructured was even more prominent. I tried to put together the actions and interactions taking place in many different spaces while being an observer and an active participant.

Another relevant point in this project is the reflexivity aspect. As a designer pursuing to research other designers in their daily practices, I understood that I could not insulate my own experiences from the research, in an illusion that my values or background would not affect the observation (Hammersley & Atkinson 2019:16). One of the challenges was to remember to treat this familiar group as "anthropologically strange" (Hammersley & Atkinson 2019:9) and make explicit the things that I could take for granted. The same caution was necessary to apply to my company observations, as the environment was familiar to me because I have worked there for a couple of years. I tried to have an open-ended approach and an exploratory

orientation as much as I could (Hammersley & Atkinson 2019:3). In this study, one factor helped make the familiar strange, and that was the fact that accessibility was also a new subject to me. Another reflexivity aspect that cannot be ignored is my own identity as an immigrant and foreigner. Being a Brazilian citizen living in Sweden was relevant to defining my fields of research, both the Swedish company and the Brazilian interviews.

A third observation connects to the anthropology decolonization debate. Many scholars have searched for and developed other ways to enact anthropology more connected to the multiplicity of the world (Bejarano et al., 2019:3). Anthropology and other disciplines that operate in the world-building – design being one of these disciplines – might pursue the "permanent decolonization of thought", quoting Viveiros de Castro (Bejarano et al. 2019:3). Thinking about the decolonization of thought, I wanted to avoid the temptation of telling a history that is not mine, the experiences of people with disabilities. Bejarano et al. (2019:27) highlight that "science can do more than know the unknown – it also works to delegitimize other". If people with disabilities have been relegated to a position of invisibility, I did not want to reproduce this pattern and to avoid it, I decided to research from another perspective, from the perspective of people that may contribute to this invisibility.

Access and consent

Research within a company has several challenges. Initially, I needed to negotiate permission from management levels to carry out the research. The observation was performed with the permission of the company's administration. Considering ethical aspects and due to confidentiality requirements, the company's name and names of employees, projects, or services were anonymized and replaced by fictitious ones. Original images and documentation were replaced with illustrated pieces that could simulate the same elements I experienced. All interviewees consented that I present parts of our conversations in this study, observing the anonymity aspect.

After getting permission from the company's management, my process of finding participants within the company consisted of checking which teams had tasks regarding the accessibility project and asking who would allow me to participate in the team's routine. I found one team that accepted me to attend their meetings. The other designers were available for chats and interviews. From the beginning of the research to access the team, I could not ignore the role of gatekeepers (Hammersley & Atkinson 2019:51) in many of these situations. One could

believe that having permission from the company's management was enough, but every new level required a new approval. As Hammersley and Atkinson highlight, "gaining access to the necessary data is an ongoing practical achievement" (Hammersley & Atkinson 2019:44).

The research within the company consisted of participant observation, semi-structured interviews, and oral conversations. During the development of the research, the initial plan had some changes. Due to the corona pandemic and the limitations of in-person encounters, a substantial part of the participant observation and interviews were made online. The office where I work was open for only two weeks in December 2021.

If, on the one hand, technology could allow me to get in touch with people in different places, on the other hand, the distance makes participant observation harder, no doubt. There was a significant deprivation of the senses. For example, it was impossible to see everyone in a large meeting, observe people's expressions, or see their body language. Other senses were even more limited. People tend to follow meetings with muted microphones to reduce the audio information. There are no side conversations, nor smells, odours, or touch. This absence became even more evident with the short time I had in the office with other designers. More than the proper conversations, being there allowed me to get the contextual information, like intertwined conversations, the coffee break, and the change of subjects, all elements that bring new textures to the interactions.

Complementing the participant observations and interviews, I followed the discussions and conversations in the other digital platforms the team and the design practitioners used to support their workflow.

Not only the pandemic was an obstacle. Outside the company, I found out that my lack of network and professional relations in Sweden made the approach more challenging. I got some people's recommendations on a "snowball" approach, but the exchange of messages was generally slow. The end-of-the-year period was also a disadvantage. I could experience that as the days were passing by in December, people were busier trying to wrap up their projects and had less available time before the holidays.

I posted a message on LinkedIn, a professional social media website, to meet other professionals. I shared that I was looking for designers with accessibility experience or interest

in the subject. After this message, three participants contact me, willing to share their experiences. I found it hard to find participants in Sweden - my message on LinkedIn got only six interested people.

As finding informants in Sweden had some obstacles, it motivated me to expand the investigation to my Brazilian network. I met the participants using the same method I used for the Swedish designers, posting a message on LinkedIn. The engagement was much higher, and I had twenty-nine interested participants. From this amount, I conducted semi-structured interviews with 15 designers. All conversations were made through Google Meet video calls, and they lasted between 40 minutes to 1h30. Some conversations kept going through emails and WhatsApp messages where my interlocutors sent me links to websites and other materials and recommendations of other practitioners that I could interview.

Part II

Accessibility in the making

“This text is an assemblage in itself” (Ullberg & Skill 2017:72). I found in this sentence a very suitable description of this study. First, I could not avoid or deny that I feel like an assemblage. A Brazilian citizen living in Sweden, trying to combine different experiences from distinct areas like design and anthropology in a single academic project. Second, while researching the accessibility topic, it took me to different environments, from a company in Stockholm to various home offices in Sweden and Brazil. Everywhere I looked, I have seen assemblages in the way DeLanda describes: non-uniform parts fitting together in various ways, co-functioning in symbiosis (DeLanda 2016:11).

The identity of any assemblage is always the result of a process. It typically contains some level of precarity (DeLanda 2006:28) due to the attempts to change the degrees of territorialization and coding. In the following chapters, I will try to describe these attempts and, consequently, if and how the assemblage was affected.

First things first: let me introduce the Booking team

> Communities and organisations consist of more than just persons and their organic bodies. They are composed of heterogeneous material bodies, including tools and machines, food and water, buildings and furniture. (DeLanda 2016:62)

Before starting our journey, I will introduce the team I observed and summarize their formation - *their assemblage* - at the moment before the parameters start changing due to the intersection with the accessibility assemblage. During the study, I focused on following the Booking team, one of the company’s product teams, that was responsible for the meeting room booking system in the coworking space the company provided. They allowed me to attend their meetings for my participant observation, and I participated in the team's daily routine during the accessibility project. For two months, we went together through the accessibility discovery phase, tests and analysis stages, the stage of issues mapping, the fixing phase, and lastly, the final tests after fixings.

The company's product teams work in an Agile project management framework. In this context, a product team means a self-organized, multidisciplinary group of people assembled by heterogeneous professionals, like developers from different specialities like Apple/iOS and Android platforms, web developers, designers, quality analysts, and product managers, among others. According to the corporate division they are dedicated to, the team set may have some differences from one to another, and they are responsible for specific segments of the company's service. For example, one team is responsible for the user's information area, known as the "Profile". Another team is responsible for the "Customer Support" section. The Booking team was responsible for developing and maintaining a service that manages the meeting room booking system. The service allowed users to select a room, choose the day and time, choose some extra services like a coffee break, and pay for it.

In a simplified description, the teamwork process usually starts with one of the team members identifying an opportunity in the service, such as features the users are missing or an issue to fix. The team analyses if the project or task is worth working on, meaning if it will benefit both the company and its clients, bringing a good financial return to the business. If the answer is yes, the team proceeds with the work, defining the necessary tasks and steps. Usually, at this moment, the designer starts their work by elaborating visual options for the system, like the website or the mobile apps. The primary goal of these visual artefacts is to guide developers on how the systems need to appear for the end-users to make them visually appealing, with suitable interactions and good usability for the intended audience. Once the design is ready, this material is handed over to developers that will integrate the visual artefacts into the systems. The workflow continues with quality assurance tests to check if the system is working as planned. Once everything is tested, the system is ready to be delivered to the end-user.

The Booking team shared a clear, familiar territory with its team members. Their domain, goals, tasks, and codes were very homogeneous (DeLanda 2016:13) in terms of ways of working and understanding what needed to be done. Meg was the designer there, and besides her, the team was composed of Martyn, the Android developer; Robert, the iOS developer; John, the web developer; Charlotte, the quality assurance analyst; and Paul, the product manager. The team was also composed of three back-end developers, but they had not participated in the accessibility project. The multidisciplinary team allowed a common symbiosis between its members, letting each practitioner become something else (DeLanda 2005:101) by associating themselves with a heterogeneous element - the other team members. This way, for example, a

designer may be able to build a website through interaction with the web developer, and an app developer or a product manager may be able to design new interfaces through interaction with the designer.

Besides the multidisciplinary team concept, one of the principles of the Agile framework regards communication. According to the Agile manifesto, "the most efficient and effective method of conveying information to and within a development team is face-to-face conversation"[11]. Individuals and interactions should come above processes and tools. Based on this principle, the team was used to having regular meetings of all sorts in the office. As it is possible to observe in the following chapters, meetings were a fundamental part of the workflow. With the beginning of the pandemic and the remote work, the routine of meetings was carried over to digital platforms. In this transposition, the video call software gained a central position, intermediating the professionals' interactions.

Not only the work meetings needed to find a way into the digital tools. A regular workday in the office combines a series of other activities. Spontaneous meetings around each other's monitor to review a task; stopping by someone's desk to ask a question; asking for a quick talk with other team members to discuss a topic; grabbing a cup of coffee with peers; inviting people for lunch. All these interactions were somehow reproduced in the new setup, some more successfully, others not that much.

Also, even in an in-person setup, many other digital platforms were fundamental for the teams and company's work. The company communication was already permeated with conversations through different software. With the imposition of remote work, the use of these tools was intensified. Through my account, other software such as Figma, Slack, and Jira will show up and have essential roles in the company's workflow, and therefore I will introduce them during the following chapters.

[11] https://agilemanifesto.org/principles.html

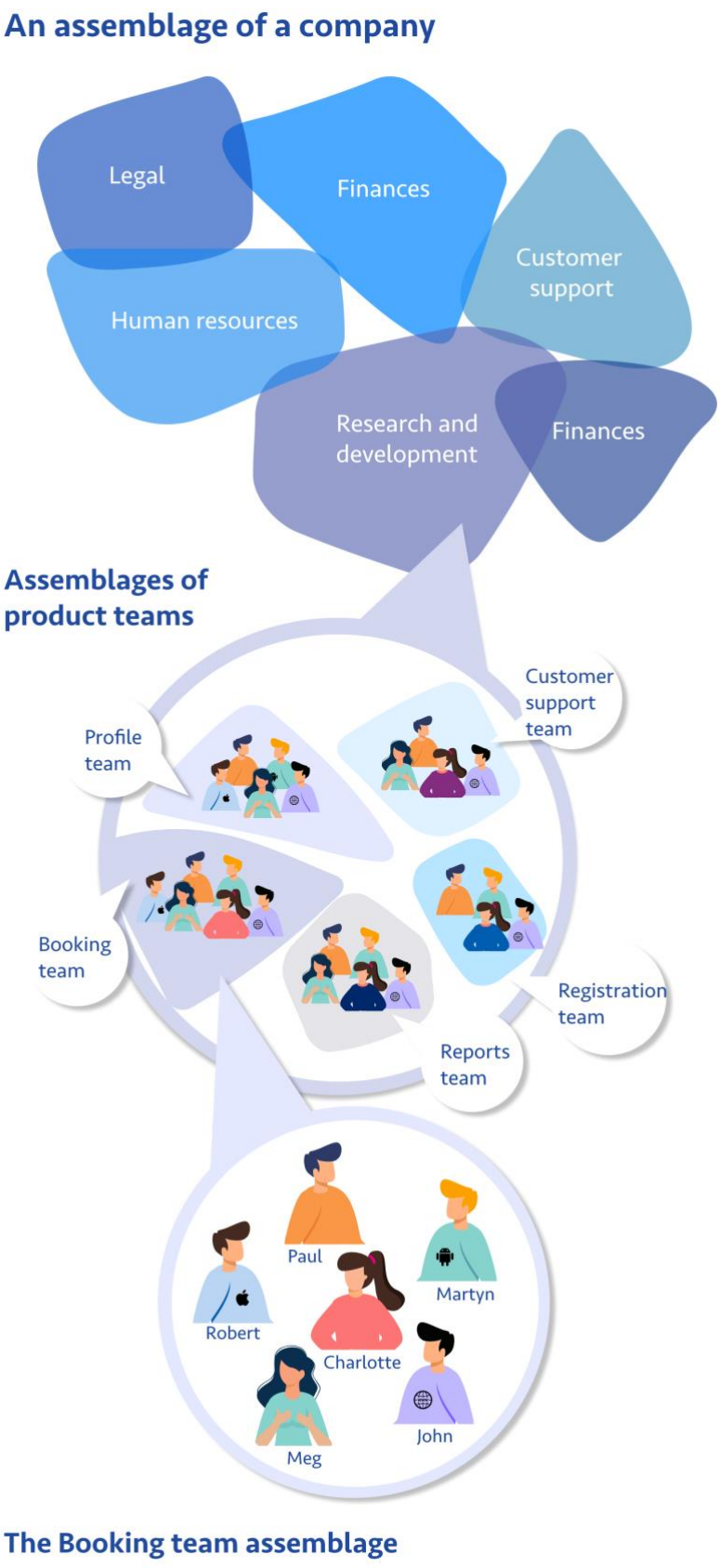

Figure 1- Nested assemblages in a company

Chapter 1 – Assemblage meets assemblage

The first contact with accessibility

The digital accessibility project took shape slowly during the year 2021. Around February 2021, a consultancy agency specialized in the topic was in charge of assessing the accessibility status of the whole company's digital platforms. For this task, the designers' collaboration was required. We needed to point out the most relevant web pages and views on the website and the mobile applications, the "apps". The designers, me included, had many questions since we had little knowledge about the accessibility subject in general. From the questions and comments raised by the designers, it was possible to perceive that some of us were slightly lost about what was relevant to highlight, but we tried to point out what we considered the most critical interfaces and flows in the apps.

The consultancy work resulted in a spreadsheet listing the views and webpages and their condition - if they were accessible or presented any issue. The assessment was organized by platform, like iOS (iPhone), Android mobile phones, and websites. Some points were easier to understand by someone unfamiliar with accessibility, like those that described texts and feedback messages. One of the listed items, for example, mentioned one interface button and that it only showed a "share" image and with no adequate text with it. This button was missing a descriptor text that could be read by a screen reader, an assistive technology used by visually impaired people. In this case, the item was described in the spreadsheet as:

> Share icon is announced as "Shareicon" *[by the screen reader]* instead of just "Share". This is true for many of the icons in the app, make sure that all icons have an accessible name.

In another case, in a web form where information like the telephone number was mandatory, the form did not show any error message if the user tried to submit it without entering the information. In this case, the user would get stuck in that webpage without knowing the problem that was blocking them from continuing:

> There is no identified error message that gives the user any specific explanations on how to rectify an error that is made.

However, the comments and recommendations on many other topics were harder to grasp. Some items mentioned used jargon or definitions and concepts unfamiliar to those that have not studied accessibility before. Some of the issues pointed out and the comments they received:

The “Search” placeholder, which serves as the only visible description of the search field, fails the contrast ratio minimum requirements, the current contrast ratio is 4:1 while the requirement for non-large text is 4.5:1.

Our question: *What does a ratio of 4:1 mean?*

* * *

The orange icon containing numbers fails WCAG minimum contrast requirements.

Our question: *And what was the minimum contrast?*

* * *

Lack of aria attributes on modal windows like in the add columns under products.

Lack of aria-live on elements that dynamically change.

Our question: *Aria attributes? Area label?*

Each defect was related to a specific requirement listed in the international accessibility guidelines versions EN 301 549, WCAG versions 2.0 and 2.1. For example, one of the defects pointed out that the website was not entirely legible and usable when the font size was increased by 200%. It means it failed at criteria 9.2.13 from EN 301 549, 1.4.4 (AA) and 1.4.8 (AAA) from WCAG 2.0 and WCAG 2.1. On the first sign, all these letters and numbers meant nothing, and they looked more like some encrypted language. Without previous knowledge of the subject, the result was an overwhelming list without much guidance on where to start.

The first contact with accessibility provoked an initial attempt to shake a well-establish, homogeneous territory by introducing new material and expressive components (DeLanda 2016:61). Although it is expected that a tech company would be open to the new and innovation, it is not possible to deny that there was a tension to maintain its normalization and self-replication. The homogeneity and fixity of a territory, maintained by the same habits, may supposedly ensure a certain level of productivity. Habit, as previously mentioned, is the main form of territorialization and is responsible for keeping boundaries over time (DeLanda 2016:36). DeLanda quotes Deleuze by mentioning that habit is a “synthesis of the present and the past in view of a possible future” (ibid., p.36), so to produce a diverse future, different from the one we were producing at the moment, it was necessary to change habits. By trying to add new material and expressive component parts to this territory, a change of parameters was pushed, and the familiar territory started feeling unfamiliar. DeLanda mentions the homogenization that makes behaviours predictable (2016:86). As an established assemblage,

the company felt stable and safe until then, and this first episode was perceived with a share of mistrust.

The assemblage of accessibility imposed new component parts and brought expressive entities to the company-assemblage, which was unprepared to receive or deal with it. The accessibility language was built in another environment, on another assemblage, and when we in the teams tried to appropriate this repertoire, we had obstacles in understanding it. We perceived a lack of affordance in relation to accessibility tools, guidelines, and frameworks. Affordances operate under some conditions of perception, dexterity, and cultural and institutional legitimacy (Davis 2020:88), and in this case, the assemblages of teams missed these conditions. We did not have the necessary dexterity or capacity to enact the possibilities of the report. We lacked an understanding of accessibility rules and codes to consume the report in its entirety. Although the accessibility report had valuable information available to its employees, the report's affordance was perceived as discouraging, thanks to its unfamiliar terms and jargon. If affordances are what exist between features and outcomes (Davis 2020:6) and shape the flow of actions, this first exposure makes it clear the lack of some of these conditions and how it did not promote further relevant actions. Instead, it discouraged people's engagement in the topic.

Not much else was done after the audit, as the primary purpose was to investigate the accessibility status of the digital platforms and provide a general assessment. The project continued taking shape until around June 2021. At that point, a deadline for Quarter 3 of 2021 was set for all teams. We were demanded to continue investigating the websites and the apps on iOS and Android devices and fix the issues found. As described previously, the deadline caused some reactions, considering other priorities and the available time to fulfil the project. Later, the deadline was changed to the end of Quarter 4 of 2021 (end of December), after some protests and the conclusion that the initial deadline was too tight.

The design introduction meeting

After summer vacation, the accessibility project had an official kick-off, and the teams started the work. Several sessions, called introduction meetings, were scheduled to present the subject to the various practitioners within the company. There were specific meetings for iOS and Android developers, product managers, web developers, quality assurance analysts, and designers. Each session sought to address the accessibility specifics for each technical domain.

The design introduction meeting took place at the end of September and marked the official beginning of my fieldwork, participating in the daily routine of the Booking team.

The introduction meetings still found some reluctance among the employees, although, after the first contact with accessibility through the consultant agency work, the company-assemblage felt slightly more prepared. This first contact increased the conditions for affordance of the accessibility repertoire. It expanded the conditions of cultural and institutional legitimacy, familiarising practitioners with the accessibility's cultural and institutional codes, values, and rules.

The design introduction meeting was attended not only by designers but also by several other people, such as product managers, researchers, and content writers. Around seventy people were in the video conference on Microsoft Teams, and for one hour, people in silence were trying to understand and absorb as much content as possible. It was possible to hear a slight nervousness in the voice of Ryan, the person presenting the slides. There was a palpable burden of responsibility. The presentation was the first "official" one to address the subject of accessibility for a large group of designers, knowing that many felt uneasy about the project. There was a concern about convincing everyone that prioritising the project was the correct action. Would one hour be enough to sensitise everyone? Should a one-hour meeting be enough to continue changing the parameters?

The presentation had three main parts. The first one touched on conceptual topics such as why we should pay attention to accessibility, the company's and business' reasons for prioritising the issue, and ethical and legal matters. The second part was focused on accessibility guidelines, and the third part addressed accessibility tools and software.

After presenting some accessibility concepts during the first part, Ryan described how our journey would be for the following months. We would start with the feeling that the building was on fire, with many accessibility issues on our platforms. We would begin to feel overwhelmed, not knowing where to start. And then we would start digging deeper, reading lots of things on the Internet, looking for more information, and we would be feeling even more overwhelmed. Nevertheless, when we began to make a little bit of progress, we would start feeling a little better, and at the end of this journey, we would be OK, and we would feel much more confident about our work. Ryan reinforced that we would not be alone along the journey

because a group of people that were enthusiastic and passionate about accessibility would be there to support everyone. The short story Ryan presented was a perfect description of a process where the degree of territorialisation was changing, provoking a phase of deterritorialisation, when familiar component parts are mixed or exchanged for new ones, causing discomfort among the assemblage's members. In this process, new component parts would be introduced, unsettling the degree of conformity until they were incorporated into a new homogeneous repertoire (DeLanda 2016:31).

The participants seemed most interested in the practical and technical information presented in the second and third parts. The accessibility team showed what it meant to have an accessible interface. Attendants wanted to understand as much as possible what constituted an accessible design. What font sizes to use? What does a font at 200% size mean? What would mean colours with good contrast? What does good keyboard or screen reader navigation mean? Questions were raised about layout, visual design, and interaction patterns. What would mean appropriate affordances for people with disabilities? How should our digital services conduct these interactions? Recalling Davis, this was a moment when we started reflecting on how our technology had been produced because until then, it was mainly reifying and replicating the power structures of those who are producing the technology. Subverting these structures, thus, requires our attention to how it operates (Davis 2020:98).

The speakers demonstrated some tools that could assist us, design practitioners, produce and testing accessible layouts. These tools provoked a lot of curiosity and questions. Some of these tools were plugins or small programs that could be installed in the design software. Now it is necessary to pause and explain the design toolkit. I mentioned that designers, in a team, are responsible for providing the systems' visual artefacts, and for that, practitioners use design software. In the researched company, they used a software called Figma. The design software, combined with these plugins, lets practitioners expand their possibilities. According to the definition found on Figma's website, "plugins are programs or applications created by the community that extends the functionality of Figma. […] They allow users to customise their experience or create more efficient workflows"[12]. Besides the visual layouts, the plugins allow practitioners to test their designs according to accessibility requirements. For example, designers may test the contrast between two colours, like the font's colour and the background's

[12] https://www.figma.com/plugin-docs/intro/

colour, to guarantee a good level of legibility. Or how the layout will adapt if the user increases the font size. Also, with the assistance of plugins, practitioners may include proper documentation to guide developers on how to build the interface. This documentation may comprise the reading order of the page elements, like if the screen reader software should start from the page title and after go to the subtitle. The whole team has access to the design work, and Figma offers resources for interaction between the team members, allowing them to leave comments and questions in the layouts for the designers.

The accessibility plugins shown in the presentation were Stark, A11y Focus Orderer, and Text Resizer Accessibility Checker. Stark was a plugin that checks the contrast between two different colours, how people with varying types of colour blindness perceive the layouts and assists in creating the reading order documentation that defines the sequence that the screen reader needs to read the page's elements. The A11y Focus Orderer provides a similar reading order documentation, and the Text Resizer plugin simulates when a user increases the font size of the app or website. In summary, the plugins would help test the colour contrast, map the reading order of the elements, document labels and texts to be read by screen readers, and try layouts on different font sizes.

The plugins raised questions immediately:

> Maria: - Oh, could you explain better about the A11y plugin? I didn't understand if it was for the developers or for us… Please, could you explain it?
>
> Sofia: - I think it can be used for both. It can be different from team to team. It depends on how you work with your developers. In my area, we work closely together, so we are using and building the specifications together.

* * *

> Anne: - Uhm, I was wondering about that plugin. If you play with the prototype, if it goes in that as well? Can you prototype the keyboard navigation?
>
> Simon: - You mean, the focus order one?
>
> Anne: - Yes, the focus one, sorry.
>
> Simon: - Good question; I'm not sure how it works in a prototype scenario.

Some questions touched on how deep they were willing to embrace the changes. Should incorporating this new coding, understood as new expressive component parts, be enough? Or

even more, would it be possible to incorporate these new component parts without causing significant changes in the assemblages of teams and the company? According to DeLanda, coding is one of the fundamental parameters of the assemblage, and changing it would consequently change the assemblage (DeLanda 2016:31).

> Ryan: - Just a quick answer to you, Adam, before jumping to Kristina. I think the way you described is really good. We can look at it as two things, one is becoming compliant, just making sure things are working. But thinking beyond compliant, how we can basically build everything from scratch with accessibility in mind? How can we improve the date picker for example from the beginning when we start designing?

* * *

> Kristina: - I have a question regarding coordination and making things consistent. How do we learn from each other, and make things accessible in the same way, and make sure we are not going in different directions? Or how we make sure we are not making different interpretations of the guidelines, that, I guess, what you need to do all the time. How can we share that in some way? On Slack? Like, I made this decision, and try to do it in the same way. So, that's, maybe, more a reflection to share.

After showing some tools, Ryan made a live demo using the screen reader to read the mobile app interface.

> Screen reader reading the app menu: - "Your profile" button…, "Services" button…, "Community" button… "John Smith Clothes manage@johnsmith.com"

> Ryan: - You can notice that the user gets trapped in the main menu because the VoiceOver [the screen reader] gets stuck here in the title, with no close button… It doesn't say if it's a button or what's the purpose of it.

The questions kept popping up, intercalated with the common incidents of an online meeting:

> Ryan: - Let's hear the voice navigation in action….

> One participant: -We can't hear the sound, Ryan…

> Another participant: - We can't hear anything…

> Ryan: Ops, let's try again…

* * *

> Elisabeth: - Let me share my screen. Ohhh no, they want to update my laptop.

The presenters tried to cover the most diverse points during the meeting, but it was hard to know how many more questions would arise. After the meeting, everyone received the mission to

assess their domains in the apps and websites and map the flaws. Although it could sound as simple as that, the task concealed many layers of learning, and a one-hour meeting was not sufficient to cover all aspects. The real questions began after we started digging into the tests and requirements.

Meanwhile, on Slack's #accessibility-channel…

The conversations were not restricted to virtual meetings. A channel dedicated to accessibility was created on Slack, and soon it was filled with questions. The introduction meeting presented some topics the designers needed to be aware of, but it was just an introduction, as the name said. Much more needed to be learned in practice, as Meg and I could experience during the tests later.

Slack is an asynchronous message tool, popular in many companies, and in the company I researched, it was no different. The software makes it possible to create channels for all topics like specific projects, and different technical domains like design, Android, iOS, etc. Each product team also had its channel, where they could discuss their projects and tasks. Slack also allows people to create private conversations with limited groups of people. The company's employees use Slack to ask questions regarding projects, ask for advice, share information, make decisions together, and even have a relaxing moment together. The team that I followed had a “social life” channel where they shared recipes, pictures of dishes they cooked, pictures of pets, hobbies, trips, memes, and jokes.

The first month after the introduction meeting, the #accessibility-channel received five to ten new questions every day, and each one could receive many answers. Some received five answers, others fifteen, and the question with the most significant number of replies received sixty-five comments. The guidelines and recommendations were not always self-explanatory. They left room for interpretation, so it was typical that many participants tried to help with their explanation of the accessibility instructions. “Of course, following the WCAG AA guidelines is not always black and white”, acknowledged one of the accessibility team members.

One of the unintended consequences of many questions that unfolded into many more answers was that it was difficult to browse all the previous messages and navigating through the channel was complex and confusing. It was common to find questions starting with some apologies like

“Sorry if this topic has already been brought up”, “I’m sorry if this question is raised before”, “Hej, this was probably already asked”.

The first explorations brought many questions about the plugins and tools to test different types of disabilities and how to browse the apps ad websites simulating the use of other senses than eyesight. When trying the Figma plugins, the main discussions were about how they were supposed to work and what type of tests designers would be able to do with them. Some problems were also reported. One of the designers prepared the whole order reading documentation using the A11y Focus Order, and it was lost due to some plugin problem. The person wrote, “Anyone else having issues with the A11y Figma plugin? It’s being super buggy for me. Whenever I open the plugin, it rearranges the annotation artboards”.

However, not only technical questions could be found in the channel. Some others tried to explore aspects regarding the use of the services by people with disabilities. Do they use it in different ways? Which ways? Do they need more information than what we are showing? Are we doing what is best for them? These were some of the discussions that participants raised in the channel.

All these questions and uncertainty reflected reactions to the new component parts that the assemblage of accessibility was bringing. The introduction of new expressive entities, rituals, processes, and habits caused a decrease in the familiar coding and territory. The homogeneous repertoire was shaken. The accessibility assemblage brings the existence of people with disabilities to the centre of the company’s territory, an existence that was partially ignored before. The changes in parameters provoked apprehension among the assemblage members, but it was part of the imperative process that gives space for “greater acceptance of difference” (DeLanda 2016:39). The disruption process was fundamental to accepting the new frameworks and, more importantly, accepting user conditions’ diversity.

If the messages reflected the questions and thoughts, emojis were responsible for showing people’s feelings. Some popular emojis were the “mild-panic”, the sad one, and the grinning face intended to depict nerves or discomfort. However, there was also space for demonstrations of gratitude and collaboration. Emojis of joy and “following the thread” (the “eyes” one) going along with requests for help. Furthermore, emojis of gratitude and “raising hands” thanking others for the received responses.

Figure 2 - Most used emojis. Negative emotions: mild panic, grinning face, disappointed face; positive emotions: slightly smiling face, raising hands, folded hands, eyes (following topic)

Convincing people: the first real task

When the accessibility project started at the company, I started reflecting on why the reactions occurred. Of course, as mentioned previously, there were deadlines and other priorities. Fundamentally, accessibility has not been considered a relevant aspect of our projects previously, and it should be part of our regular practice. Furthermore, why was this happening? As the review of anthropologic literature showed, accessibility is a subject that can easily be ignored. Individuals with disabilities are commonly invisible by being excluded from different environments such as companies, universities, schools, and others. Their needs are easily forgotten because they are not present, and many artefacts we produce may contribute to this invisibility. Davis relates to the anthropological studies, reminding us that infrastructures have been constructed with a presumed human model in mind, one that walks, sees, and hears (2020:94). The author adds that these assumptions have resulted in a "disabling social structured" for the bodies not in line with this concept (ibid., p.94). The making of accessibility starts with understanding the diversity outside the dominant territory that produces the technology.

In my conversations, I found out that talking about accessibility was a usual stage in this knowledge process. In one of my interviews, Helena, a designer that has worked on an e-commerce website, reported that they tried to start with the practical tasks, skipping steps like awareness, sensibility to the topic, and cultural mindsets. The receptivity to the subject was not good:

> My team *[the accessibility one]* was created to comply with the Public Ministry requirements. The starting plan was to make the whole user journey and adjust the flaws we could find. But the company is big, with many teams working on something new every day. So we noticed we were doing pointless work. Every day we had something new on the website that removed the accessibility work we had done, and the website accessibility rating was dropping. So we decided to start working with an accessibility culture. As designers, we have done training and lectures. Same for the developers, for QA. We started doing it because we noticed that this work could help us make our work easier and more productive.

In similar ways, designers working in different companies try to find ways of bringing awareness to accessibility. The most common strategies include promoting workshops and training sessions to explore relevant aspects of accessibility, such as the main aspects and benefits of providing accessibility resources and features. As part of these workshops, Rafael looked for people with disabilities in the company he has worked:

> I searched within the company to also find people with disabilities. I managed to find four people. Three deaf and one person with low vision. We created a channel on Slack to chat, to talk about experiences, and it was really cool. They were also very happy, they said "I am very happy to know that I am not alone". And then I brought them to this presentation, and we had some time for them to talk, they talk about their experiences. One of them, a deaf woman, she gave a very touching account. She has been deaf for a short time, she has had a gradual history of losing hearing and then it is still a very recent issue for her. She gave such a touching account, and everyone was kind of affected. It was so nice.

The strategy of bringing people with disabilities to the conversations attempts to weaken closely-knit parameters of territorialisation and coding. One of an assemblage's homogeneity characteristics is the density of its connections, the "degree to which everyone knows everyone else" (DeLanda 2016:20). Bringing a component part from the accessibility-assemblage is an effort to weaken this density and provoke changes in the parameters.

The demand for improving accessibility may arise differently for the companies, but the most common is due to legal requirements. It was how the topic arose in the company I researched, but it happened in other companies as well, as others reported. Rafael mentioned that the Brazilian organisation that regulates bank services, the Central Bank, communicated that their services had accessibility issues. Motivated by it, Rafael said his manager asked him what they could do about it. It was the starting point for him to research it and elaborate a strategy to engage other professionals.

Although there are laws and legislations about accessibility in many countries, like Sweden and Brazil, the truth is that the government control is not very rigorous up to this time, which means that fines are not very common yet. It creates a scenario where some companies understand the need for accessibility, and some are starting to treat the subject as a pertinent cause, but there is still considerable resistance. As Rafael and Helena mentioned, changing the vision of accessibility means a cultural shift.

Helena mentioned that "it is common that people see accessibility as something not profitable" and forget about the population with all types and degrees of disability. In many conversations,

the importance of accessibility for business is highlighted. Some designers, such as Fabiana, mentioned that they do not want to work on this for "pity" but because people with disabilities are consumers, clients, and users. They also want to buy products and services. The business approach is often necessary to convince other peers in the company to prioritise the topic. These conflicts between organisational areas are an example that a company is still an assemblage of assemblages, and although these heterogeneous parts usually work in some level of symbiosis, there is still some friction. Marcela highlighted:

> I think it is perhaps the way accessibility is sold, we have to connect it better to the business goals. I make this parallel a lot, the designers, we have to constantly sell ourselves, connecting to the business goals. We have a lot of this attitude, "ah, let's do this because the user needs it" but why, what is the business motivator? Because I think we always have to be connected with a business goal, I think we need to help people to connect accessibility to the business goal so we can get sponsorship for this task.

DeLanda points out that the material bodies, people and their tools, that compose an assemblage "are linked by the enforceable social commitments created by the enunciation of speech acts" (2020:62). The material bodies that compose the business area are linked by common social commitments manifested by the speech acts of return on investment, key performer indicator, cost of investments, capital, and costs. More than words, these concepts drive how a business-assemblage usually operates. When designers speak the language of "business", the tension between these different assemblages can be mitigated, and design practitioners can build a more homogeneous repertoire, composing alliances with business agents to prioritise accessibility in their projects instead of creating opposition. That is why we, as designers, seek to share the same business' "expressive components" (DeLanda 2006:57).

Also, when speaking about business, it is a commonplace to question if the companies have any consumers or clients with disabilities. In the researched company, the question was also raised by some, "How many users do we have with disabilities?" In the Slack accessibility channel, one person asked if there was a way to measure the use of accessibility settings, as the teams spent months implementing them. Meg, the designer I followed for some weeks, observed, "how are people supposed to use the websites if they find obstacles to using them?" Although the business perspective provokes a degree of discomfort for some practitioners, it is one of the arguments for convincing others about the importance of accessibility. Carla mentioned:

> Things we hear daily: "ah, but no one has ever complained about it, no client has ever complained about it to us" *[the lack of accessibility]*, "our user base with some type of disability must be tiny", "ah, so, no, the customer who buys it is not the person with limitations", "imagine that if a person with a disability will do

> this activity", and then it seems that the mindset of whoever is running the project, it seems that it is a bit binary in a sense, either you have a high-level disability, or you don't.

In different ways, the design practitioners are trying to expand the general awareness about accessibility, that their products and services reach people with different characteristics and needs. Marília, a software engineer that works very closely with the user interface designers, recalls that on a Brazilian commemorative date, Grandmother's Day, she produced an illustration with screenshots of the company's app. The goal was to show how different generations were using the app and how inadequate it looked for users who needed larger fonts to facilitate the reading. It was an attempt to show that, even though they were celebrating the date, their product was not shaped for the needs of that specific audience. Many times, the understanding of accessibility begins with talking about accessibility. However, who is willing to talk about it?

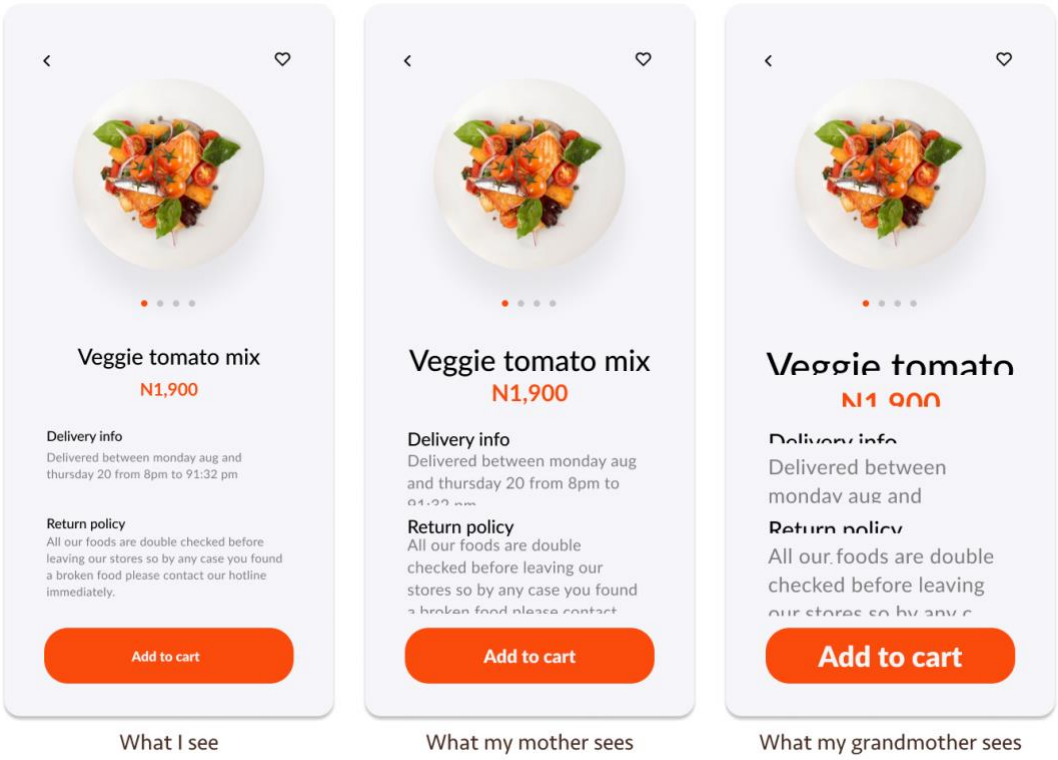

Figure 3 - The illustration Marília produced, showing different audiences' use

Conclusion

In this chapter, I aimed to describe the situation where the teams, as assemblages, and mainly the Booking team, found themselves right before starting the contact with the accessibility-assemblage. In this initial moment, the company had a structure composed of heterogeneous parts that were habituated to function in homogeneous ways. They had their processes in place,

with their related habits, rituals, and events. They produced the objects with affordances that matched their specific conditions of dexterity, perception, and cultural and institutional legitimacy. The produced affordances provided appropriate means of request, demand, discourage, encourage, refuse, and allow for non-disabled people. However, they fail to provide corresponding affordances for people with disabilities.

Some new environmental factors like the laws and fines started to affect the company and the team assemblages, affecting the company's parameters. With the introduction of the accessibility repertoire, with its tools, guidelines, procedures, and best practices, the organisational assemblages started a period of instability that brought feelings of uncertainty and uneasiness to workers within the assemblages. Although the first contact with the accessibility repertoire brought disturbance to the organisational assemblages, the latter was forced to adjust and adapt as the environmental factors could not be avoided or discarded.

One of the unexpected things is that the accessibility frameworks came with a lack of affordance for the company's employees. They also needed to overcome a lack of conditions, mainly cultural and institutional legitimacy, to be fully prepared to handle these new component parts. Many conversations were promoted to overcome these feelings and start to familiarise themselves with the new parameter's setup. It was necessary to turn the unfamiliar familiar.

Chapter 2 – Parameters on the move

Incorporating a new language

By introducing the accessibility repertoire, some changes started to operate in the company-assemblage. The coding parameter started to be affected by introducing the language of accessibility. New words, terms, and names had to be learned. DeLanda highlights that "language shapes the most intimate beliefs of persons, the public content of conversations, the oral traditions of small communities, and the written constitutions of large organisations and entire governments" (2006:45). The practitioners were in the process of getting to know a new assemblage through a new language and incorporating these new elements, more than just learning new software or standards.

Starting the journey into the digital accessibility world means that some new tools, resources, and concepts have become part of the designers' lives. Ironically, while the company's digital products lacked the proper levels of accessibility and consequently did not offer adequate affordances for people with disabilities' interactions, a similar scenario could be found in the accessibility tools and resources from the designers' perspectives. Some design practitioners found themselves without the proper dexterity to understand and use the accessibility frameworks. Davis defines *dexterity* as "the capacity of a subject to enact the functions of an object" (2020:93), and these capacities may be physical or cognitive. Putting it simply, as I witnessed in my own experience and with other designers, we needed to learn how to use the accessibility framework. Our initial attempts were full of frustration and unknowns. It was necessary to improve our dexterity conditions to increase the capacity to produce technology with proper levels of accessibility.

As we began to understand the need to project for other forms of use and navigation, more than the visual screens, the assistive tools became present during the daily practice. Assistive tools can be both hardware and software, and they allow people to use electronic devices in different ways. Keyboards and mouse, for example, are maybe the most common and popular assistive technologies, but others are also utilised, like the screen readers. Screen readers are software that read all elements on the screen. They can describe components like buttons, text fields, links, and images and read all the textual elements on a page. The most popular ones for mobile phones are Apple's VoiceOver and Android's TalkBack. For desktop computers, there are many others like NVDA and JAWS.

Accessibility test tools come in a wide variety of types. They can exist in different forms, as plugins that can be installed as extensions to web browsers like Chrome and Firefox, or plugins that one can install in other software, like Figma, as described previously. The browsers' plugins allow testing the pages and check different aspects like colour contrast, the layout appearance for colour blindness people, and if structural HTML elements are correctly structured from an accessibility perspective. One of the most popular plugins is WAVE[13], a web accessibility evaluation tool offered by the WebAIM, an organisation maintained by the Institute for Disability Research, Policy, and Practice, at the Utah State University.

Another fundamental resource is the guidelines that describe how the systems should operate and interact with assistive technologies. The primary guideline is the Web Content Accessibility Guidelines, mainly known as the WCAG, which is currently in its 2.2 version. It is provided by the World Wide Web Consortium (W3C), an international community whose goal is to develop "open standards to ensure the continuous growth of the Internet"[14]. Another reference is the Harmonised European Standard (EN) number 301 549, provided by the European Telecommunications Standards Institute (ETSI)[15]. The guideline has the WCAG as the foundation, with some specific adaptations to the European scenario.

WCAG, the primary reference, specifies the levels of accessibility. They are A, AA (called by practitioners double-A), and AAA (triple-A). Level A means the minimum conformance level to accessibility requirements, AA is the satisfactory level, and AAA is the highest conformance level. The accessibility test tools help practitioners identify at which level their websites and app elements are. By using the test tools, a person can check, e.g., if a contrast colour between the font and the background is A (poor), AA (good), or AAA (excellent). In general, laws and regulations demand that websites and apps reach an AA level in their elements to be accepted by legal requirements.

Why were all these tools and guidelines necessary? The company, a homogeneous environment formed by component parts that resemble each other, was used to doing things in a certain way - their habits. The company's habit was to produce objects with affordances that reflected the

[13] https://wave.webaim.org/
[14] https://www.w3.org/
[15] https://www.etsi.org/deliver/etsi_en/301500_301599/301549/02.01.02_60/en_301549v020102p.pdf

team members' dexterity and perception. When reflecting on teams' dexterity, the objects suited our physical and cognitive capacities but ignored capacities diverse from ours. By reflecting teams' perceptions, the technological objects were perceived as easy to use for people with the ability to see but lacked affordance for people that needed other resources. How a blind person, for example, would perceive a digital object that misses the audio descriptions? With the accessibility requisites, the teams were demanded to produce for different conditions, and the assistive devices and technologies would help to reproduce characteristics from an unfamiliar assemblage.

In the process of the company-assemblage getting in touch with the accessibility-assemblage, many factors were affecting the company's parameters by introducing new vocabulary, new repertoire, and new processes. However, one element was still missing: the human being. All the introduced tools, in fact, end up trying to make up for the absence of people with disabilities within the work teams, which makes me question the actual changes in terms of cultural legitimacy.

Accessibility? What is this thing?

Over the next two weeks after the introduction meeting, the teams, including the Booking team where Meg worked, found themselves in various meetings to understand what and how things should be done. The first meeting between Meg and Paul, the team's product manager, had a very suggestive title, "accessibility?" It sounded like someone asking, "what is this thing?" The question mark seemed to be a constant wherever you looked.

Following that meeting, there were four other meetings that Meg's team was involved in, which purpose was trying to understand where the work should start. The first two meetings were focused on organization tools. One of them was for the whole department, where the accessibility team tried to explain how tasks should be organized in the Jira project management tool. Jira is a management software where teams create and organize all tasks they need to work on to execute a project. Each task is transformed into a "ticket" on Jira and receives a title, a description, who is responsible for it, and the complementary information. Besides the tasks' description, it is also common to find messages between the team members on the tickets, like short dialogues. If the responsible person for that ticket has any questions, he or she adds these questions on the ticket, naming ("tagging") who can help. After creating the tickets, the teams manage the progress of the tasks according to their status. The tasks' status follows a workflow

stage like “to-do”, “in progress”, “in review”, or “test”, and finally, a list of the finished tasks. The second meeting was only with Meg and her teammates, the Booking team. They tried to organize their tasks after the general recommendations. Even with all the conversations, there was still a distressing feeling of not knowing what needed to be done. After these two initial meetings, the team had two other meetings to organize the initial discovery phase. One meeting was called “pre-planning” and the other “planning”.

During these two weeks, in addition to the team's meetings, I follow Meg in her first explorations with the assistive tools. On our first day, we decided to focus on testing the computer's tools. Our first test experiment was with the VoiceOver, the assistive tool on the Mac computer. In an attempt to understand how to navigate and use the computer with the screen reader, we decided to check the tutorial offered by the system. However, the feeling of frustration was overwhelming because we were unsure how to use it. The instructions were not very comprehensible for us, and although our different attempts, we found ourselves stuck without knowing how to continue in the navigation. After spending about 30 minutes trying to navigate with the assistance of VoiceOver and looking at YouTube for some simplified instructions, we gave up. We decided to move forward and try the other recommended tools.

The following tool was more straightforward than the previous one. We installed the “Web Disability Simulator” extension, a tool for testing colour contrasts, on the Chrome web browser. It allowed us to simulate different types of colour blindness or visual impairments, limitations on mobility like Parkinson's, dyslexia, small vocabulary, and concentration difficulties. Once the extension was installed, we could apply the simulations on the website, browsing and testing the variations. This time, at least, there was a sense of progress. We tested the website in all simulations and did not find issues. The third tool was the Wave extension, which also points out accessibility problems on the websites, such as the absence of labels and contrast problems. Wave also identified issues in the HTML code, and we were unsure what they meant. We decided to review the Wave's results with John, the web developer.

Our initial impression from this first test day was that we needed to look for something, but we were uncertain what we were trying to find out. Our first try left us feeling a little discouraged and feeling that it was not productive, as we spent about 2 hours trying to use the tools and understand what we were doing. Meg verbalized: “I am not sure what I am doing here, where I should look at. I cannot use it properly *[the screen reader]*”.

The next day we decided to try the mobile phones' assistive tools. The first attempt was with the screen reader VoiceOver on an iPhone. Our experience was, again, somehow frustrating. We turned on the screen reader, but we were unsure how to navigate it. OK, reader activated, now what? Uhm, there are some instructions on gestures and how we interact with the interface by touching the screen, in combination with the screen reader. There are some types of gestures like swiping one or two fingers to the top of the screen, double tap on the screen, flicking fingers up or down, left or right, etc. Without knowing for sure, we tried to navigate using the gestures for some minutes without much success. We decided to try the assistive tool on the Android phone. Gesture instructions felt clearer on Android. Oops! Two fingers this way, and the screen reader reads an item aloud. Again, the same gesture, and we went to the next item. We had the feeling of some progress, finally. The gestures seemed clearer and encouraging, and we navigated through the app. Testing the font with a larger size seemed straightforward too. Our question was about the size we should test. Was it 200% really? Was it the same for iPhone and Android? We went to the accessibility settings and increased the font size to the largest option. The settings did not have any numbers either. We set the largest size and used the apps as we were unsure. Between the mistakes and successes of the day, we ended the day feeling slightly better. We had a sense of progress because we could test the screen reader and the larger fonts, even though we still had many questions.

While Meg's tests were ongoing, she was also having conversations with the developers on her team. On these first days, the priorities were still not entirely clear, and aligning the work between the team members was still troublesome.

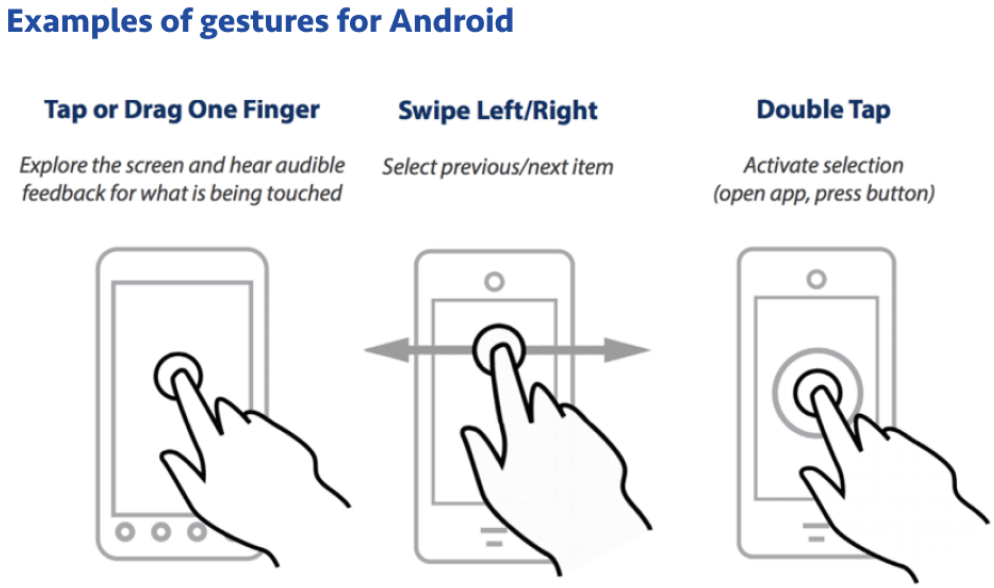

Figure 4 - Some examples of gestures[16]

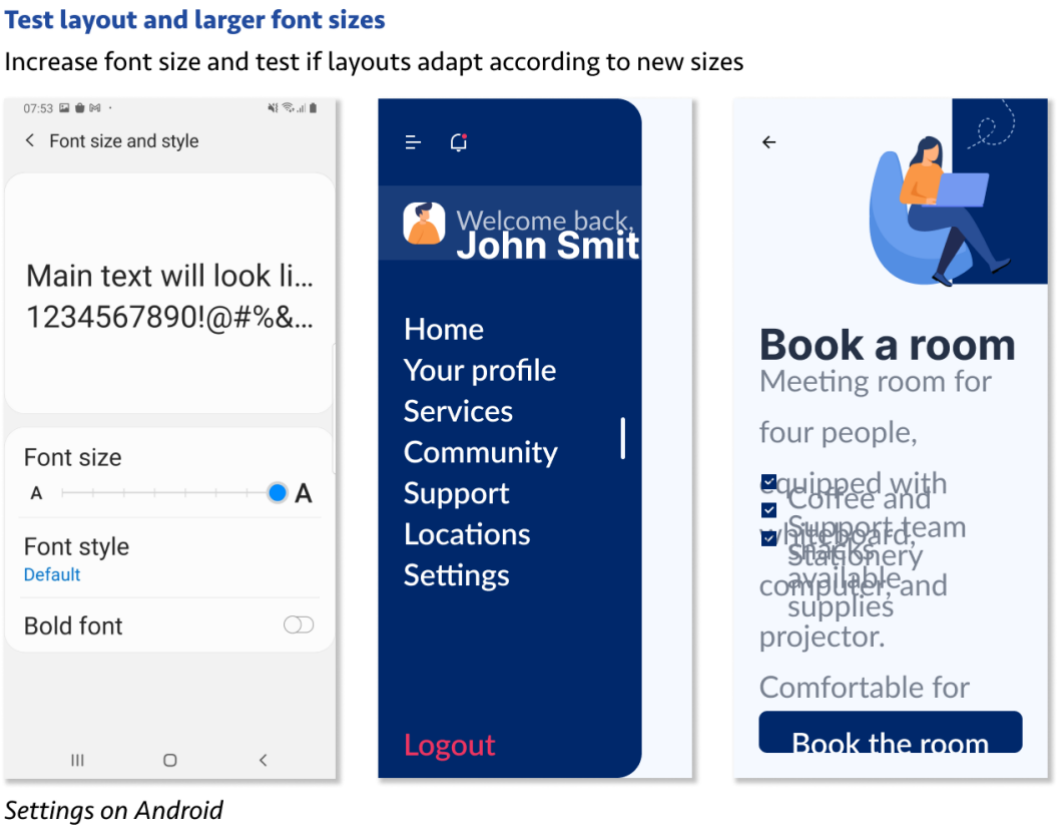

Figure 5 - Testing with a larger font size

[16] https://medium.com/@larenelg/mobile-accessibility-resources-dab97a739080

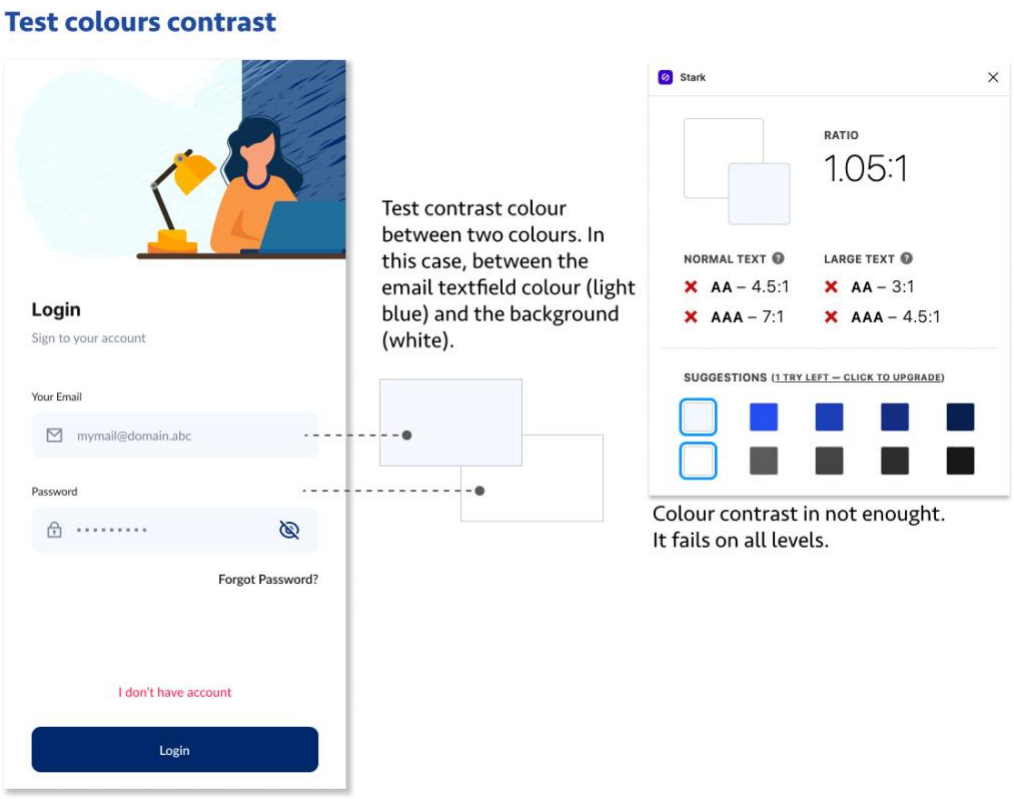

Figure 6 - Testing colour contrasts

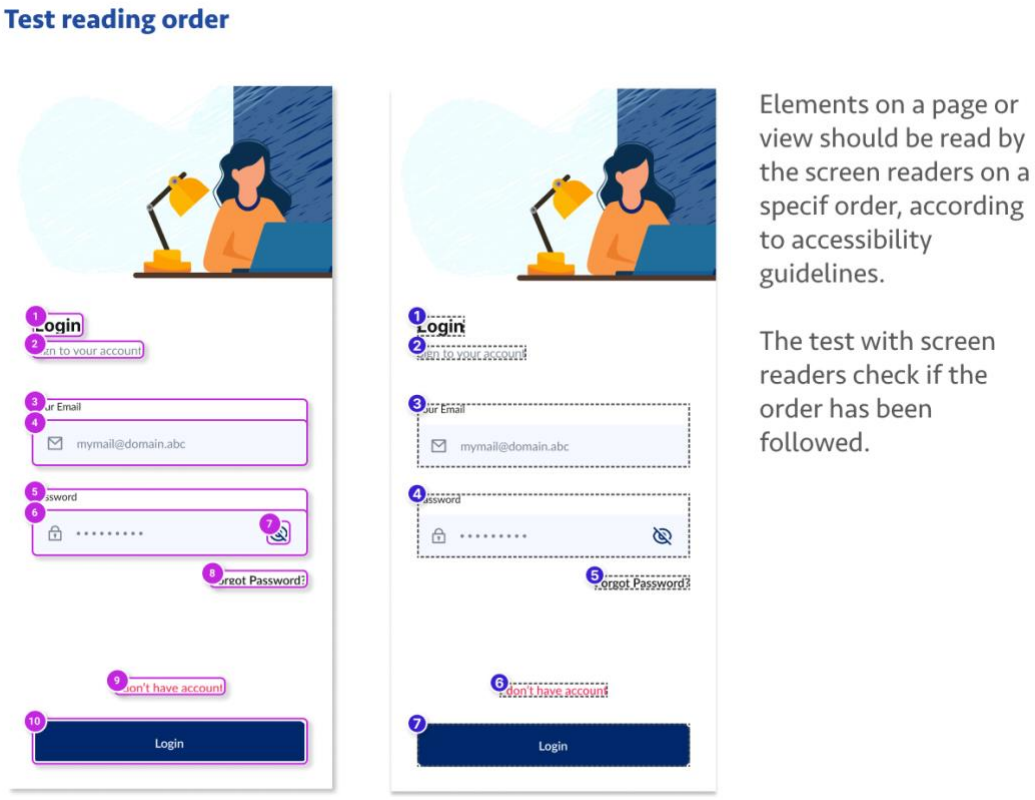

Figure 7 - Testing reading order

Rediscovering a familiar territory

Meg and her team started the discovery phase after the initial two weeks of individual explorations and the team's tentative to organise the work. The purpose of the discovery phase was to explore the sections each team was responsible for, map, organise and prioritise the issues to fix. The accessibility team recommended that everyone fully dedicate some days to this investigation. This first stage was the first significant phase of the accessibility project.

The Booking team's first attempt was to split the investigation into pairs, and each pair would focus on one platform. One pair would test the iOS devices, another the Android devices, and the last pair the websites. The tests would include tasks such as navigating with the assistance of screen readers, checking colour contrasts, and testing layouts with increased font sizes. They imagined that doing tests in pairs would improve mutual support and facilitate the learning curve and discussions. Meg observed that they were not making any progress a few days later. Part because of a lack of knowledge about how to do the tests and partly because of priority conflicts. Even in pairs, they still had many questions and felt uncertain about the tests. The feeling of frustration remained in everyone.

Part of the confusion resided in the lack of conditions for affordance. Without proper conditions, the teams' first attempts to use the new tools and guidelines were a series of unclear and confusing activities. The teams were still in the process of changing their cultural and institutional legitimacy conditions, which implies changing their norms, values, rules, and laws (Davis 2020:97) to a new set, this time according to the accessibility repertoire. While in this process, the lack of affordance from the accessibility frameworks continuously discouraged the learning progress. We were not previously prepared. In other words, we did not acknowledge these new conditions before starting to work on the project.

After the failed attempts, Paul, the team's product manager, decided to ask the accessibility designers for help. On a Monday, we had a meeting with two of them. We had several questions. How would we test the website on Windows since they all use Mac computers? Or, how to use VoiceOver? Which tools made the most sense? The team and I felt we were asking the same questions repeatedly because it was still unclear what to do or how. We felt unprepared, and the team could express this uneasiness in their tone of voice, faces, and expressions that looked worried. Toward the end of the meeting, the accessibility designers joked and said, "Don't panic!" I asked if they were repeating "Don't panic!" a lot to people, and they laughed. Ryan

joked that it was common to feel like in Donna Summer's song, "At first I was afraid, I was petrified", but soon things would be better. The joke helped to relieve the tension, the meeting ended with some smiles and laughs, and the team felt slightly better.

On Tuesday, Meg dedicated her time to taking screenshots - screen pictures - of the website's pages and the apps' views and building a virtual whiteboard with them, pointing out what they should test. She also took some time to read the messages on Slack and save the information that could be useful to them. She added this information to the same whiteboard. On Wednesday, we met again. During this meeting, the team members decided to test the platforms together since the tests in pairs were not successful. The team members schedule several test meetings, which they call "mob sessions", to cover all platforms. According to the Agile Alliance, "mob sessions" are "a software development approach where the whole team works on the same thing, at the same time, in the same space, and at the same computer"[17]. In the case of a remote mob session, all team members would access the same video call meeting and work together. To make the tests easier, one person was responsible for sharing the app or the website screen with the rest of the team, and they could review it together.

The team decided to start with the iOS platform for the first mob session, mainly using the iPhone. Robert, the iOS developer, prepared a guide with the things they needed to test and how they would test them, which helped a lot. The guide listed the main flows, like the booking room and the payment flows, and what type of assistive tools they would use, such as screen readers and larger font sizes. The team's process during the session consisted of the developer leading the tests by sharing his mobile screen through the video call and navigating through the areas of the app.

We started with the screen reader. Ryan, the accessibility leading designer, was with us. He explained how to do the tests, and as we started navigating the app, some questions were raised. Ryan explained what we should pay attention to, like the labels on the buttons and the reading sequence. After an hour of tests, Ryan needed to leave for another meeting, but we continued. After the first hour with Ryan, we felt more confident to continue, and the tests looked easier. We continued for another two hours, and we could cover the screen reader navigation, the font sizes, touch areas, and colour contrasts.

[17] https://www.agilealliance.org/resources/experience-reports/mob-programming-agile2014/

If the team members had many questions on the first day and felt a little lost, the iOS session changed the mood and gave some hope that it was possible to finish the work within the estimated deadline. The team felt relieved, and one of the team members expressed, “I think it’s doable to fix the accessibility issues by the end of Quarter 4”.

Later that day, I had a conversation with Julia, another designer. She had started recently at the company and had some questions about the process. Her team members tested individually, so she could not observe them during the tests. She described that the developers tested most views, and she was trying to help on some specific points. It was interesting to observe that each team had adopted a different testing and exploration method. In one example more about the lack of the tools’ affordance, Julia said that she spent two days trying to learn how to use the VoiceOver and screen-read the app until she noticed that she was doing it wrong, and the screen reader was “reading” and scanning the views in the wrong way.

Thursday continued with more tests, this time on the Android app version. Martyn, the Android developer, prepared the artefacts for the meeting, like an app simulation on his computer and some guidelines to conduct the tests. They spent the whole day testing the app. As we navigated, we could observe which elements were working correctly and which were not. The other participants took notes of issues and questions on a virtual whiteboard. Robert, the iOS developer, was also in the session, and we could compare both platforms, discuss the issues, and decide on a shared solution. Later, the issues were categorised according to their priority to fix. Some were considered more relevant, others not so significant.

Many questions were raised because some problems did not have an intuitive solution, or it was not clear what would be the best usability for individuals with disabilities. It was a persistent question within the team. Should the pattern be this or that way? We have not known because we did not understand how people with visual impairment, for example, would use the app.

No one had any impairment in the team, so learning how to use the assistive tools has been a part of the discovery because nobody has ever used them. It was possible to notice that everyone in the team became tired of navigating using the screen reader after some time (one hour, one hour and a half). The screen reader verbally describes everything on the screen, usually adding more content to make it possible for the user to understand the whole context. For example, the

screen reader could read a button with just an arrow icon as "Return to the previous page button," so the user can understand the whole action flow. By announcing the action, the user would understand that the element is a button and what would happen when clicking on it. At some points, it was hard to know what amount of information would be enough or not. Should the team explain the elements on the screen with more or less information? Was it necessary to add more content and more explanations? After lunch, Meg and I attended an office hour session to bring some questions to the accessibility team. We discussed what would be necessary to announce through the screen reader. Some of these situations were the loading moments (when the app is waiting for some information); the translations to other languages (should we test the text in other languages?); patterns - should all back buttons receive a "Back" label on the button?

Later on, there was another design meeting with some designers from one specific area. We discussed how to use a documentation pattern and library to mark the correct order to navigate, interaction patterns and how to involve the UX writer effectively in the process. The UX writer observed that many things had been a "trying and learning" process. Another designer observed that the illustration of the house on fire was an excellent way to illustrate this beginning of the learning process.

On Friday, we continued testing to finalise the Android app. The day's workflow was similar to the previous days, with the positive side that they finished the Android app tests. The team was tired, but there was a sense of satisfaction with another stage completed. Furthermore, in the following week, the team continued testing the website. The process was slightly different, as testing the website required different tools. John, the web developer, led this new testing session. The first test, perhaps the easiest, in this case, was the font-size test. We increased the font size and browsed the site. Next, we used Mac's VoiceOver and tested tab and keyboard navigation. Finally, we use the Wave plugin[18]. Some issues were found, but they looked too technical for Meg and me, and we left them for John to take a deeper look.

The company-assemblage parameters were in the process of being affected by the new environmental factors coming from the accessibility assemblage. Part of the feelings of destabilisation and loss of unity (Ball 2018:243) was the unknown territory of "who was this

[18] https://wave.webaim.org/extension/

user with disabilities?" Behind questions like "should the screen reader start from the title or the button on the left?" the real question was "how to design for affordances conditions that look so unfamiliar to us?" How could the team build objects that demand and request appropriately from users with disabilities? How can these objects encourage and allow them properly? Bringing part of the assemblage component parts was a start, but still, there was a gap left. One employee asked if the teams would do any assessment of the work with people with disabilities:

> When we develop a product, we try to engage with customers as soon as possible to understand them, right? So maybe engaging with target user group in early stage makes sense, cuz there might be a situation that a certain UI is made accessible yet not very pleasant to use by the end user in general. Reading this page *[Nothing About Us Without Us on Wikipedia]* made me think about the a11y work and the way it is done on the organisation level [...]

The sessions were also tiresome. As no one was used to navigating through the VoiceOver, after some hours of listening to the screen reader, the team expressed some relief when it was turned off.

- It's kind of annoying… *[when continue listening to the VoiceOver]*

* * *

- Should we read the page *[through VoiceOver]*?

- I don't want to, but we must…

* * *

- Is everyone mentally prepared? *[Before browsing the page with the screen reader]*

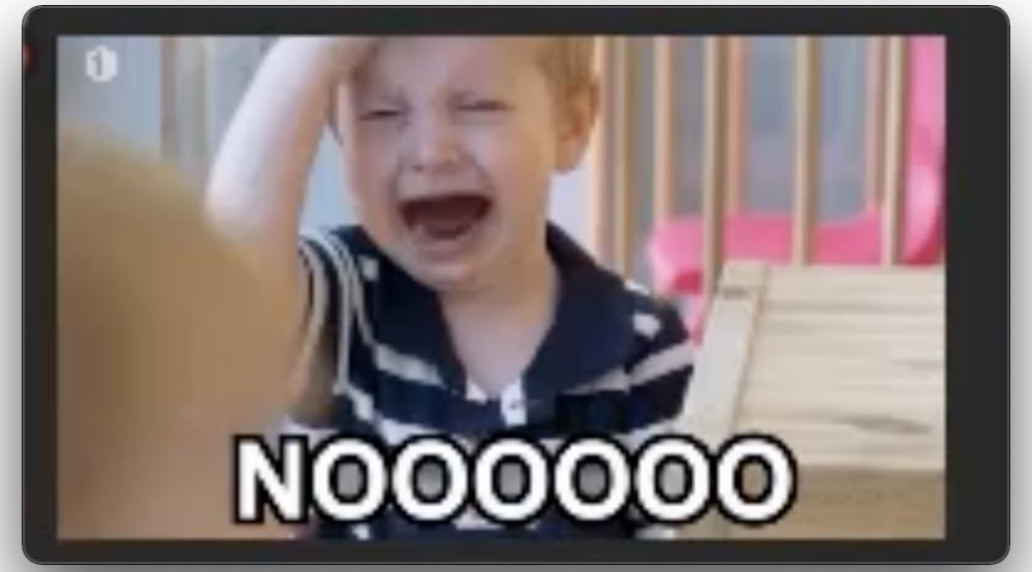

Figure 8 - Gif shared in one of the sessions, after listening to the VoiceOver for some hours

Learning how to use technology devices through new affordances present a new relation to the world. The voice navigation with a screen reader, for example, appeals to different perceptions and dexterities, and it uses other sensory faculties that the team members are not used to. Rafael, one of my Brazilian informants, shared a similar experience:

> Wow... it was... it was a slap in the face. I spent a couple of hours just to get the basics down. Android has a little tutorial. It kind of teaches you how it works, so what are the gestures, movements and such. I made this tutorial, and then I was trying to navigate some applications. I tried our app too, it was just impossible. It was very, very difficult to navigate using the screen reader. That thing, you thank God you don't have to use it. But this gives a very real dimension of how different the experience is, it's another universe. And that helped me a lot, it helped me a lot, because every time I sit down to design a page, it's now another vision.

Once again, an assemblage implies homogeneity. The company's teams unconsciously have been used to produce objects that reflect our dexterity, and our physical and cognitive capacities to use them, but we were clueless about other dexterities. Davis points out how dexterity is a relevant condition in disabilities studies (2020:94), as social and urban structures have historically been built for a presumed model human, enabled in every aspect. This historical process has resulted in disabling social structures for bodies that do not fit the ideal models (ibid., p.94). Trying to simulate interactions with other dexterities was also a way to realise the lack of affordance for other conditions.

The team took many notes about the issues and questions during the test sessions. After the sessions, Meg and Paul registered the issues into Jira tickets. For the accessibility project, all teams categorized their Jira tickets with an “a11y” label, an abbreviation that means accessibility, to allow the whole company to follow the accessibility work progress. After all the investigation and documentation steps, it was time to fix things.

Conclusion

While in the first chapter, the Booking team was still in a stage of talking about it and getting to know the new repertoire, in this chapter, the team-assemblage had started a process of effectively changing its parameters. The accessibility-assemblage was not a total stranger anymore, but neither was entirely familiar. The team members were immersed in many questions, figuring out how to create and build things and simulate affordances for these other conditions.

At this moment, the changes in territorialization and coding parameters were more acute. The simplest assemblages on teams - the assemblage composed of a practitioner and their technological and digital components - were going through deterritorialization and decoding courses by receiving new component parts as new tools, guidelines, and procedures. It affected the larger assemblages, like the team and the department, and all nested assemblages were demanded to accommodate. The consequences were that these new workflows demanded more time, more tasks to be filled, and new rules to learn. The team members tried to find their way to absorb these changes and adapt to the new repertoire. The changes in parameters also made the practitioners perceive their familiar territory with new senses, and it was sometimes challenging and exhausting.

Chapter 3 – Getting (un)comfortable

The unfamiliar becoming familiar

Once the discovery and mapping phase was finished, Meg's team started the fixing phase, when the team was focused on mending the accessibility issues. At this stage, the "mob sessions" were substituted for on-demand conversations mostly. Meg, Robert, and Martyn had a private Slack group for them, where they shared the questions, decisions, and the tasks' progress. During November, the routine was mainly composed of daily conversations through Slack messages and video calls. When the discussions started to extend through many text messages, the group could decide to have a synchronous chat. The communication had its bumps, as the remote work does not favour a good view of one's availability. For example, when Meg asked Martyn and Robert if they could talk for some minutes, Robert and Martyn could not because they were busy with other meetings. When they were available to talk, it was Meg's turn to be on another video call.

The three of them had worked together for more than a year, and it was noticeable how comfortable they were with each other. Their discussions were punctuated with laughs and jokes, like when Robert asked Meg which accessibility text he should add before an amount of money. Robert tried to explain that he needed a text like "bla bla bla 0,00 euro" and asked, "what should I write instead of bla bla bla". Martyn joked, suggesting that Robert could add "yada yada yada".

Not everything was just fun and laughter, of course. In their conversations, they were constantly debating about their best options. They had questions regarding accessibility best practices, but they also needed to deal with differences between iOS and Android platforms. They used to joke that it was their internal project, the "inconsistency project" because the patterns for both platforms had several unwanted discrepancies. One example of the inconsistencies appeared when Meg asked if it was possible to have two different texts, depending on whether the text field had a piece of information. Meg asked:

> Meg: - Is it possible to have two different labels?
>
> "Enter an amount to deposit" if it's $0
>
> And if there's an information input, have another label that says "Deposit amount, $97"
>
> Martyn: - Sure, where should that label be? *[for Android]*

Robert replied: - Hi, no, it's a static localised string *[for iOS]*

With these answers, Meg decided: - Between the “sure” and “no”, it’s better to only have one label ☺

Meg brought many questions raised in the discovery phase to the accessibility office hours, besides sending them in the Slack channel. The more they worked on the accessibility issues, the more confident and well-informed they felt. Although they still had questions, the general perception was that getting familiar with the accessibility repertoire took much more energy, dedication, and effort than fixing the issues. The deterritorialisation process, where people needed to adapt to new settings and accommodate new habits, demanded the assemblage’s members to invent new forms of communal interactions (DeLanda 2016:37). The teams created new social conventions during this process, defied new borders in space and time, and organised a new territory (DeLanda 2016:37).

The intersection between the company and the accessibility assemblages brings new parts to the former. When the company-assemblage started to be exposed to accessibility, the parameters in one of the company’s minor assemblages, the practitioner-computer-software, changed. These changes, as DeLanda highlights, had an irradiating effect and affected the parameters of all the larger assemblages that come up (2016:76). The way Meg, Robert, and Martyn have worked introduced new practices to their routine. These changes could be perceived in varying ways. For example, the improvement in their capacity to develop more accessible objects could be seen as good, but the fact that some processes got more complex and would take more time was not so welcomed. These changes did not reflect only on Meg’s team but on all other product teams that were demanded to follow the new accessibility framework.

After two months of questions, uncertainty, new codes, and new frameworks, the Booking team celebrated the end of the accessibility project at the beginning of January 2022. All issues were fixed, and as a new company’s process, all the following new projects should consider accessibility as a requirement.

What’s next?

Adopting a more inclusive design means a change of mindset and habits from the companies and professionals. A change of mindset because, usually, disability is an invisible topic within the companies. As far as one can observe, few employees with disabilities work within the

companies. Furthermore, the much-publicised diversity does not embrace disability that much. But not only. When speaking about a change of habits, it is also that tech practitioners can and should adopt accessibility practices as part of their work process. Daniel works in a large company focused on construction materials, and he points out that:

> People with disabilities are usually excluded from the process of creating and testing products. It is very common to exclude them, we talk about creating personas, but we never create a persona that needs accessibility. How is the person going to handle it? How a person who only has one arm is going to use it?

One common observation presented in my conversations and interviews was the reference to "bubbles", that in one way or another we dwell in our “bubbles”, and our perception is affected by it. Bella, a designer from a Brazilian consultant agency, observed:

> I think because our society raises people with disabilities separately, so we have schools for deaf children, for autistic children, with Down Syndrome. We don’t see these people later in society, or when we do, it’s very rare, it’s very little. If we think that more than 50 million people have disabilities [in Brazil], then we see them very infrequently. So I think the fact that we are not living together with them on a daily basis ends up creating this bubble, like “oh, the number is much smaller than we think”, so it doesn’t have to be a priority to create an application, considering these people.

The term “bubble” in technology was popularised by Eli Pariser (2011). The author defines the bubble as an environment created by engines that cater for the information delivered to people (Pariser 2011:10). The filters that create the bubbles are invisible (ibid., p.10), and people do not choose in which bubble they would dwell (Pariser 2011:11). Being a prevalent term in the technology area, it is comprehensive that my interviewees expanded the concept to describe the “filtered” environments they inhabit, spaces that “filtered” and left out the different ones. There are similarities between the bubbles and the assemblages. DeLanda describes that people, as assemblage’s component parts, are both limited and enabled by the assemblage (2006:37). Both bubbles and assemblages tend to have borders. The more cohesive, the more they reinforce their own territory. They are limited by their component parts in some aspects, and they enable other potentialities by symbiosis.

The perception that we, as designers, dwell in a “bubble” is present in some of the experiences reported by Swedish and Brazilian practitioners. In the company I investigated, Ryan also observed that he lacked this type of education at college, and the feeling of exclusion pervades his experience. “We never got exposed, never were able to understand, we never built empathy”.

The precarity of assemblages and their constant changes

DeLanda explains that parameters identify, define, and quantify the environmental factors that can affect the phenomenon, known as the assemblage (DeLanda 2016:28). Parameters indicate the environmental factors in the same way a thermometer shows the day's temperature. In his example, with the phenomenon of water, the environmental factor of temperature may oscillate in different ways. Depending on the changes, it may only affect the water in a quantitative way, e.g., by changing its inner temperature. However, when the environmental temperature reaches critical degrees, it qualitatively affects the water parameters, turning it into a solid or gaseous state (ibid., p.28). No matter the assemblage state, it has some level of precarity (ibid., p.28), which means the assemblage may change again to its initial state or any other.

The accessibility project was a task force that summoned all company's teams to review their domains and fix the issues in a specific period of time. Nevertheless, the question left was: what about now? What would be the next steps? In terms of the company's procedures, an accessibility assessment is now a mandatory step for all new projects. I spoke with Meg around April 2022, and in one of her team's projects, they needed to fill these new checklists. Some questions were relatively easy to understand, like the questions about colours, layouts, font sizes, and tests with screen readers. Other questions were confusing, like the ones asking if they had documented the content (but it was never a step for them) or if they were using specific frameworks that they had never heard about. In her analysis, the checklists demanded more time because the items were not clear. Meg also felt that the strong interest from the first months dramatically decreased. She questioned if the project provoked any other fundamental cultural changes besides a long list with checkboxes to mark. She mentioned there were many messages on the Slack accessibility channel at the beginning of the project - around five to ten messages a day. Since most of the teams have finished the project, messages went down to around ten a month. Would this indicate that the practices have already been incorporated into their routine? Or that the matter was no longer so important? Following DeLanda's example, could it be that the water only warmed up a little and returned to its initial temperature?

For Meg, she considered that her work had changed. Now, when she prepares the design for a new project, she adds accessibility documentation to guide the developers. In this documentation, besides the regular layouts, she includes the colour contrast tests for all elements in the pages, the reading order for the screen readers, and a layout simulation with large font sizes. These steps have impacts on all the workflows. The developers need to pay

attention to these factors, and quality tests by the end of the development also need to consider these aspects. However, are these steps enough to build a more inclusive culture?

Tom, one of my Brazilian informants that have been designing accessible websites and apps for more than ten years, highlighted that the technical approach might be not enough because it focuses primarily on the accessibility guidelines requirements. It does not consider a holistic view of the user experience:

> We reached a point where we had technical knowledge for the WCAG, but that isn't enough. It just wasn't enough. Well, it was technically ok, but it didn't take into account the *[user]* journey. It didn't take into account the *[user]* experience. It took into account only specific technical points and technical patches for these issues. And then I started to get a little unhappy with this purely technical view. "Test this page and see if this page corresponds to such accessibility items, like checklists and such". And so I started to move away from the technical approach, from an accessibility approach that didn't take into account the global *[user]* experience.

It is undeniable that the company-assemblage went through changes, and the changes were incorporated into Meg's routine. Initially, the parameters of territory and coding were affected by environmental factors in the form of laws and fines. After, they were affected by the accessibility repertoire that the company was exposed to. After a period of deterritorialisation and decoding, the assemblage adjusted to these new component parts. The destabilisation gave space for new normality. However, it does not mean the work is done. The new processes would help avoid significant accessibility issues, but some practitioners still see a journey ahead towards a more holistic experience. Ryan, one of the accessibility leaders in the company, pointed out that the ideal scenario is to continuously "shift *[accessibility]* to the left", meaning that, instead of reviewing accessibility requirements by the end of the project, this mindset should be present as soon as the projects start. The reference to the left alluded to the beginning of the production line. These changes in mindset may take more time than just having new checklists. Helena described her work as an accessibility specialist as a daily fight and that it demands patience as changes come in small steps. "It is really baby steps, 'micro' baby steps". Fabiana, who works in a company focused on education, also highlighted the baby steps as the strategy to increase the degree of change.

For Tom, the best example he could think about inclusive design come from the account of a quadriplegic freelancer graphic designer he met and how her story illustrates accessibility beyond technicalities:

> She told me that she used to do design projects for people. She explained to me that she received the budget and brief by WhatsApp or Gmail, she executed the work, delivered the project, and her clients had never known that she was a quadriplegic person. And she did the whole project *[without them knowing]*. I said, "This is what the real accessibility experience is because you had a journey with your customer, and at no point, at all, they need to see you as different". And this, I think, is the ideal world for accessibility.

Conclusion

When parameters started changing, the friction between the known component parts and the new ones was higher. There were moments when the assemblage's territorialisation and coding parameters felt more unstable, but the new component parts started settling down after the acknowledge period. Even if practitioners had not mastered the new repertoire, the once-unknown accessibility-assemblage became more familiar. The changes in parameters created new habits and practices, and although they were still in the process of becoming a comfortable territory again, the assemblage began to feel stable again.

The relevant question was to what extent would the initial changes in parameters change the assemblage and how permanent these changes would be. Like DeLanda's water example, where the temperature factor could be enough to warm the water or sufficient to boil it to a gaseous state, should the laws, fines, and new organisational practices be enough to change a mindset in favour of a more accessible design?

An assemblage is never done. It is in a constant precarious situation, risking changes at any time. So, the accessibility journey had started but was not finished. When processes and ways of working are analysed, it is possible to notice that parameters were changed. But still, as technicalities. Maybe the technological objects display more appropriate affordances to people with disabilities by checking criteria on a checklist. However, the remaining question is: by not including people with disabilities in the digital design assemblage, can this assemblage genuinely create the best affordances for them?

Part III

Concluding discussions

This thesis aimed to investigate digital accessibility in the making through the theoretical lens of the assemblage theory. I analysed how the company and its teams as assemblages shifted according to the environmental changes applied to their parameters and what kind of impact these changes had on the affordances of the technological objects they produce. These were the research questions of the study:

- How is the digital design work assemblage affected by the intersection with the accessibility assemblage?
- What happens when new component parts are introduced in an assemblage?
- What are the challenges faced by an assemblage during its processes of changing parameters?
- What are the relations between affordances and assemblages?

In chapter 1, I described how the assemblages of teams found themselves before starting a relationship with the accessibility-assemblage. The company was habituated to function in homogeneous ways, meaning they had in place the way of producing their digital services and products, with their processes and standards. The teams were developing technological objects with affordances that matched their conditions of dexterity, perception, and cultural and institutional legitimacy. However, they failed to provide corresponding affordances for people with disabilities. Some new environmental factors like the laws and fines affected the company and the teams' assemblages, influencing their parameters. With the introduction of the accessibility repertoire, the corporate assemblages started a period of instability that brought the practitioners feelings of uncertainty and uneasiness. The accessibility component parts also came with a lack of affordance for the company's employees. Although these first contacts with the accessibility repertoire brought disturbance to the organisational assemblages, the environmental factors could not be avoided or discarded, and the assemblages were forced to adjust.

In chapter 2, the assemblages of the teams started a process of effectively changing their parameters. The accessibility-assemblage was no longer a stranger, but neither was entirely familiar. The team members were immersed in many questions, trying to absorb the new component parts. They were also figuring out how to simulate affordances and build things for

other conditions they were not fully acquainted with. At this moment, the changes in the territory and coding parameters were more acute. The changes in parameters also made the practitioners perceive their familiar territory with new senses.

In chapter 3, the new component parts started to settle down. Even if practitioners had not mastered the new repertoire, the once-unknown accessibility-assemblage begins to feel more familiar. The changes in parameters created new habits and practices, and although they were still in the process of becoming a comfortable territory again, the assemblage began to feel stable again. DeLanda highlights that "the main territorialising process providing the assemblage with a stable identity is habitual repetition" (2006:50). The more the teams could repeat the new processes, the more familiar they became. "Routinisation" is crucial to stabilise the territory (DeLanda 2006:74).

The remaining question was to what extent would the initial changes in parameters modify the assemblage and how permanent these changes would be. Like DeLanda's water example, where the temperature factor could be enough to warm the water or boil it to a gaseous state, should the laws, fines, and new organisational practices be enough to change a mindset in favour of a more accessible design?

When thinking about the research questions, it is undeniable that the proximity of digital design to the accessibility assemblage provoked changes. As mentioned, the environmental factors, in the form of fines and laws, could not be avoided in this case. They demanded the assemblages of the company and teams accept and adapt to the changes in the parameters of territory and coding. Parameters changed and shifted habits. New component parts were brought, and the organisational assemblages needed to find new ways to work with them.

When the new component parts were introduced to the assemblage, it created moments of conflict. The boundaries between what is inside and what is outside were sharpened (DeLanda 2006:57), but through the actions of creating new routinisation of everyday activities, in the form of regular rituals and systematic performances of activities, the identity of the organisation began to stabilise again (DeLanda 2016:41). Among the challenges faced by the assemblage, both practitioners and teams had to make sense of these novel practices, understand unknown conditions of affordance, and create and accommodate new routines and habits. In this period of destabilisation, practitioners felt uneasy, even if they were aware of the importance of digital

accessibility in their work. DeLanda points out that new skills mean a deterritorialisation process because it allows breaking with past routines, and the exercise of this new skill would soon become part of the routine (DeLanda 2006:50). Despite the challenge of temporary deterritorialisation, these new skills started to find their places in the broader assemblage after a while.

The new skills, the new component parts, changed the assemblage, even if the changes were not as profound as some would like. When processes and ways of working are analysed, it is possible to notice that parameters were changed, but would these changes be enough?

Some would say only technicalities were changed. The changes in the assemblage collaborate for teams to produce objects with a more appropriate affordance to people with disabilities. With the new tools, guidelines, best practices, and procedures, the teams were equipped to build objects that respected accessibility rules. However, still, there were questions about the quality of this affordance. When thinking about a scenario of inclusive design, the absence of people with disabilities in the design process is still noticeable. The remaining question was: can the digital design assemblage create the best affordance for people with disabilities without including them in the assemblage? From a pessimistic standpoint, these changes may be not enough yet. Nevertheless, in an optimistic view, every change needs to start somewhere.

* * *

The unrest feeling experienced when the accessibility project started in the researched company is not a unique situation. In several conversations, similar situations were experienced by other practitioners, in other places. Accessibility requirements are often not prioritised for a series of excuses such as time and cost. Sometimes, these requirements are left aside until laws and fines emerge. Some Brazilian interviewees illustrated the situation by quoting a rhyme in Portuguese: “se não aprende pelo amor, aprende pela dor” (if you do not learn through love, learn through pain), meaning that if the corporate culture cannot change due to humanitarian reasons, it needs to change due to legal reasons.

However, behind the excuses, other factors could be observed. The scenarios in Sweden and Brazil are different, with distinct historical backgrounds, but in both, it was possible to perceive the absence of people with disabilities working within organisations. This realisation can be extended to the absence of people with disabilities in many social structures, not only in

business companies. The lack of diversity, or the absence of what is considered the “other”, is not a problem exclusive to the technology and design fields. It reflects a social issue present in several other sectors.

Design and technology reflect the society in which they are inserted, but they can also shape and provide a more inclusive living. The interaction and cooperation with a broader diversity of experiences could assist in understanding how disability worlds are made. It is possible to learn and build new worlds and futures through these relations. As Escobar points out, “design is about creating cultural meanings and practices, about designing culture, experience, and particular ways of living” (Escobar, 2018:25), and people with disabilities should participate in the process of designing the world to make one that includes them too. When social institutions and organisations are built on presumed access, the impacts for those without access are amplified exponentially (Davis 2020:128). It is more than time to realise that the structures and mechanisms that produce digital disabilities create more than barriers on apps or websites. It creates digital inequalities (ibid., p.128), and nowadays, these limitations do not restrict or act only on the digital spheres but can affect the whole social existence of people with disabilities.

Appendix

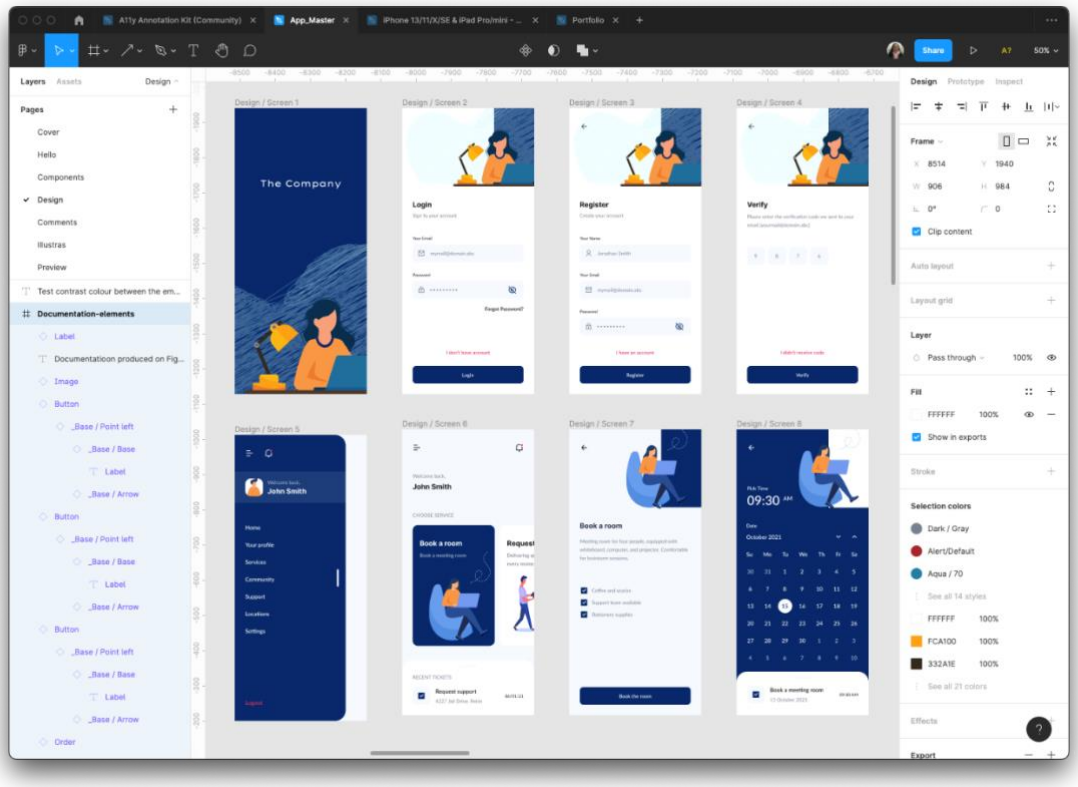

Figure 9 - Figma software

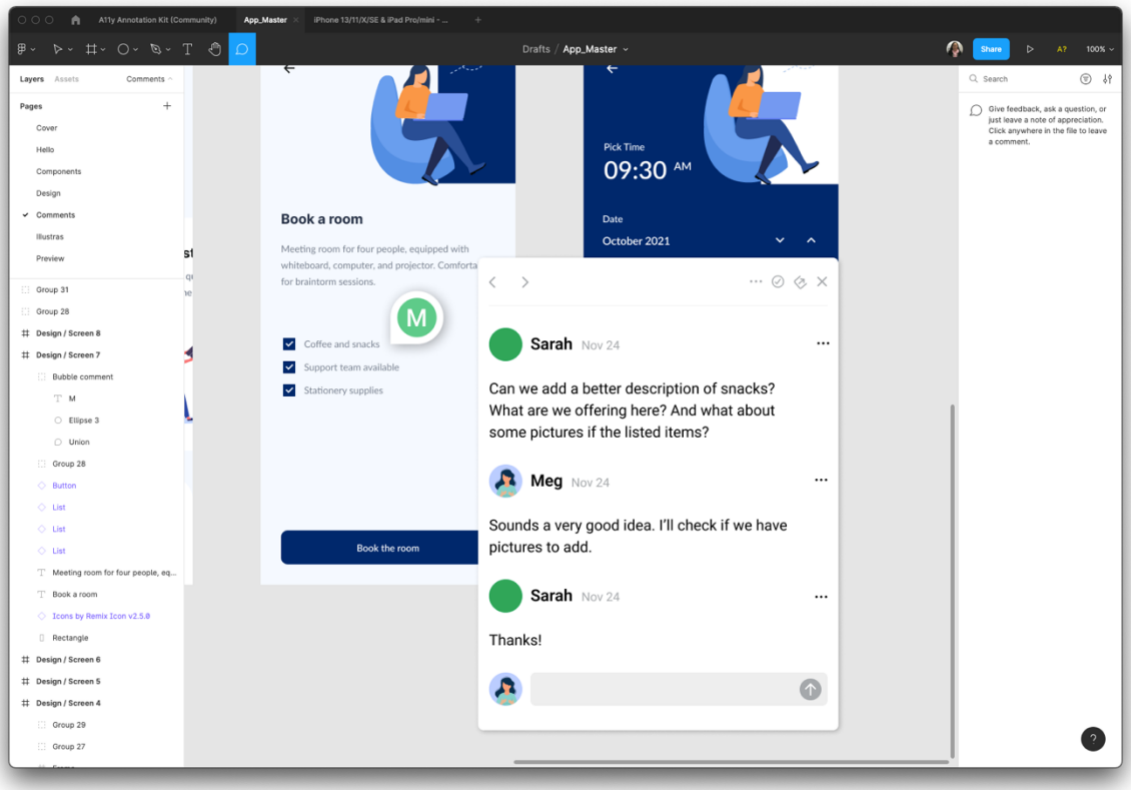

Figure 10 - Figma with comments from team members

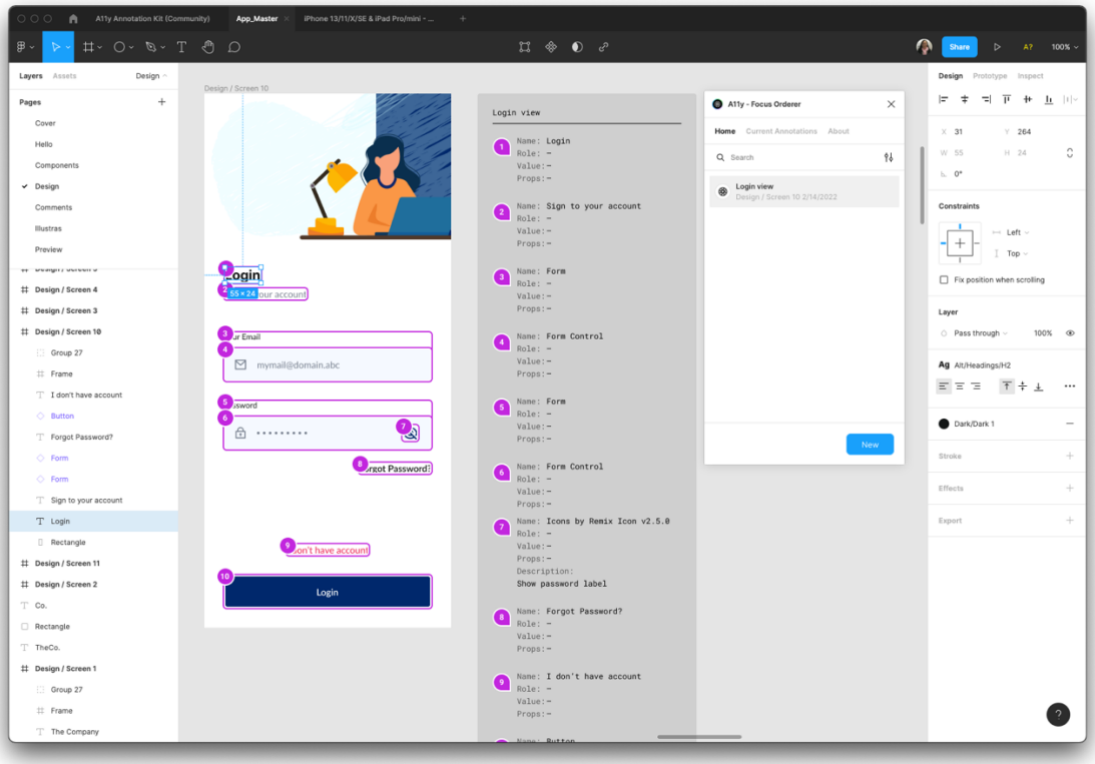

Figure 11 - Documentation to define reading order for elements on page

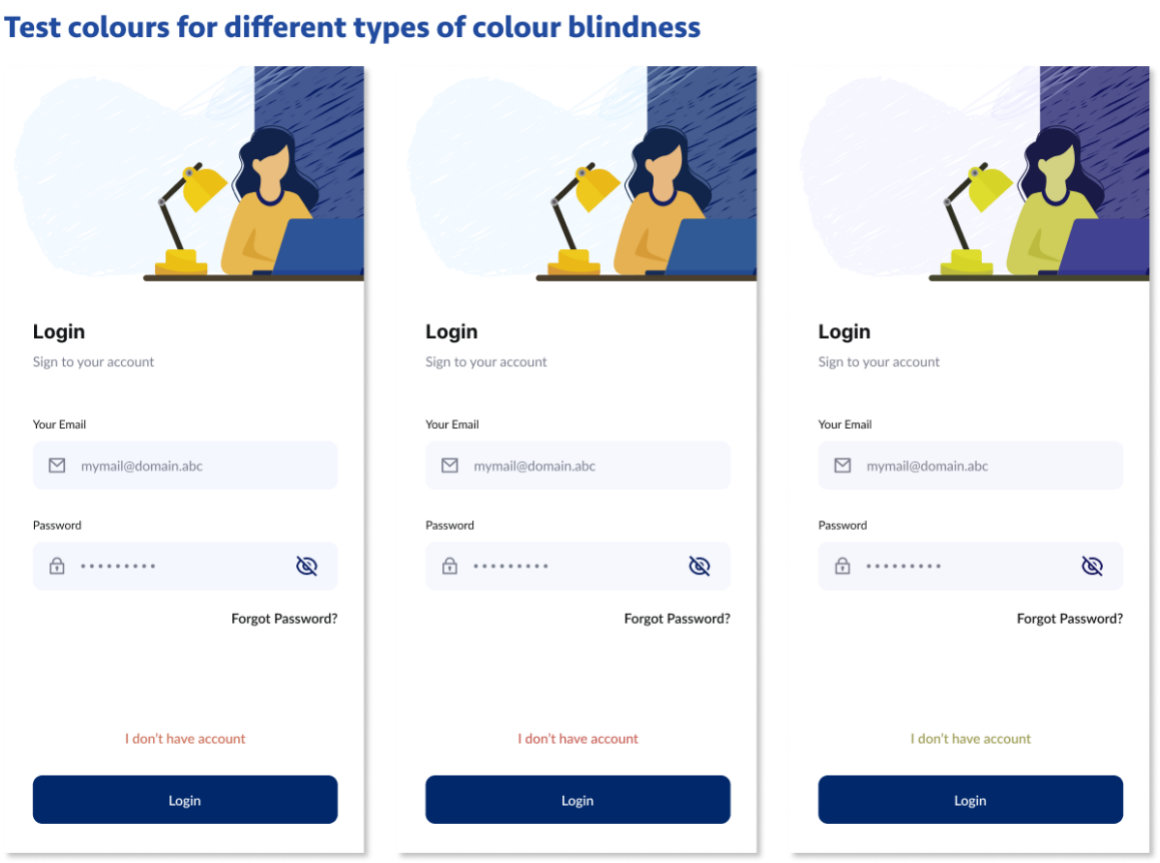

Figure 12 - Testing for different types of colour blindness

Figure 13 - Accessibility documentation produced in design stage

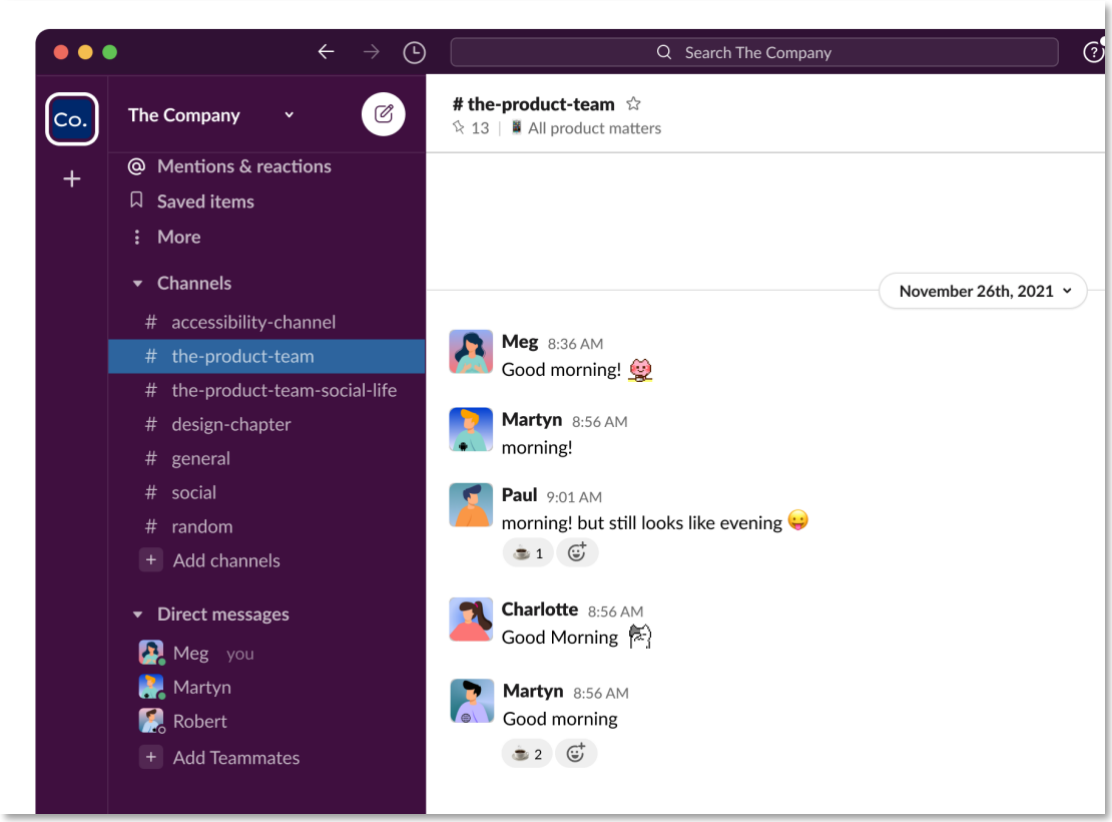

Figure 14 - Booking team Slack channel

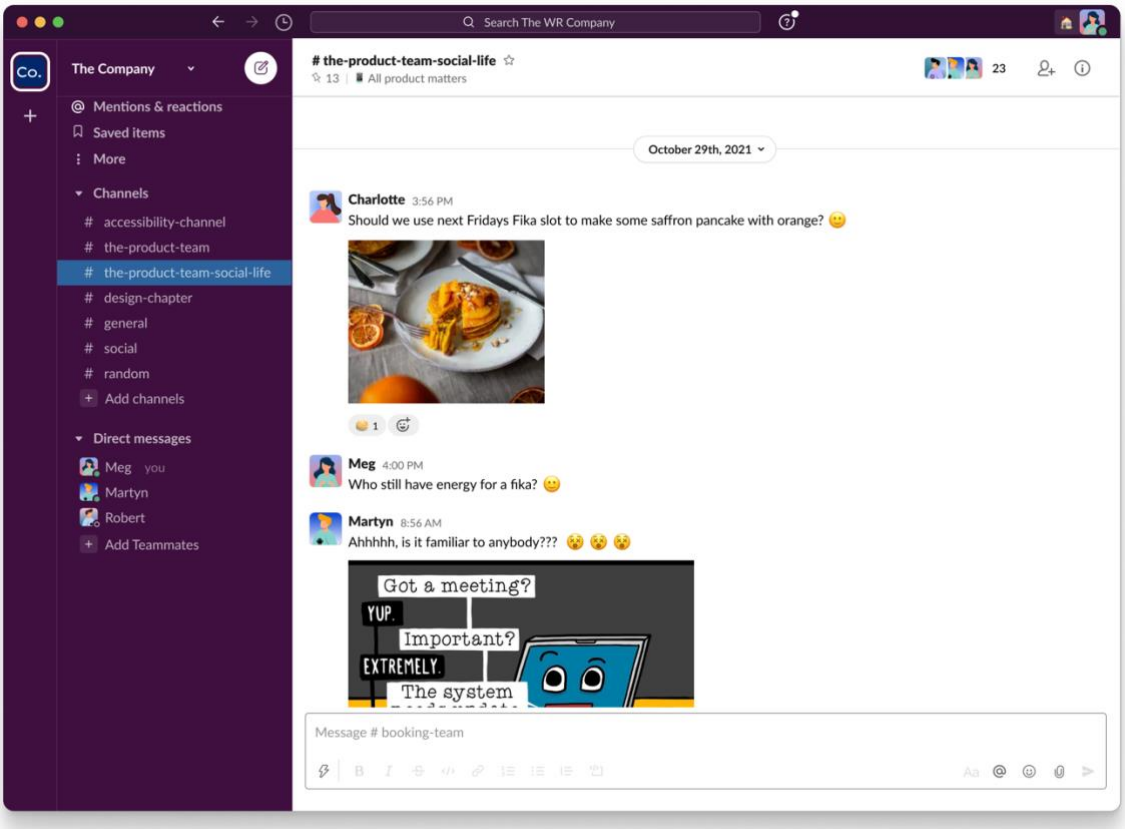

Figure 15 - Booking team Slack social channel

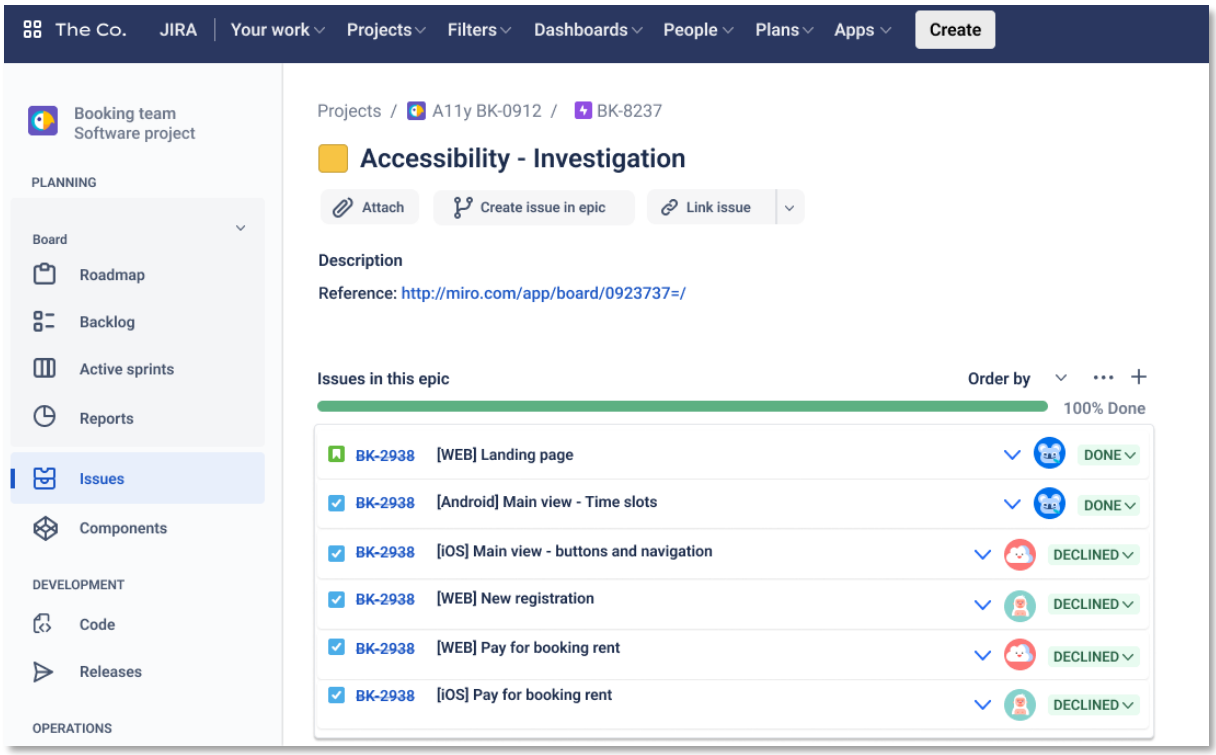

Figure 16 - Jira and tickets for the accessibility project

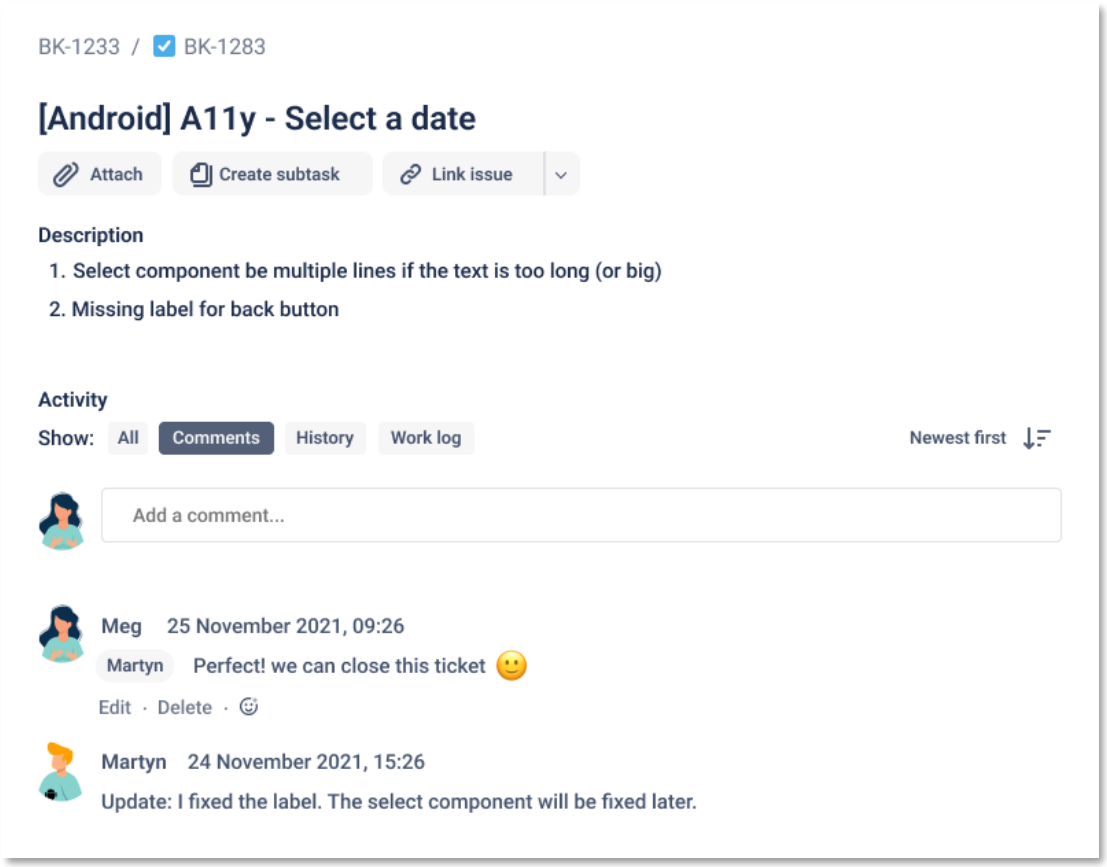

Figure 17 - Ticket on Jira with details about the task

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