Improving Inclusion in Digital Design Workflows

by

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Abstract

Inclusive design was first introduced in 1994, with the objective of ensuring that the outcome of a design process addresses the needs of as many people as possible, no matter their age or abilities. However, adoption of inclusive design is still stymied by the similar barriers. Progress has been made through encoding certain aspects of inclusive design in the tools used by digital designers such as UI components in design systems. This paper explores how changes to the digital design workflow and its tools might further the uptake of inclusive design, what barriers still exist that prevent its adoption and how to bridge the gap created by the barriers. The findings show how digital designers are aware of the inclusion challenges they are not addressing and yet the lack of adoption of existing tools that might improve their outcomes.

Keywords: Inclusive Design, Digital Design, Adoption of Inclusive Design, Digital Design Tools, Remote Research, Remote Co-Design

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Nobody prepared my classmates of the 2019/2021 cohort of the Inclusive Design MDes program for the lockdowns and challenges brought by the COVID19 pandemic of 2020. And yet, we endured. I know I wouldn't have got through this year without all of you.

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And last, but certainly not least, to Jesús, my partner in these random adventures that life keeps throwing at us. Without you, without your crazy idea to come to Toronto five years ago, I wouldn't have had this amazing opportunity and these words would have never been written. To many more of everything with you.

Dedication

To my son, Telmo.

My inspiration, my motivation, my everything.

I hope you never stop learning.

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1. Introduction

Inclusion is, as of today, a proactive effort that we all have a responsibility to pursue. In the world of design, Inclusive Design was first introduced back in 1994 by Roger Coleman at the Royal College of Arts, recognizing the efforts and gains made by the civil rights movement and how design plays an important part in achieving an inclusive society (Coleman, 1994). Since then, Coleman and others have been making the case of why inclusion is an obligation for designers but as well how it is actually good for business (Goodman, et al. 2006, Dong, et al 2015).

Unfortunately, most designers believe that even though inclusive design is, overall, beneficial for society it is difficult to implement, costly and most importantly, their clients are not interested in it. And this attitude has remained more or less the same since 1994 (Waller, et al. 2015).

This project aims at exploring how digital designers can change their workflows in simple ways that can improve inclusion without having to go through a complicated or cumbersome change process.

First, a thorough review of the origins of inclusive design, what are the existing barriers for adoption of inclusive design, initiatives to topple those barriers and what kind of knowledge gaps exist that can be explored.

Second, a set of research questions to help frame the research and serve as a way to evaluate the success or failure of this project.

Third, a design research proposal, with a set of activities to find evidence to answer the research questions.

Fourth, what evidence was found during the research process and a description of the activities.

And lastly, an analysis of the evidence and a conclusion on how to move forward to promote the advancement and adoption of inclusive design.

2. Literature Review

To understand the adoption of inclusive design in digital designers the content reviewed starts with Roger Coleman's "The Case for Inclusive Design" (1994). In its early years, its study is built upon other methodologies, areas of work or design approach depending on the industry. For example, in software applications, it is formulated as a way to solve problems for an aging population (Porrero et al. 1998). In architecture and urban design, it follows the path of universal design (Imrie et al. 2003) but it is not until the mid-2000s when the industry made it part of their corpus (CABE, 2006). The same arguments are found years later in similar content using similar arguments showing that the case for inclusive design as an independent approach is still very dependent on concepts that predate it (Keith et al. 2008). As well, its study was geographically and culturally restricted as until the end of the 20th century the content and study in the English language of inclusive design only originate from the United Kingdom (UK). In other geographies, such as the United States, the ideas of inclusive design are discussed as universal design. In the early 2000s, it is

mostly mentioned alongside usability and accessibility in software development, as the adoption of the internet has been rising and the World Wide Web Consortium (W3C) tries to reinforce it through Web Content Accessibility Guidelines (WCAG) directives to make content accessible (Newell et al. 2000).

At the time, companies and individuals in the UK part of the design industry declared that inclusive design is important for their clients while at the same time it is a constraint because of its perceived cost to implement or even awareness by their clients. At the same time, there is a perception that the value of inclusive design has been demonstrated amply and there is available knowledge to help designers make their case for inclusion but without clarity on how to proceed. Even then, it is seen as a competitive advantage by those who don't practice it both for themselves and for their clients as it is seen as a way to expand the reach and therefore the market (Dong, 2007). Lack of time and budget and understanding of the methodology has appeared in similar studies (Goodman et al. 2006).

Outside of academic research and in the field of what's known as digital design, the inclusive design was, in the beginning, seen as just a more proactive approach to accessibility and point of focus for the design process, that allows designing for everyone by focusing on the few. Though even then you can risk exclusion, highlighting the complexity and risks of the approach as when accessibility is the domain of a few they tend to obfuscate the problem from the rest of the population (Tognazzini, 2009). An example of how this approach can exclude people by being too focused can be found in when Apple first introduced a feature called Zoom as part of a set of improvements aimed at making MacOS, their operating system, more accessible. This feature allows the user to "enlarge any time the area of the screen around the mouse pointer". When the feature was launched it displayed a black rectangle around the zoomed in area of the screen. The feature was quickly adopted by partially sighted people, but others were put off by the black rectangle and usage was limited to a very limited set of users. A few years later when Apple made the rectangle an optional aspect of the feature that more people started using it, demonstrating how by making

some accommodations the same idea can work for everyone (Tognazzini, 2009).

In parallel, the design industry has embraced design thinking as a key methodology in their toolkit to the point that the number of publications on the topic has gone from 5 a year in 1999 up to 45 in 2008 (Johansson-Sköldberg et al. 2013). It has been argued that this has prevented the adoption of inclusive design by designers, and their clients, as this methodology reinforces existing biases and power structures. Design thinking assumes there is only one optimal solution that works for everyone, sanctioning this approach with its sophisticated methodology, ignoring any other possible scenarios that might work better for a diverse society (Iskander, 2018). An example of how design thinking methodology creates this illusion of progress and innovation is how codesign has been co-opted by practitioners everywhere without a proper evaluation of its implementation in design processes everywhere creating this false sense of inclusion (Moll, et al. 2020).

The academic world is studying how to improve the uptake of inclusive design in a professional context as well as this knowledge gap in the design industry, as well educational institutions (Goodman et al. 2006; Dong et al. 2015; Wilson et al. 2017; Zhang et al. 2017). There is validation that the main challenges from the earlier days of inclusive days are still intact: lack of awareness, financial and cultural factors, lack of resources and practical difficulties listed across most research. The client still tops the list as the major barrier that prevents most designers from applying inclusive design methodology in their day to day. One approach to increase adoption focuses on bridging the knowledge gap in designers and exposing them existing content and material around inclusive design (e.g.: Inclusive Design Toolkit from the University of Cambridge) using similar activities to the ones they are already used to, adopting the content so it's more visual and appealing to their mental models, with a special focus on the user research activities. Another approach is using the success story of sports design, a hyper-specialized field, that puts a very specific user at the forefront of the design process, at the other end of inclusive design that has seen the outcomes of

their processes successfully adopted by larger audiences. Both approaches highlight the importance of involving diverse users in research and the difficulty that most professionals face when trying to do this as it is seen as a potential slowdown in the process.

This has been explored specifically in the context of defining the Designer's Behaviour Change Model (DBC) to increase the uptake of inclusive design by designers based on existing psychology and design research (Vala-Webb, 2017).

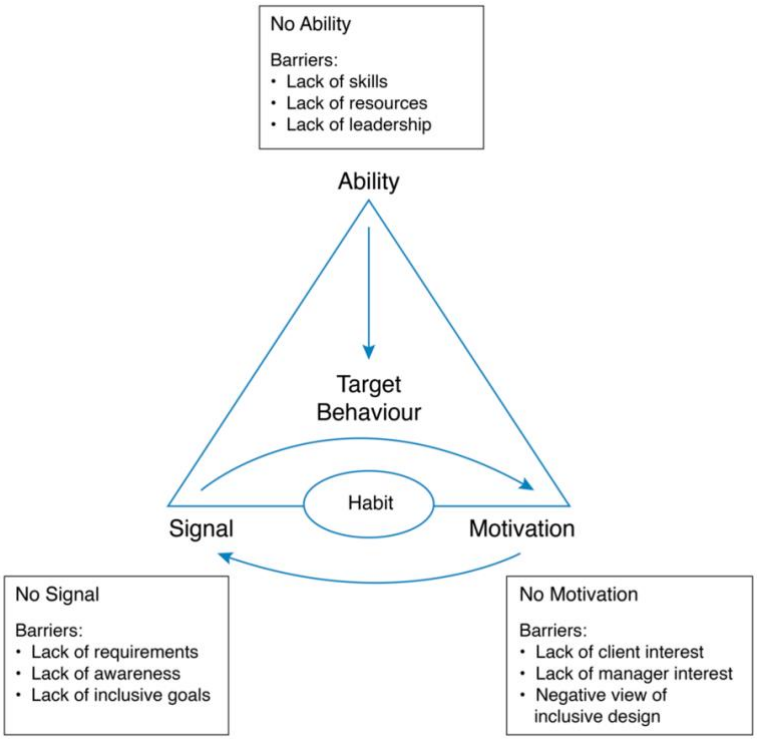


Figure 1: The Designer's Behaviour Change Model (DBC) with Existing Barriers (Vala-Webb, 2017)

The conclusion is that the key in the success of improving adoption of inclusive design is targeting designers themselves and aim at changing existing behaviours. Dissemination strategies to achieve this change have been analysed and evaluated such as academic research centres (Inclusive Design Research Centre), post-secondary educational curriculums (Master on Inclusive Design at OCAD), legislation (Accessible Canada Act) and toolkits (University of Cambridge's Inclusive Design Toolkit). All of them have strengths and weaknesses and, in particular, toolkits while deemed as being successful at improving the chances of adoption of inclusive design methods, their impact is limited as it's up to designers to seek and apply what's in them, which requires a degree of self-motivation that is unmeasured. The DBC proposes that for designers to apply a change to their behaviours, potentially adopting a new tool, the designer has to receive a signal. Currently, there is a lack of requirements, awareness and inclusive goals that translate into a lack of signal.

For the adoption to be successful, the designer has to have an external motivation which "will pull the individual towards the new behaviour"

(Vala-Webb, 2017). And, as per previous research there is little to none client interest, no manager interest and a certain negative view of inclusive design because of perceived increased costs and longer delivery timelines (Goodman et al. 2006; Dong et al. 2015; Wilson et al. 2017; Zhang et al. 2017).

Lastly the designer incorporates the new behaviour using their existing skills and tools. Designers seem to lack the necessary skills and access to resources with no clear leadership on the topic.

All of this is reinforced through a habit-creation loop, as the signal and motivation can feed each other. As this loop happens overtime the new behaviour becomes a habit, which means overcoming existing barriers first.

Meanwhile, companies have embraced the discourse of diversity, at least publicly (Google, 2019) arguing that diversity and inclusion are actually good for business with research findings going back more than 20 years backing this fact up as actual data shows that companies that embrace diversity are 35% more likely to have better financial returns than the average (Hunt et al. 2015). Yet, straightforward approaches to improve this situation haven't worked as well as previously thought. For example, online and in-

person diversity training has not produced the expected results in workplaces (Chang et al. 2019 and Kalev et al. 2006). Job descriptions are still a gendered barrier as women won't apply to jobs unless they feel they match most of the qualifications on them (Mohr, 2014). At the same time, instead of trying to have a direct effect over individuals to remove or change biases, smaller initiatives such as changing gendered wording in job advertisements can have a positive effect on increasing diversity in a workplace (Gaucher et al. 2011). The hiring process has become a key development area to remove biases and increase diversity in companies with specialized enterprises promising better results using inclusive approaches (Nobel. 2016). Specialized tools have been developed to automatically analyse the language of job descriptions in order to remove phrases and words that might hide biases and make recommendations (Applied - Job Description Analysis Tool, 2019).

2.1 Knowledge Gaps

The research and experiments conducted to reinforce the inclusive design mindset in designers that haven't yet adopted it has focused on the education and exposure of these designers to tools that they have to proactively use to integrate into their workflow (Dong et al., 2015). Designers are open to using the tools exposed to them:

- Educational content,
- Searchable databases of products and its users,
- Impairment simulators,
- Inclusive design toolkits,
- Co-design approaches,
- Pregenerated personas.

And yet, there is still a reluctance to adopt them. Researchers point out that *"There is currently a lack of tools that support effective use of user data. [...] Through involving designers in the whole process of the development and focussing on accessibility and desirability, it is hoped that more and more*

appropriate user data tools for designers will be developed." (Dong et al., 2015) in that same report, yet no further experimentation has been done. This is the key knowledge gap that this project proposes to tackle directly.

2.2 Problem Statement

In the progress of inclusive design, there have been three major drivers behind it: academic research, which has been for the last 30 years mostly come out of the UK, legal requirements, driven mostly by the civil rights movement, and by businesses looking to expand their market or those that specialize in individuals with diverse needs. Each of these drivers has boosted the progress of inclusion and pushed design professionals to improve their understanding and practice of it, but the general consensus is that there is still a lot of room for improvement, specifically in digital services and products.

On a daily basis, digital designers across the world practice their craft oblivious to their own biases that prevent inclusion from happening. There

are many design tools that educate and assist designers in implementing Inclusive design, yet there is a lack of inclusion in our society. Thanks to government initiatives such as the Accessibility for Ontarians with Disabilities Act (AODA) or guidelines such as WCAG the world is truly becoming more inclusive, but to what extent? Designers like any other human have to make change through effort and dedication and inclusion is certainly not an easy goal to achieve. Direct approaches to promote inclusive design or unconscious biases training show limited impact. So, can marginal improvements be achieved by changing smaller aspects of the day to day of a designer? How inclusive is the process of individuals in design consultancies and in-house design teams? Through the review of existing practices of designers can inclusivity gaps be identified such as the use of language, proposed solutions or research participants screening that could, if improved, increase inclusion in our society? By analyzing the output of work from past projects by design teams can inclusion gaps be identified in existing design processes and improve inclusion in the output of these teams that will impact society? For example, does the sample of participants of

design research projects reflect the actual population of Ontario or Canada? This project's hypothesis is that design teams that focus on digital products and services or in business innovation can improve inclusion through small changes to their process such as language, diverse recruitment, and testing protocols.

2.3 Research Questions

2.3.1 Primary Research Question

What kind of inclusion gaps exist in the toolkit of a digital or service designer?

- Is inclusive design mistaken for accessibility? If so, why is this?
- What is the level of adoption and awareness for existing inclusive design guidelines?
- Is regulation the only impactful way of enforcing inclusive design approaches?

2.3.2 Secondary Research Question

What influences the decision of a designer to integrate inclusive design in their process?

- What drives a designer to embrace inclusive design methods and tools?
- What is the role of empathy in motivating designers to adopt inclusive design? Is it worth exploring it?
- Where can marginal improvements be made to a modern design process and toolkit in order to improve inclusion and diversity?
- What dimensions of inclusion and diversity can be boosted through nudges and toolkit improvements?

3. Design Research and Methods

The approach for this project will be a purely qualitative approach as the effort needed to achieve statistical significance in a quantitative approach would be difficult to achieve considering it targets a very specific segment of people, which is digital designers. To understand the attitudes and meanings of the individuals involved across the design processes and their different interpretations of it, as well as figure out how they relate to the topic of inclusion a qualitative framing is more appropriate. Improvements at scale can be achieved through inferring the commonalities across them. The assumption is that some of the commonalities are derived from elements that can't be unique or distinctive enough such as screening for research candidates, usage of language or legal requirements that force the design process into certain guardrails.

As the project uses online questionnaires as one of the research methods it can be argued that the project uses a mixed approach, but the potential sample is not statistically significant, and the method still has validity to

gather information as demonstrated by other research initiatives (McGuirk et al. 2016).

For this initiative the plan is to use four distinct methods to understand the problem and identify potential solutions:

- **Semi-structured Interviews.** The plan is to interview two or three persons from four or five digital design agencies in Canada. The interviews represent the foundation of the attitudes, values, beliefs, and motives around the current state of inclusion by the designers involved in the process. This will help understand the existing biases and obfuscation of information as well that people might have. The findings from the interviews will be used as a reference point to check for the validity of findings (Berg, 2007).
- **Online Questionnaires.** In order to be able to scale and understand the dimensions of the findings from the interviews, an online questionnaire was prepared to be filled by digital designers to validate, amplify and complement the interviews. The questionnaire can be used as well as a design artifact gathering tool. This method will help

inform which design artifacts are to be evaluated in the archival research method (McGuirk et al. 2016).

- **Archival Research.** The archival research method will be adapted to review the project documentation and design artifacts of design teams and review their process and output to identify patterns of exclusion and cultural norms. Not all the people in a company that works as a design consultancy are necessarily aware of all the decisions made when producing content as not everybody participates in all the projects. Through this method, unspoken behaviours can be identified that prevent inclusion through implicit biases. This approach to improving a particular practice has proven successful in other fields as texts produced by organizations are, essentially, the manifestation of the discourse and the culture of those organizations (Ventresca et al. 2017).
- **Co-Design workshops.** This type of activity is adequate to dig deeper on the findings from the other methods with individuals from different design agencies. The workshop will focus on identifying

possible solutions to improve inclusion, leveraging the expertise of the designers to work on themselves. This method will potentially be used as well to validate the hypothesis of the research proposal. As well, it will further the understanding of the worldview of designers on inclusion and see what the best tactics are to implement change in the design process by finding common patterns across design groups (Sanders et al. 2008).

3.1 Change of design research

The original design of the research was to work with partner organizations and use their internal digital design team as participants in the research activities. As well, the semi-structured interviews and co-design workshops were meant to happen in an in-person context. During the set-up of this research project external developments forced the design of it to change these two aspects of it.

First, when the partner organizations were engaged it became obvious that their legal requirements would impair the sharing and propagation of this research project. Their legal departments required the signing of Non-Disclosure Agreements (NDA) that prevented the research to be shared publicly without submitting the content for review by the organizations, every time that the research was to be shared or presented. Because of this impediment, the research approach was modified to recruit digital designers directly rather than work with partner organizations. The two limitations that this change brings to the project are that it impacted recruitment, as digital designers had to be contacted individually, and the viewpoints and attitudes gathered in the research activities do not reflect group perspectives.

As well, in March 2020, the global COVID19 pandemic forced many people around the world to isolate to prevent further spreading of the virus. This meant that the semi-structured interviews and co-design workshops couldn't be conducted in person anymore. As well, as the lockdowns and forced isolations progressed, and more people started to transition to remote work, an increase of usage of computer-mediated communication (CMC) (e.g.:

Zoom, Webex, etc) has led to a widespread development of what is known as *"Zoom fatigue"* (Lee, 2020). Semi-structured interviews had to be conducted using CMC solution (Skype) but the co-design workshops were restructured to become asynchronous (Cummings, 2015) to allow participants to contribute their points of view without having to be *"present"* through a real-time CMC solution.

The findings of the research are believed to be still valid.

3.2 Recruitment

Because of the legal constraints, recruitment was done using LinkedIn and Twitter to find digital designers in both in-house and external design studios with a variety of experience and team sizes. More than forty-five (45) designers were contacted with a letter of invitation that explained the project, its intent and what would the participation in it entail (Appendix A, page) Of the forty-five (45), fifteen (15) digital designers were selected (Appendix B, page 82). These fifteen (15) received consent forms in order to

participate in the semi-structured interviews, co-design workshops and contribute design documentation for the archival review (Appendix C and D, page). All of them returned the consent forms properly complete and signed.

The digital designers are mostly bilingual with a mixture of English/Spanish and English/French as their spoken languages and are located both in Europe and North America. They work in studios as small as four (4) designers up to organizations with eighty thousand (80,000) employees, and six hundred (600) designers. Most of them work in small sized organizations, between twenty (20) and one hundred and forty (140) employees with a strong representation of digital designer roles. Four (4) of them work as design managers, seven (7) as digital product designers, three (3) as service designers and one (1) of them as content designer.

The change in recruitment affected the online questionnaire as well, as in the original design research the intent was to use the partner organizations to distribute it among their digital design teams. To mitigate this and get a sufficient number of responses of good enough quality and of the target

population the link to the questionnaire was shared through Twitter and LinkedIn. All questionnaire respondents were asked to provide their consent in the questionnaire itself and they had to self-identify as digital designers and provide proof through an at least two-year-old social media profile that showed that they had been working as a digital designer. Valid examples of social media profiles are LinkedIn profile pages, Twitter bios with portfolio links, Behance portfolio pages, and Dribble portfolio pages. This data field was discarded after validation of work credentials and before any analysis on the data was done. A total of one hundred and eighty-two (82) responses were recorded and forty-five (45) were scrubbed because of insufficient validation of credentials.

3.3 Semi-structured Interviews

As per design research semi-structured interviews were conducted with fifteen digital designers with the objective to understand attitudes, values, beliefs, and motives around the current state of inclusion, and how it fits in current digital design workflows and tools.

All interviews were conducted remotely, using video chat software (Skype) to record all conversations to facilitate transcription, analysis at a later date and to audit its content later in the project.

During recruitment the interviews were scheduled with each of the participants, and interviews lasted, on average, between 75 to 90 minutes. Each interview was transcripted on a spreadsheet and coded to identify themes on each individual interview and to cluster into aggregated topics (Linneberg et al., 2019).

The interview structure was designed in order to validate how inclusive design is understood in digital design teams, understand the dimensions of attitudes, values, beliefs, and motives around the current state of inclusion by the designers involved in the process, and gather a list of digital design workflow documentation. Optionally, participants were asked to contribute with actual examples of documentation for the archival review research activity.

A total of twenty-seven (27) interview questions were split in three (3) thematic groups: introduction and validation of the context of the interview,

the context of the work environment of the participant and how inclusive design currently existed in their workflows. The interview script with all the questions can be found on Appendix E (page 92).

3.4 Online Questionnaire

Two versions (versions A and B) of the online questionnaire were produced using Google Forms with a total of fifteen multiple choice questions and three free form text. The design of the questionnaire can be found on Appendix F (page 92). The difference between the version A and version B is one optional question at the end of version A that allowed the respondent to upload a document, in case they wanted to contribute a document example for the Archival Review activity. Version B did not include this option. This decision was made because of a limitation on the questionnaire tool that collected identification data from the participant when uploading a document without their permission. Both versions were offered to all respondents and a total of ninety-seven (97) responses were recorded on

version A and eighty-five (85) responses were recorded on version B. Only two (2) respondents chose to upload documents for archival review.

The questionnaire was designed to evaluate how experience and education affects the perception and understanding of design and inclusion, as well as see how our interview participants compare to a larger group of designers. The interview structure was designed in order to validate how inclusive design is understood in digital design teams, understand the dimensions of attitudes, values, beliefs, and motives around the current state of inclusion by the designers involved in the process, and gather a list of digital design workflow documentation. Optionally, participants were asked to contribute with actual examples of documentation for the archival review research activity.

3.5 Archival Review

During the recruitment process, participants were asked to contribute documentation in digital format from current and former digital design

projects and activities. The participants were provided a secure method to deliver this documentation and it was stored in encrypted media. A total of two hundred and five (205) documents were gathered during this process. Twenty-six (26) of them were discarded as they seemed to be unreadable.

All remaining documents were classified according to the following dimensions: year of production, language used, type of engagement, phases of design workflow, issues found, and industry (if relevant).

The first step was classifying all the documents as to what part of the design workflow they belonged to. This meant assigning the documents to one or more of the phases of a design process as described by Design Council's Framework For Innovation (Design Council, 2019). These phases are Challenge, Discover, Define, Develop, Deliver and Outcome. This classification helps understand which parts are more and less represented in the analysis.

When this classification was done, then each of the documents were opened individually to identify if an inclusivity related issue could be spotted at least once. The list of issues that could be identified is as follows:

- **Inclusive Design.** The document did not refer to Inclusive Design in any way.
- **Methods and Tools.** The document did not include methods or tools that can be applied as part of an inclusive design process.
- **Language.** The document used exclusionary or non-inclusive words and expressions.
- **Recruitment.** The document, if applicable, did not specify the recruitment of participants with disabilities for any of the design activities.
- **Testing.** The document, if applicable, did not specify testing protocols or use cases for participants with disabilities.
- **Design Delivery.** The document, if applicable, did not detail how the product or service would be used by people with disabilities of any kind.
- **Design Specifications.** The document, if applicable, did not detail inclusion or accessibility considerations of the product or service.

- **Accessible Document.** The document, if supported by its file format, was not accessible.

All PDF documents were as well tested for accessibility using Adobe Acrobat built in Accessibility test. Video documents were tested for captions and description text. Every other document type was expected to be accessible as per operating systems accessibility features.

During the semi-structured interviews some of the participants made reference to their organization's design system as a repository of knowledge and information on how they performed the function of design, including descriptions of tools and methods. Specifically, the participants commented on how accessibility compliance was somehow built into these systems. Because of this, the archival review activity was expanded to include publicly available design systems from organizations that have to operate under regulations like WCAG or legal frameworks such as ADA. For the purpose of this activity a design system is defined as *"a single source of truth for shared parts and processes, such as components, patterns, and guidelines, to build consistent products"* (MacDonald, 2019).

A list of ninety-four (94) design systems publicly available through websites were audited and classified as per the type of organization supporting them. The three (3) types of organization identified were government, enterprise, or community backed.

Each of the design systems was opened to identify the following:

- **Accessibility Content.** The design system does acknowledge accessibility as a goal and has content that aims to achieve it somehow (e.g.: its components are tested for WCAG 2.2 compliance).
- **Inclusion Content.** The design system does acknowledge inclusion as a goal and has content that aims to achieve it somehow (e.g.: inclusion is listed as a design principle).
- **Accessibility Compliance.** The design system is, on itself, compliant with WCAG 2.0 guidelines.

For accessibility compliance each of the design system websites was tested using AInspector WCAG 0.96.0 in Mozilla Firefox 86.0.1. The computer used for testing was a 27-inch 2020 iMac with macOS Big Sur 11.2.3. AInspector was used to evaluate three (3) pages of each of the design systems:

the homepage, a component page and a content page. The number of WCAG violations for all three (3) pages was added up and recorded.

3.5 Co-Design Workshop

Eight (8) participants were selected from the semi-structured interview activities to participate in the co-design workshop to explore possible solutions that could be implemented in digital design tools and processes to improve inclusion. The co-design workshop was designed to be conducted remotely and asynchronously to mitigate computer-mediated communication fatigue and ensure adequate participation and engagement.

All participants were first contacted through email with a letter of invitation and a request to sign letters of participation. In the email the participants were briefed on the structure of the workshop, the tools that were to be used, the required time commitment and how their data will be collected and used for the research.

All activities were conducted using email, a video briefing (hosted in YouTube) and an online digital design collaboration tool (Figma). The participants would receive an email explaining which was the next activity, a short brief on what it was about, and a link to a virtual board hosted in the collaboration tool. As well the emails would contain any links to previous activities in case the participants wanted to check past content. The virtual board (Figure 2) had detailed step by step instructions on how to perform the activity with a pre-filled example, as well as a link to a video briefing (Figure 3) and an agenda to inform participants of the progress of the workshop.

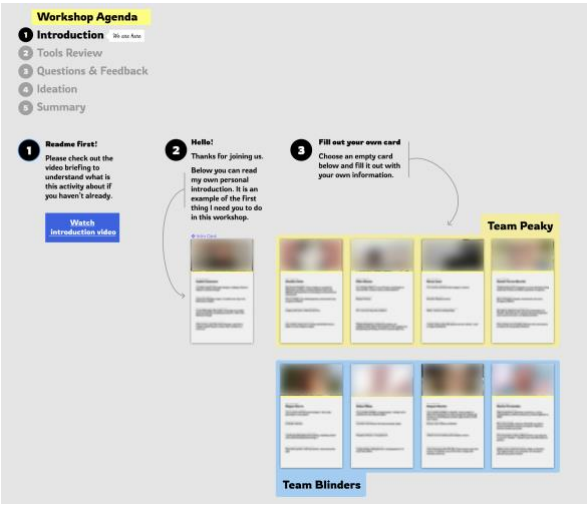
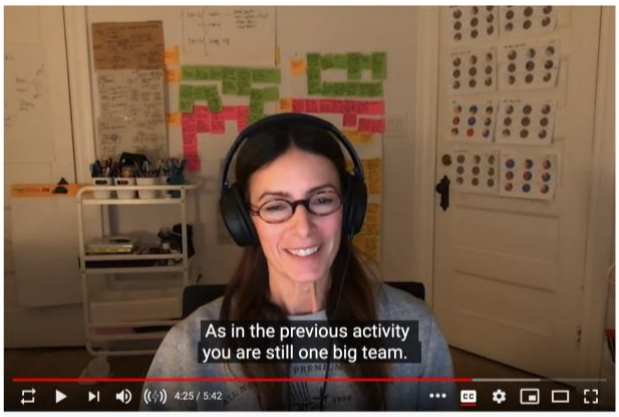


Figure 2: Virtual Board for Activity 1 - Introduction



Workshop activity 4- Improving Inclusion in Digital Design Workflows

Figure 3: Video Briefing

The tools had been previously classified to tackle four problem spaces that can improve adoption of inclusive design:

- **Language.** The tools associated with this problem space were AlexJS and Textio.
- **Cost.** The tools associated with this problem space were
- **Recruitment and Testing.** The tools associated with this problem space were Stark and Fable.
- **Knowledge.** The tools associated with this problem space were Inclusive Design Toolkit and Diversity and Inclusion Toolkit.

Tool Name	Owner	Type and Cost	Description
Inclusive Design Toolkit	University of Cambridge	Toolkit, Free	A free online toolkit with methods, examples and guides for designers and organizations to understand and adopt inclusive design.
Diversity and Inclusion Toolkit	Brown University	Tookit, Free	This is a list of guidelines put together by a university to identify best practices for promoting diversity and

			inclusion. The guidelines are meant to help their teachers, students and employees improve their sense of inclusion for all identities.
Cards for Humanity	Idean	Tool, Free	This tool shows you two random cards that display a person and a physical condition. It can help people consider attitudes and context they might not be familiar with when they are designing products and services. This tool exists as a plugin for Figma as well.
Stark	Stark	Tool, Free and Paid Subscription	Stark is a set of tools that helps designers test basic accessibility issues such as contrast and colour blindness in Figma, Adobe XD and Sketch.
Textio	Textio	Tool / Platform, Paid Subscription	An online service that analyses any text and helps write more inclusive content for corporate communication, job descriptions and branding materials. It provides insights on how your company's communication materials are understood by diverse audiences and how they compare to other organizations.
Material Design System and Guidelines	Google	Toolkit, Free	Material design is Google's design system. They provide specific guidelines for accessibility that explain

			how it works, and what to think about when considering diversity among its users. Material design is used by other organizations and is leveraged by many designers in products and projects across the world.
Fable	Fable	Platform, Paid Subscription	An on-demand platform for testing digital products with people with disabilities. It helps organizations recruiting and sourcing individuals for user interviews, compatibility tests, prototype reviews, QA sessions and other research activities.
AlexJS	Open Source	Tool, Free	A code library that can be integrated to any text editor. It monitors your writing and looks for insensitive language that might be exclusionary. For example, it flags when the writer uses words or expressions that are gender favoring, polarizing, race related, religion inconsiderate, or other unequal phrasing. It does suggest more inclusive alternatives.

Table 1: List of tools evaluated in the co-design workshop.

The workshop agenda had five distinct activities:

1. **Introduction.** This activity was for the participants to introduce each other by filling out a simple form with their names, avatars and responses to icebreaker questions.
2. **Tools Review.** In this activity the participants reviewed eight tools that were identified during the previous three activities by other participants and considered to help, support or promote inclusive design. The activity was split in two rounds, and the participants split in two separate teams. On round one, each team had to answer four questions about four tools. And on round two, the teams compared the other four tools through another three questions.
3. **Questions and Feedback.** In this activity the participants became one single group again and were instructed to do a quick role play as if they were interacting with the owners of each of the eight tools. In the roleplaying scenario they had to ask questions that would help them make a decision whether to start using each of the tools and provide feedback as if requested by the owners of the tools.

4. **Ideation.** In this activity participants suggested ways to get other designers to adopt and start using the tools, as well as suggest other existing comparable tools to achieve similar results tackling four previously identified barriers that were shared as triggers for the ideation: cost, language, recruitment and knowledge. Tools were associated with each of these triggers to frame them. Participants were asked as well to choose which of the four barriers they believed there is more opportunity for improvement and impact.
5. **Summary.** In the final activity the participants were shown a summary of all the activities and asked for one last time if they had any further input, suggestions, or further comment after participating in the workshop about improving adoption of inclusive design and the workshop format itself.

For a detailed agenda script, see Appendix G (Page 100).

4. Findings

4.1 Introduction

From the research activities it can be quickly deduced that the same barriers that were identified in the past (Dong, 2005, 2015, Vala-Webb, 2017) still exist or have somewhat been transformed. While awareness and motivation to implement are higher than before, the biggest barrier still lies within the digital designers themselves who say they want to act, and yet fail to do so.

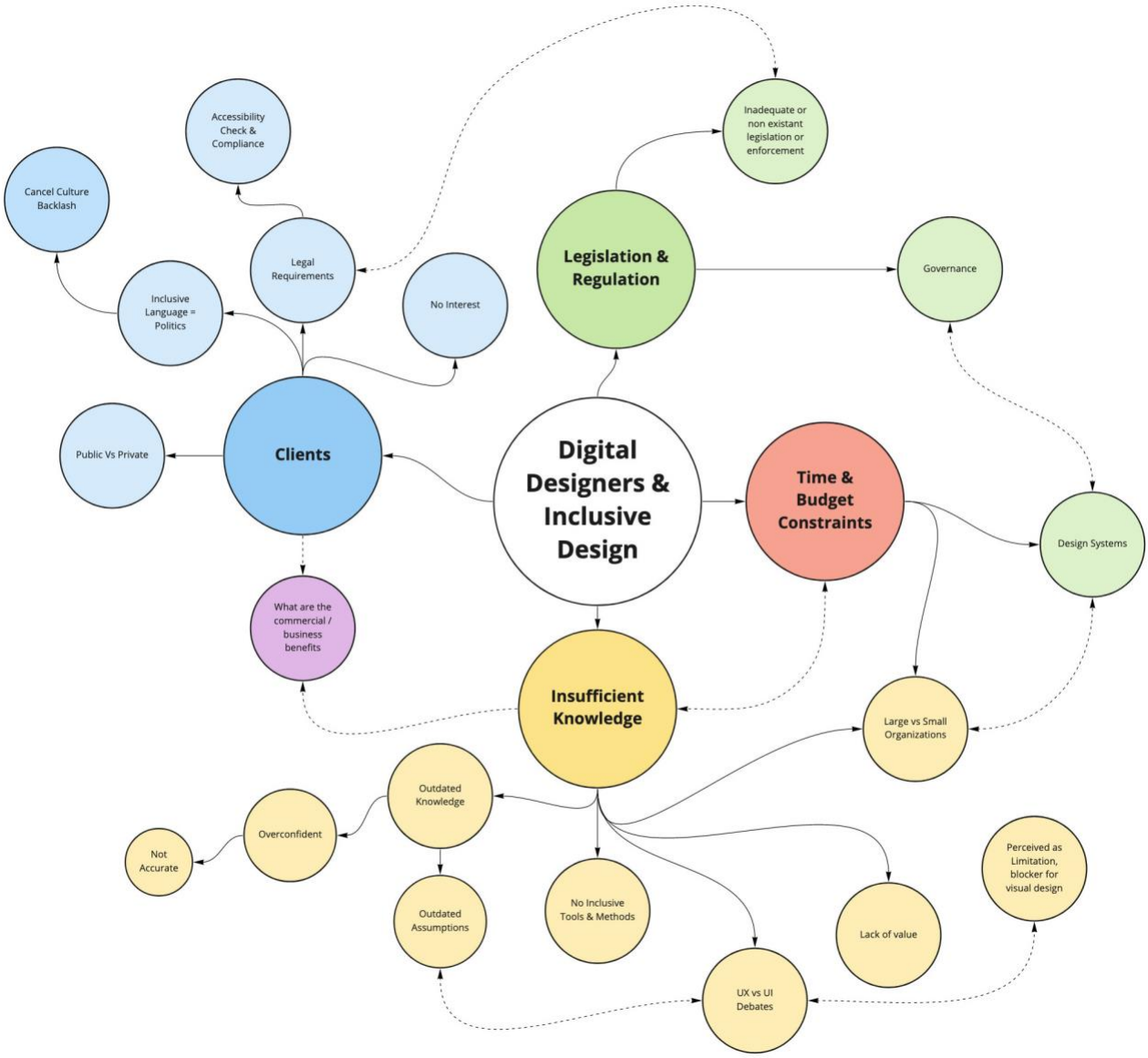


Figure 4: Thematic Map of Findings

The three key themes that seemed to demotivate the participants from picking up inclusive design tools and methods are still clients, time and budget constraints and insufficient knowledge. The main driver is still legislation and regulatory frameworks that push accessibility requirements as a path towards facilitating inclusion.

The underpinning barrier is a lack of insufficient knowledge. Many participants have a partial or incomplete understanding of inclusion and inclusive design that produces two outcomes: they are overconfident on their grasp of the matter and, at the same time, overestimate the effort needed to design inclusively. This gap affects the conversations with stakeholders, any kind of time and cost estimation they might want to be involved in and pulls them into endless debates that don't help progress the adoption of inclusive design.

Stakeholders, whether internal or external, are not familiar with inclusive design, and therefore do not ask for it, unless it is in the context of a legal requirement. As designers do not have the necessary knowledge to engage in a meaningful conversation to push for it, the disinterest shown by stakeholders becomes a barrier for adoption.

And since participants saw inclusive design as a differentiated approach, rather than an integrated mindset, they hold notions that any kind of effort will increase time and cost of any project.

4.2 Interview Findings

All participants in the semi structured interview activities knew of inclusive design, but most of them struggled to define it past a connection to accessibility. It's as if because accessibility has been pushed as an external requirement by legislation and regulations that the participants haven't internalized inclusion as an objective. They see accessibility as a checkpoint they have to go through, not as an enabler. And that is as far as they get, mostly, in regard to describing inclusion because of its strong ties to the accessibility requirements. Those who had first-hand experience in accessibility, either from a technical or theoretical perspective seemed to display a better understanding of inclusion as demonstrated by Participant 5 *"it comes from universal design, where we take in account everyone, no matter who they are, where do they come from and what are their abilities"*.

Some participants did talk about the need to include everyone as an ethical issue. It felt to many of them wrong to leave someone out of any product or service they were working on, but they couldn't remember any recent situation where they argued for inclusion in the context of work. They seem

to acknowledge that it is important from this perspective but acknowledge that they do not discuss it on their day to day. Participant 15 argued that *"I know is the right thing to do, but it's very tiresome to be the only one who seems to care about this."*

Participants did reflect on the idea that achieving full inclusion is a good outcome for business success, saying that the more people use a product or service, then the more successful that product or service is. At the same time, many could remember situations where trade-offs were made in a work context that deprioritized efforts to address accessibility issues. Most agreed that accessibility was usually an afterthought, managed by IT specialists that tackled the task as an audit.

When discussing both the ethical aspect of inclusion and the tools and skills needed to apply it the participants didn't know where to begin the path to change their own workflows and thought of it as *"an uphill battle"* (Participant 8).

Most participants had read at least one or two articles on the topic because someone else had mentioned the topic on social media. Those that worked

for larger organizations with established accessibility teams had been exposed to training and content on Diversity and Inclusion, with some of them highlighting how they were trying to *"provide a layer of basic compliance with accessibility regulations by validating our components in our design system"* (Participant 6).

4.3 Questionnaire Findings

The questionnaire respondents can be split in two distinct groups:

- **Group A.** Works by themselves or for a small design studio or agency, less than 50 people. This group represents 45% of the respondents.
- **Group B.** Works for a large organization of more than 50 people, usually as part of an in-house design team. This group represents 55% of the respondents.

The questionnaire reinforced many of the findings of the interviews, specifically that those in **Group B** were more likely to display a good understanding of inclusive design. This group usually had more first-hand

experience working with people with disabilities. Those in **Group A** showed a more fragmented understanding of inclusive design and less. As well, this group didn't have much experience interacting with research participants with disabilities and overall participated less in research activities.

Participants from **Group B** have as well, on average more experience from those in **Group A**, with more than 60% of the group having at least ten years of experience in contrast.

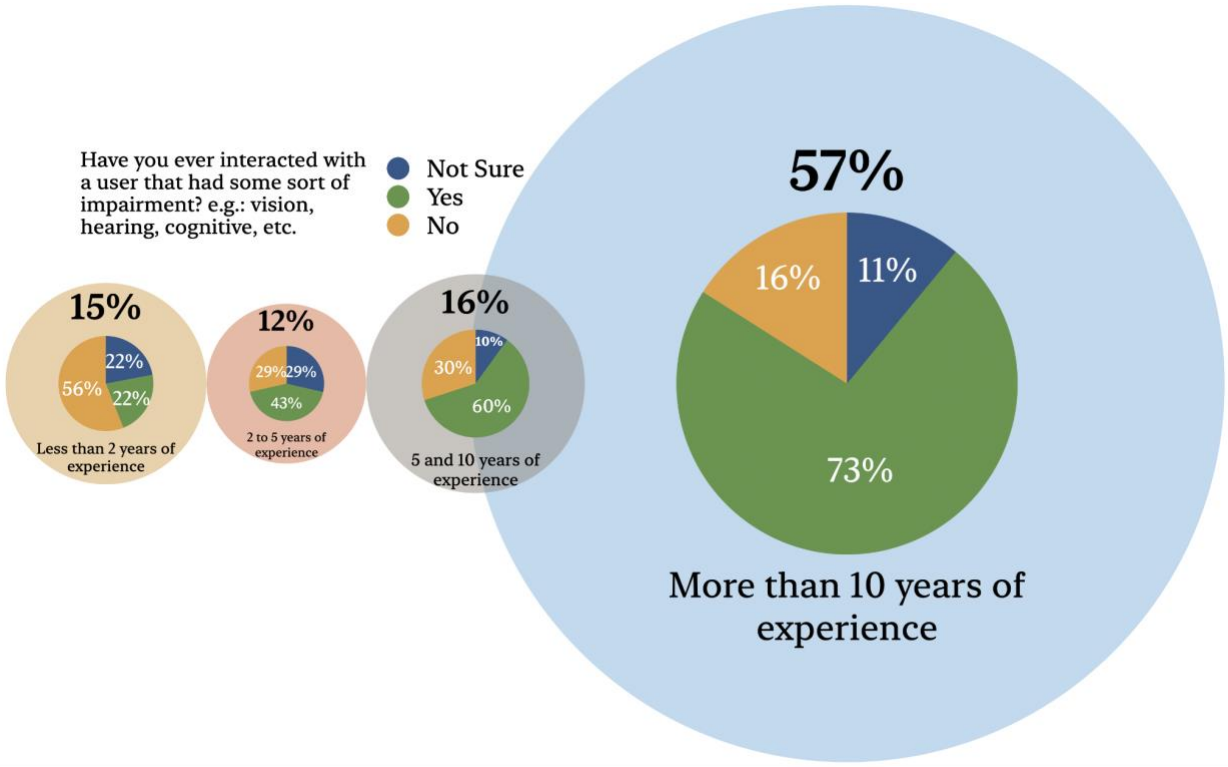


Figure 5: Breakdown of responses to Question 14 - Have you ever interacted with a user that had some sort of impairment? E.g.: vision, hearing, cognitive, etc.

The majority of respondents interact with users in research activities, but it seems as involving people with disabilities is somewhat correlated with experience. Having said that, the sample of the respondents is heavily skewed towards people with more than 10 years of experience as digital designers, which supported the segmentation based on the number of people in the organization.

Apart from validating existing trends found in the interviews, the most important observation from the questionnaire is that participants that work as part of larger groups with complex management structures they seem to be more exposed to inclusive design and have a clearer understanding of what it is for. Another way of looking at it would be that smaller teams, having less diversity themselves, are less exposed to a broader variety of opinions and perspectives limiting their worldviews. It seems as if time and exposure are two passive drivers of inclusive design adoption.

#	Question	Responses
1	How long have you been working as a digital designer?	15% Less than two (2) years 11% Between two (2) and five (5) years 16% Between five (5) and ten (10) years

		56% More than ten (10) years
2	Do you work by yourself or are you part of a team?	12% By myself 61% As part of a team 26% Both
3	Do you lead or manage other designers?	43% Lead some design activities 7% Manage other designers and support them on their careers 18% Both lead and manage 31% Neither
4	How big is the organization you work for?	8% Work as an independent consultant 19% two (2) to twenty (20) people 11% twenty (20) to fifty (50) people 61% Larger than fifty (50) people
5	Have you ever studied design in a higher education institution? e.g.: a university, college, etc.	68% Yes 32% No
6	Are you familiar with Inclusive Design?	81% Yes 19% No
7	Choose one statement that you agree the most with - Inclusive Design is ... :	64% It is a design approach that considers the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference. 19% It is a design methodology, born out of digital environments, that enables and draws on the full range of human diversity. Most importantly, this means including and learning from people with a range of perspectives. 10% It is a design process (not restricted to interfaces or technologies) in which a product, service or environment is optimized for a specific user with specific needs. Usually, this user is an extreme user, meaning that this user has specific needs that are sometimes overseen with other design processes. 5% The design of mainstream products and/or services that are accessible to, and

		usable by, as many people as reasonably possible ... without the need for special adaptation or specialized design. 2% It is just accessibility with a different name.
8	How did you hear or learn about Inclusive Design?	50% By reading articles and/or research papers on the topic 35% A combination of sources 7% Through a friend or acquaintance 6% It was part of an education program at school 2% Not sure where
9	Choose one from the following that you agree the most with - Design is ... :	38% to develop a plan or specification for the construction of an object or system or for the implementation of an activity or process, or the result of that plan or specification in the form of a prototype, product or process. 36% solving problems. 14% about progress. It is the conceptualization and creation of new things: ideas, interactions, information, objects, typefaces, books, posters, products, places, signs, systems, services, furniture, websites, and more. 9% to devise courses of action aimed at changing existing situations into preferred ones. 2% to create, fashion, execute or construct according to plan.
10	Which tools do you use at work?	18% Sketch; 18% Keynote; 11% Microsoft Powerpoint; Adobe Illustrator 15%; 7% Figma; 5% Miro; 4% Google Suite; 2% Adobe Photoshop, Notion and Mural; 15% Other
11	How do you share your work with others?	41% Workshop or meetings 33% Online collaboration tools 26% Documents sent over email/Slack/etc
12	Do you interact with users during projects? e.g.: as part of research, co-design, etc	88% Yes 12% No
13	Have you ever interacted with a user that had some sort of	60% Yes 25% No

	impairment? e.g.: vision, hearing, cognitive, etc.	15% Not sure

Table 2: List of Questions and Answers grouped by % (n=137).

4.4 Archival Review

For this activity more than one hundred and fifty documents were reviewed, and, after identifying during the interviews its relevance, a total of ninety-four (94) design systems were added to the activity. Documents were produced as early as 2010 and as recently as 2021, most of them written in English and slightly less than a third of them in Spanish. Spanish is a gendered language which hampers further the educational gender gap (Davis et al, 2018). Majority of the documentation reviewed was produced between 2013 and 2016, and three quarters of the documentation were produced as part of a consulting or agency engagement.

The design documentation was classified using the Design Council's Double Diamond (Design Council, 2019). Most of the documentation was spread evenly across the four big phases of the double diamond, Discover, Define,

Develop and Deliver, with a good representation of documents from the Challenge phase.

Phase	Number of Documents	Mentions of Inclusion	Inclusive Des Methods	Accessible
Challenge	29 (12%)	0	0	3 (1%)
Discover	55 (24%)	1	0	21 (9%)
Define	57 (24%)	0	0	28 (12%)
Develop	38 (16%)	1	2	25 (11%)
Deliver	53 (22%)	3	3	4 (2%)
Outcome	3 (1%)	0	0	1 (1%)
Total Unique Documents	**179**	**5 (3%)**	**5 (3%)**	**68 (38%)**

Table 3: Breakdown of Documents Reviewed per Double Diamond Phase and Issues Identified - Individual documents can be representative of more than one phase of the Double Diamond

As shown in the table above almost none of the documentation reviewed talks about inclusion, on explicit or implicit terms, and while many use methods that can be found in inclusive design, none framed the activity from this point of view. In some cases, there are mentions of reaching as many people as possible with the service or product described in the document, but when this happens it is usually to refer to market fit.

Similarly, when looking for examples of recruitment protocols and criteria for research activities none of them make specific provisions to ensure a

diverse sample of participants. As a matter of fact, the recruitment criteria tend to focus on the average representation of the different segments the product or services are aimed at. For example, if the product is an app for a financial service, the recruitment criteria is designed to find the average existing customer of the company developing the product.

More than half of the documents reviewed were set in Adobe's Portable Document File format (PDF). This format has built in features to facilitate accessibility, but almost all of the PDFs had accessibility issues reported when analysed using Adobe Acrobat's accessibility checking tool.

The design systems were analysed to understand what kind of organizations were publicly supporting them, if they had specific content for inclusive design and accessibility, and if they fulfilled basic accessibility requirements. Many participants of the semi structured interviews pointed to their own organizations design systems as a source of consistency and design components that had been already certified as compliant with accessibility regulations. As well, design systems can be classified as an external motivation that might influence the habit forming described in the DBC.

The vast majority of the design systems reviewed are supported by enterprises, with less than 10% of them either produced by governments or community organizations. More than half have specific accessibility content, either describing how the design system has been certified for compliance or the components themselves have some sort of accessibility

But less than 10% of the design systems talk about inclusive design or inclusion, as a methodology or as part of the design principles that support the design system.

All of the design systems website had some sort of accessibility error reported by the automated testing tool, with an average of thirteen (13) A level errors (W3C WCAG, 2008). This speaks to the challenges of producing accessibility compliant components - a developer might be able to produce a component that passes all WCAG validation, but when used in an actual product or service this validation might break. Most participants did not understand this technical complexity when talking about their own organization's design system.

It seems that design systems have the potential to become a motivator and a signal for digital designers to improve the chances of digital products and services to be inclusive but as of today they are still more focused on the technical aspects of accessibility.

4.5 Co-Design Workshop

The co-design workshop was conducted asynchronously as described in Section 3.5 to mitigate the impact of *"Zoom fatigue"*. This meant that the two workshops that were designed to happen over six (6) linear hours ended up happening over a three (3) week period.

The eight (8) have been working as digital designers with at least 10 years of experience each. Half of them work as part of larger in-house design teams and the other half work as design consultants in design studios between ten (10) and fifty (50) designers. All of them had first-hand experiences doing research with people with disabilities and had participated in all the phases as described in the Double Diamond (Design Council, 2019). All of them

knew of inclusive design, with two of them having more experience than the others on accessibility regulation and compliance.

Out of all the tools introduced in the workshop as detailed on table 1 in Section 3.5, the participants were only familiar with Google's Material Design. All the other tools were new, and many participants said they were *"pleasantly surprised that this tool already exists"* (Participant 1) at the beginning of the workshop.

The tools shared in the workshop were easily understandable by the participants who could point out how they could use the tool in their existing workflow with ease. At the same time, all participants could point out barriers quickly on why they wouldn't adopt all the tools. This is probably the most important insight that came out of the workshop, and that echoes many comments from the interviews - digital designers are aware that inclusion is necessary, and see it as a fundamental ethical quandary, but, when faced with a possible solution or approach to help them in their workflow they come up with reasons to demotivate themselves from adopting them.

Those participants that worked as in-house designers seemed to understand better how a tool might be used or could anchor the tool with a team or an individual in their organizations who could take ownership of rolling out the tool. The other half of participants, those that work as external consultants, struggled to explain how they would integrate a tool in their existing workflows.

When evaluating the tools, the participants identified as useful tools that were free (Google's Material Design) or that tackled recruitment (Fable). The tools that were rated worst or that participants seemed to be less interested in were the two toolkits (Cambridge and Brown) and the language validation tools (AlexJS and Textio). The toolkits are free as well, and so is one of the language validations tools, and yet, they were poorly rated as useful by the participants. The toolkits were described as *"too complex, too cumbersome"* (Participant 2) and the language validation tools as *"too intrusive"* (Participant 7).

Out of all the barriers and problems that the participants identified in digital design workflows, they thought that the best opportunity for improvement

lies in recruitment and testing with a diverse group of people. Some of the participants, who were familiar with recruiting participants for research, commented on the challenges on finding people with disabilities and the cost to set up accommodations for testing products with them.

Overall, the participants did reflect throughout all the workshops activities on another key theme: ownership of inclusion. In every activity there were at least one or two participants commenting on how *"inclusion is something we have to own; we have to take responsibility for"*. It was unprompted and spontaneous, and when pushed to elaborate they said that *"it is the right thing to do"*. Yet, none of the participants identified a mechanism or path forward to convert this apparent self-motivation into a behaviour, or even the adoption of one of the tools shared in the workshop. Some even shared that they thought that *"tools won't save us"*, rejecting the idea that they could start with something as simple as a language checking tool. Interestingly enough, many participants saw accessibility as an external mechanism, usually owned by developers or business owners. And constantly used accessibility and inclusive design as interchangeable concepts.

5. Proposed Solution

When this Major Research Project (MRP) started, the objective was to come up with a framework that could be easily replicated to create some sort of virtuous circle of improvement of inclusion. The literature review pointed out at a gap that had been there for a lengthy period of time, and many attempts have been made at tackling this gap.

As shown in the Figure 6: Inclusive Design Adoption Flow, there are three possible opportunities to kickstart this virtuous circle of improvement to drive inclusion. First, ensure a diverse recruitment process, both for participants in research and digital designers to join existing teams. Through a diverse recruitment approach, digital designers get exposed to new ideas, new points of view, and new ways of considering their products and services that can spark solutions that help a broader group of people. Second, well conducted co-design workshops expose digital designers to new perspectives that they might not be aware of. And third, which was the main objective of this research project, by making a small change in a tool, or a process, that

change can scale through the virtue of repetition, making the small change a huge improvement over time.

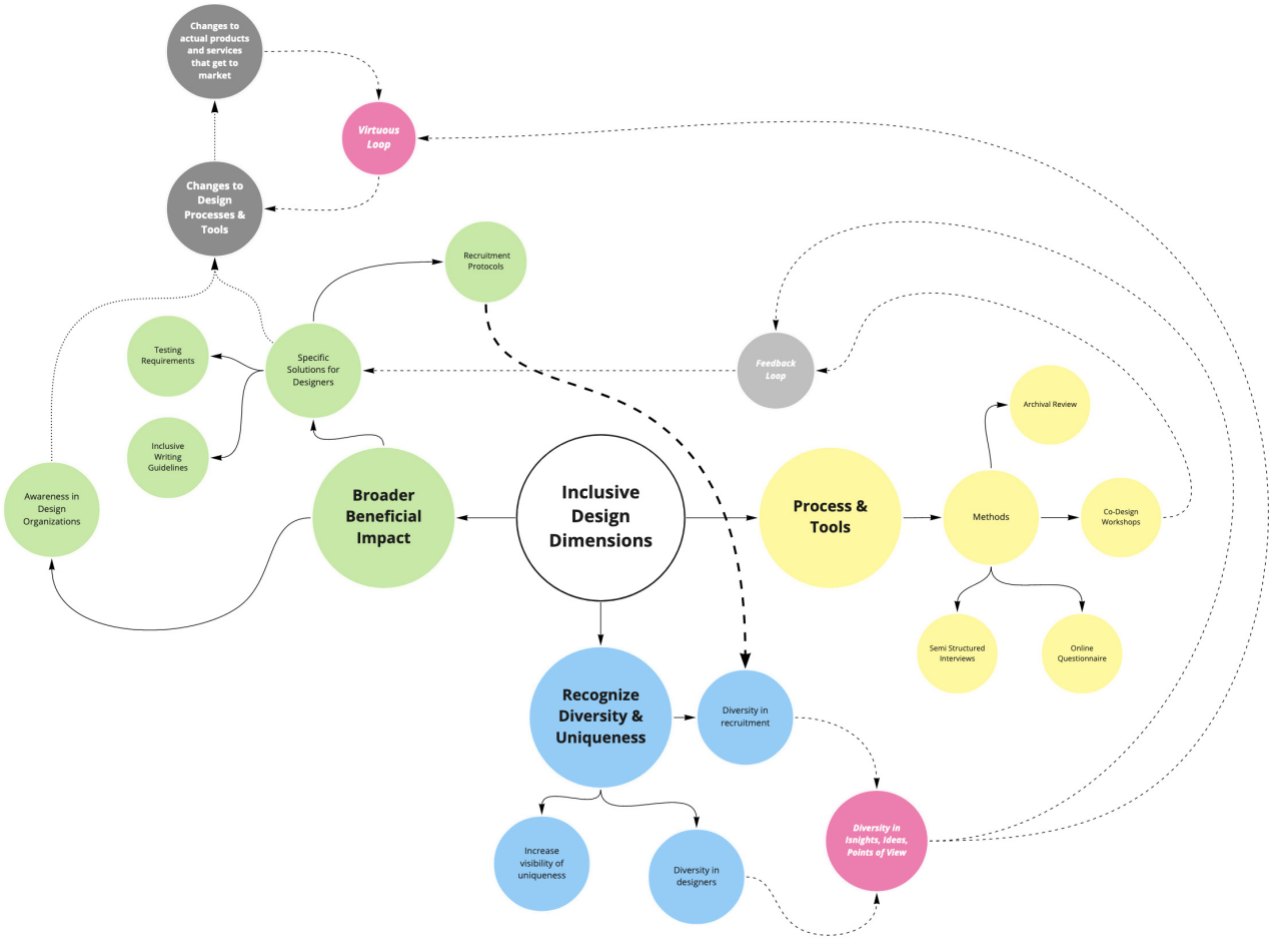


Figure 6: Inclusive Design Adoption Flow

All three of these opportunities can create feedback loops that build a positive momentum: a diverse team of digital designers has a larger network to recruit from, a diverse set of participants can bring new insights in research, and so on.

And yet, throughout the research activities this gap that prevents all three possible opportunities from becoming a reality in digital design became more evident than ever.

In the workshop the limitations of the focus of the Major Research Project (MRP) became very apparent: participants recognized the gap, demonstrated the willingness to own the problem and tackle it. But when faced with possible solutions kept coming up with multiple ways of keeping the status quo.

Reflecting on the activities and on the Inclusive Design Dimensions, the best solution seems to be to focus on a diverse recruitment strategy, both for participants for research and digital designers to join in-house and design studios. At the same time this is the least actionable solution, in a scalable way, which was the intent of this MRP - because it means expanding the social networks of digital designers across the world, so diversity becomes a requirement. This is challenging as it adds extra work to any recruitment

process, whether looking for a research participant or a digital designer. Any extra work on an already complicated process is likely to be discarded. The objective of the MRP was to lower the amount of work, not add to it.

On one hand this project has explored the gap from a different perspective, which is the tools that digital designers leverage in their workflows to do their work. In this regard, it has successfully identified the kind of understanding the participants have, and what it means to them, of inclusive design and inclusion, providing context on how to frame conversations regarding this. On the other hand, it hasn't fulfilled the promise of finding improvements that can be easily deployed and scaled.

6. Conclusion and Future work

When this project started the objective was to answer two questions *"what kind of inclusion gaps exist in the toolkit of a digital or service designer?"* and *"what influences the decision of a designer to integrate inclusive design in their process?"* with the intent to figure out what kind of changes or improvements can be introduced to the workflow of a digital designer to improve it, so inclusion is achieved through passive means. The literature review showed that many efforts have been made since the inception of inclusive design to promote its adoption and yet while in the built environment great progress has been achieved the same barriers have persisted for more than two decades in the digital environment.

Since most of the previous attempts focused on the process, on the skills and on the designers themselves an opportunity was identified to focus on the tools used by designers. By encoding changes in these tools, the outcome of the work by digital designers should be more inclusive. And by focusing on

the tools, rather than on themselves, the designers could be more open about their own shortcomings on adopting an inclusive design mindset.

A set of activities were designed to confirm that these barriers still exist, how they are perceived, what is the understanding of inclusive design and inclusion and through a co-design workshop co-create an approach that could be easily adopted by others.

From the activities two contradictory learnings can be observed: digital designers see themselves as responsible for improving inclusion and, at the same time, do not know where or how to begin the journey to adopt an inclusive design mindset. There was no simple solution coming out of the co-design workshop, as participants struggled to see a starting point to understanding inclusive design - their internal motivations are not strong enough to produce a signal that will drive habit formation. What came out of the workshop as the best path forward is to expand the recruitment of participants for research activities to include the full range of human diversity. In principle that is a simple change to make to recruitment

protocols as discussed in the workshop but, at the same time, it was identified as a difficult one to make because of an unclear path forward.

While this project was being designed and conducted, the world was paralyzed by a global pandemic. A contagious disease, called COVID 19, forced most of the world's population to self-isolate to avoid falling victim to the SARS-CoV-2 virus. This impacted how some of the research activities had to be conducted, as they had to be done remotely rather than in person. The outcome of the activities would have probably been different, and that has to be acknowledged.

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8. Appendix

This Appendix contains the following items:

A) Letter of Invitation to Participants of Semi-Structured Interviews and Co-Design Workshop

B) Table of Participants in Semi-Structured Interviews and Co-Design Workshop

C) Semi-Structured Interview Consent Form

D) Co-Design Workshop Consent Form

E) Semi-Structured Interview Script

F) Online Questionnaire Script

G) Co-Design Workshop Agenda

H) Research Ethics Board Approval

I) Research Ethics Board Approval Amendment

8.1 Appendix A: Letter of Invitation

Hello,

Thank you very much for being open to participating in this research project. You can find my Major Research Project proposal attached, but here is a summary as I know your time is very valuable:

Through work done in my master's program, I have uncovered a potential opportunity to improve inclusion in digital design. As you might be aware, inclusive design has existed for a long time now (since the early 1990s), but most companies see it as a nice to have, not a must-have. Designers seem to think that it is too costly, or too difficult to implement. There have been a few initiatives to try to change this, but they focused on training the designers themselves. My idea is that instead of focusing on the designers we should focus on the tools and processes. By making small changes we can achieve small gains that produce more inclusive services and products. Right now, I think that language used in documents can be improved to boost inclusion, as well as research recruitment and testing protocols.

So, what I am looking for is to recruit participants so I can do the following activities with them:

- **Semi-structured interviews.** I would interview two to three people per company to create a baseline on the current understanding of inclusive design, attitudes towards it, and the role it plays in their organizations.
- **Online questionnaire.** I'll create a questionnaire, to be shared within those organizations and to a broader audience, so I can confirm the findings from the interviews and maybe get some statistical significance.
- **Archival review.** I want to ask for examples of documents that represent the design process of the companies that participate in the research. I'll analyze the content to look for inclusion gaps.
- **Co-design workshops.** With what I will learn from the previous activities I want to do two workshops with designers from my partner organizations to figure out what can be done to improve processes and tools.

I will provide an NDA, so all the content is confidential and not shared with anyone but me.

When I publish my work, the content shared with me won't be shared publicly. It will only be used during the analysis phase and only I will have access to it. I'll be doing most of the work, right now I believe that I will need a total of 20 hrs from each company that participates for all the activities (hopefully not too much).

An example of a tool similar to what I am thinking is this service: https://textio.com/. This one is more focused on diversity, though, but I believe that we can produce something similar for digital design and inclusion.

Let me know if you have any questions. It would be great to have you on board.

Thank you again.

8.2 Appendix B: Table of Participants

Participant	Role	Experience	Organization Size	Type of Organization
1	Content Designer	12 years	300,000	Consultancy
2	Owner and Product Designer	20 years	5	Consultancy
3	Service Designer	10 years	30	Consultancy
4	Interaction Designer	5 years	5	Consultancy
5	Owner and Design Director	23 years	15	Consultancy
6	Design Lead	15 years	4,000	In-House Team
7	Service Designer	10 years	30	Consultancy
8	Product Designer	8 years	150	In-House Team
9	Product Designer	12 years	150	In-House Team
10	Product Designer	5 years	15	In-House Team
11	Visual Designer	8 years	60	Consultancy
12	Design Lead	10 years	1,200	In-House Team
13	Interaction Designer	10 years	1	Consultancy
14	Design Lead	18 years	150	In-House Team
15	Design Director	23 years	80,000	In-House Team

8.3 Appendix C: Semi-Structured Interview Consent Form

PURPOSE

- The purpose of the interview is to gather attitudes, values, beliefs, and motives around the current state of inclusion by the designers involved in the process. This will help understand the existing biases and obfuscation of information as well that people might have. The findings from the interviews will be used as a reference point to check for the validity of the findings.
- Between 8 to 10 participants will be recruited, that currently work or have recently worked as a digital designer in a consultancy or as part of an in-house design team for a large company (more than 500 employees).
- This research is being conducted by Isabel Casanova, a graduate student, as part of their major research project (MRP), to comply with the educational requirements of the Master's in Inclusion Design program at OCAD.

WHAT'S INVOLVED

As a participant, you will be asked to:

- Join an online conferencing tool at a specific time and day. You will be required to have a working internet connection and be at your computer for the duration of the interview.

Participation will take approximately 1.5 hours of your time.

No demographic data will be recorded.

POTENTIAL BENEFITS

Possible benefits of participation include exposure to the current understanding of inclusive design and potential tactics to improve inclusion in your own design team.

CONFIDENTIALITY

The information you provide will be kept confidential, i.e. your name will not appear in any thesis or report resulting from this study. However, with your permission attributed quotations may be used.

Audio- or videorecording:

After the interview you will be provided the option to review and edit the transcript of the session. The recording and transcripts will be kept in an encrypted storage only accessible by the principal investigator. When the research project is published all the recordings and transcripts will be safely deleted.

Data collected during this study will be stored in a secured and encrypted cloud-based service. If during the interview you disclose information of a potentially criminal conduct, insider or outside, it might be reported to the police.

Data will be kept for 2 months after which time the data will be securely deleted from the cloud-based storage.

Access to this data will be restricted to the co-investigator.

❑ Yes, I wish to be attributed for my contribution to this research study.

You may use my name alongside statements and/or quotations that you have collected from me.

Audio- or video- recording

❑ I agree to be audio and video-recorded for the purposes of this study. I understand how these recordings will be stored and destroyed.

INCENTIVES FOR PARTICIPATION

Participants will not be paid to participate in this study.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study.

Further, you may decide to withdraw from this study at any time, or request withdrawal of your data prior to data analysis and you may do so without any penalty or loss of benefits to which you are entitled. Your choice of

whether or not to participate will not influence your future relations with OCAD University or the investigators involved in the research.

To withdraw from this study, let PI know at any point during the study or you may contact Isabel Casanova by email at [redacted].

To withdraw your data from the study, please contact Isabel Casanova by email at [redacted] no later than [TBD]. Data gathered up until that point through your participation will be deleted securely.

PUBLICATION OF RESULTS

Results of this study may be published in reports, presentations to conferences and colloquia. In any publication, data will be presented in aggregate forms. Quotations from interviews or surveys will not be attributed to you without your permission.

Feedback about this study will be available (to all participants when the research project is finished. Please contact Isabel Casanova by email at

[redacted] if you wish to provide feedback.

Feedback won't be published or shared outside of this research project.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please ask. If you have questions later about the research, you may contact the Principal Investigator Isabel Casanova or the Faculty Supervisor (where applicable) Michelle Wyndham-West using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at OCAD University 2020-67.

If you have questions regarding your rights as a participant in this study, please contact:

Research Ethics Board c/o Office of the Vice President, Research and Innovation

OCAD University

100 McCaul Street

Toronto, M5T1W1

416 977 6000 x4368

research@ocadu.ca

AGREEMENT

I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: _____

Signature: _____

Date: _____

Thank you for your assistance in this project. Please keep a copy of this form for your records.

8.4 Appendix D: Co-Design Workshop Consent Form

PURPOSE

- The purpose of the workshop is to focus on identifying possible solutions to improve inclusion, leveraging the expertise of the designers to work on themselves. This method will potentially be used as well to validate the hypothesis of the research proposal. As well, it will further the understanding of the worldview of designers on inclusion and see what the best tactics are to implement change in the design process by finding common patterns across design groups.
- Between 6 to 8 participants will be recruited, that currently work or have recently worked as a digital designer in a consultancy or as part of an in-house design team for a large company (more than 500 employees).
- This research is being conducted by Isabel Casanova, a graduate student, as part of their major research project (MRP), to comply with the educational requirements of the Master's in Inclusion Design program at OCAD.

WHAT'S INVOLVED

As a participant, you will be asked to:

- Join an online collaboration tool at a specific time and day. You will be required to have a working internet connection and be at your computer for the duration of the workshop. There will be breaks for stretching and disconnecting.

- Participate in facilitated activities that include review documentation, ideation, sharing findings and provide feedback.

- All the activities will be moderated by an experienced facilitator.

Participation will take approximately 3 hours of your time.

No demographic data will be recorded.

POTENTIAL BENEFITS

Possible benefits of participation include exposure to the current understanding of inclusive design and potential tactics to improve inclusion in your own design team.

POTENTIAL RISKS

There also may be risks associated with participation: you will be exposed to other individuals that you have never met, their opinions and thoughts. You might feel unsafe or insecure about this. To mitigate this risk the workshop facilitator will remove any offensive content and expel the participant who wrote or said the offensive content.

CONFIDENTIALITY

All information you provide will be considered confidential and grouped with responses from other participants. Given the format of this session, we ask you to respect your fellow participants by keeping all information that identifies or could potentially identify a participant and/or his/her comments confidential.

Audio- or videorecording:

After the workshop you will be provided the option to review and edit the transcript of the session. The recording and transcripts will be kept in an encrypted storage only accessible by the principal investigator. When the

research project is published all the recordings and transcripts will be safely deleted.

Data collected during this study will be stored in a secured and encrypted cloud-based service. If during the workshop you our someone else discloses information of a potentially criminal conduct, insider or outside, it might be reported to the police.

Data will be kept for 2 months after which time the data will be securely deleted from the cloud-based storage.

Access to this data will be restricted to the co-investigator.

❑ Yes, I wish to be attributed for my contribution to this research study.

You may use my name alongside statements and/or quotations that you have collected from me.

Audio- or video- recording

❑ I agree to be audio and video-recorded for the purposes of this study. I understand how these recordings will be stored and destroyed.

INCENTIVES FOR PARTICIPATION

Participants will not be paid to participate in this study.

VOLUNTARY PARTICIPATION

Participation in this study is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study.

Further, you may decide to withdraw from this study at any time, or request withdrawal of your data prior to data analysis and you may do so without any penalty or loss of benefits to which you are entitled. Your choice of whether or not to participate will not influence your future relations with OCAD University or the investigators involved in the research.

To withdraw from this study, let PI know at any point during the study or you may contact Isabel Casanova by email at [redacted].

To withdraw your data from the study, please contact Isabel Casanova by email at [redacted] no later than [TBD]. Data gathered up until that point through your participation will be deleted securely.

PUBLICATION OF RESULTS

Results of this study may be published in reports, presentations to conferences and colloquia. In any publication, data will be presented in aggregate forms. Quotations from interviews or surveys will not be attributed to you without your permission.

Feedback about this study will be available (to all participants when the research project is finished. Please contact Isabel Casanova by email at [redacted] if you wish to provide feedback. Feedback won't be published or shared outside of this research project.

CONTACT INFORMATION AND ETHICS CLEARANCE

If you have any questions about this study or require further information, please ask. If you have questions later about the research, you may contact

the Principal Investigator Isabel Casanova or the Faculty Supervisor (where applicable) Michelle Wyndham-West using the contact information provided above. This study has been reviewed and received ethics clearance through the Research Ethics Board at OCAD University 2020-67.

If you have questions regarding your rights as a participant in this study, please contact:

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416 977 6000 x4368

research@ocadu.ca

AGREEMENT

I agree to participate in this study described above. I have made this decision based on the information I have read in the Information-Consent Letter. I have had the opportunity to receive any additional details I wanted about the study and understand that I may ask questions in the future. I understand that I may withdraw this consent at any time.

Name: _____

Signature: _____ Date:

_____

Thank you for your assistance in this project. Please keep a copy of this form for your records.

8.5 Appendix E: Semi-Structured Interview Script

Introduction Speech

"Hello, thanks for spending time with me to talk about yourself and the company you work for about the topic of design. This interview is part of my Major Research Project on how digital designers can improve inclusion through changes in their tools and workflows. I am doing this project to fulfil my educational requirements of OCAD's MDes in Inclusive Design. Your answers will be of great help."

1. First, how much time do you have available for this conversation?
2. And do you need any help understanding what I am saying?

"Great, I don't plan to take more time than that. Before we start, I am recording the conversation to keep track of the answers but I won't be using any of the answers as a way to identify you in any way. Everything will be kept confidential and anonymous. I might paraphrase some of your answers, but I'll strip any data that might be used to identify you or break any confidentiality agreements."

3. Do you have any questions on the recording of the conversation or how the data might be used?

"Perfect. The focus of this research project is to understand how digital designers think about inclusive design and what kind of tools and workflows you currently use that support inclusion."

4. Can you describe your role and the company you work for?
5. How many people work at your company? And how many of those could you classify as designers?
6. How long have you been working in the design industry?
7. How would you describe the work your company does?
8. Are you familiar with the term inclusive design?
    a. If yes go to question #9
    b. If no, go to question #16
9. Can you describe what inclusive design is?
10. Do you remember the first time you heard about inclusive design?

11. Would you say your company integrates inclusive design in their workflows and processes?
12. Have you ever talked to a client about inclusive design? If yes, do you remember what was their reaction?
13. What would you say are the benefits of inclusive design? And the challenges of applying it?
14. Do you have any specific examples of how your organization applied inclusive design in a project? Can you share the documentation used in that project?
15. Do you have dedicated inclusive designer roles in your organization?
16. Have you had any specific training or education on inclusive design?
17. What would you say are the benefits of integrating inclusive design in your workflow?
18. Are you familiar with accessibility?
    a. If yes go to question #19

b. If no, go to question #26

19. Can you describe what accessibility is?

20. Do you remember the first time you heard about accessibility?

21. Would you say your company integrates accessibility in their workflows and processes?

22. Have you ever talked to a client about accessibility? If yes, do you remember what was their reaction?

23. What would you say are the benefits of accessibility? And the challenges of applying it?

24. Do you have any specific examples of how your organization applied accessibility in a project? Can you share the documentation used in that project?

25. Do you have dedicated accessibility specialist roles in your organization?

26. Are you familiar with any campaign or initiatives that promote inclusion?

27. Lastly, are you aware of any regulation or law that promotes inclusion as discussed today?

"Thanks so much for your time and your answers. This was very helpful. If you are interested in the results of this research project. Any parting thoughts before I turn off the recorder?"

8.6 Appendix F: Online Questionnaire

Introduction - "Hello and welcome to this online questionnaire. The form won't take longer than 10 to 15 minutes to fill out. We are looking to understand how digital designers think about inclusive design and what kind of tools and workflows you currently use that supports inclusion.

This questionnaire is a research component of my Major Research Project on how digital designers can improve inclusion through changes in their tools and workflows. I am doing this project to fulfill my educational requirements of OCAD's MDes in Inclusive Design. Your answers will be of great help.

Please read our privacy and confidentiality statement - in brief, this questionnaire doesn't gather any personal or private information. Responses will be kept confidential and anonymous and if any documentation is submitted through this questionnaire, it will be treated as highly confidential.

If you have any questions before you start, please submit them to [redacted]."

1. Are you a designer or have worked as a designer?
    a. Yes (Continue to Page 2)
    b. No (Exit questionnaire)

Page 2. Questions (Segmentation) -

1. How long have you been working as a digital designer?
    a. Less than 2 years,
    b. Between 2 and 5 years,
    c. 5 to 10 years,
    d. More than 10 years.
2. How would you describe your role in the context of the company you work at?
    a. Individual contributor,
    b. Design team leader,
    c. Design business manager,
    d. Other (please specify)

3. How big is the organization you work for?
    a. Just one person.
    b. 2 to 20 people.
    c. 20 to 50 people.
    d. Larger than 50 people.
4. Have you ever studied design in a higher education institution?
    a. Yes,
    b. No
5. How long have you been working as a digital designer?
    a. Less than 2 years,
    b. Between 2 and 5 years,
    c. More than 5 years.

Page 3. Questions (Inclusion Awareness) -

1. Are you familiar with Inclusive Design?
    a. Yes (go to question 2)
    b. No (go to question 4)

2. Choose one statement that you agree the most with - Inclusive Design is ... :
    a. The design of mainstream products and/or services that are accessible to, and usable by, as many people as reasonably possible ... without the need for special adaptation or specialized design. (Inclusive Design Toolkit)
    b. It is a design process (not restricted to interfaces or technologies) in which a product, service or environment is optimized for a specific user with specific needs. Usually, this user is an extreme user, meaning that this user has specific needs that are sometimes overseen with other design processes. (Wikipedia)
    c. It is a design approach that considers the full range of human diversity with respect to ability, language, culture, gender, age and other forms of human difference. (OCAD)
    d. It is a design methodology, born out of digital environments, that enables and draws on the full range of human diversity.

Most importantly, this means including and learning from people with a range of perspectives. (Microsoft)

e. It is just accessibility with a different name.

3. How did you hear or learn about Inclusive Design?
    a. It was part of an education program at school,
    b. Through a friend or acquaintance,
    c. Through a training program at work,
    d. By reading articles and papers on it,
    e. Other (please specify)
4. Choose one from the following that you agree the most - Design is ... :
    a. to develop a plan or specification for the construction of an object or system or for the implementation of an activity or process, or the result of that plan or specification in the form of a prototype, product or process. (Wikipedia)
    b. about progress. It is the conceptualization and creation of new things: ideas, interactions, information, objects, typefaces, books,

posters, products, places, signs, systems, services, furniture, websites, and more. (University of Illinois)

c. to create, fashion, execute or construct according to plan (Merriam Webster)
d. to devise courses of action aimed at changing existing situations into preferred ones. (Herbert Simon)
e. solving problems.

Page 4. Questions (Documentation and Design Workflow) -

1. Which tools do you use at work? (choose as many as you like)
    a. Adobe Photoshop
    b. Adobe Illustrator
    c. Microsoft Powerpoint
    d. Keynote
    e. Figma
    f. ... (list of tools)
    g. Other (please specify)
2. How do you share your work with others? (choose all that apply)

    a. Documents sent over email/slack/etc
    b. Playback Workshops
    c. Online collaboration tools (e.g.: Google Docs)
    d. ... (list of sharing methods)
    e. Other (please specify)
3. Do you interact with users during projects?
    a. Yes - if yes, go to question (4)
    b. No - go to question (5)
4. Have you ever interacted with a user that had some sort of physical impairment?
    a. Yes
    b. No
    c. Not sure
5. If possible, please upload a design document you are most proud of. Please only upload if you are sure, you have the right authority to do so and you are not violating any copyrights. [Upload button].

Page 5. Wrap up - "Thanks so much for your time and your answer. If you are interested in the results of this research project, please sign up for our newsletter so I can send you updates or send me a note if you want to participate in our co-design workshops on this topic. As well, if you have any parting thoughts you can write them down below:"

1. Open text form field.
2. Finish button.

8.7 Appendix G: Co-Design Workshop Agenda

1. **Week 1**
    a. **Introduction** (video playback)
    b. **Warm-up** (Online Collaboration Tool, OCT)
2. **Week 2**
    a. **Documentation and Tools Review** - Round 1 (OCT)
    b. **Share back** (video playback)
    c. **Documentation and Tools Review** - Round 2 (OCT)
    d. **Share back** (video playback)
3. **Week 3**
    a. **Questions and Feedback** (OCT)
    b. **Sharing and feedback** (video playback)
4. **Week 4**
    a. **Wrap-up and close** (video playback)

Total active time: 3hrs and 45 minutes

Total workshop time: 4 weeks

Introduction (video recording, 5 minutes) - "Hello everybody, thanks for joining us on this workshop. This activity is part of my Major Research Project on how digital designers can improve inclusion through changes in their tools and workflows. I am doing this project to fulfil my educational requirements of OCAD's MDes in Inclusive Design. Your participation is greatly appreciated. As you know the format of the workshop has changed from a traditional synchronous workshop to an asynchronous workshop. This is to mitigate what is known as Zoom Fatigue."

- Introduce facilitator, objectives of the co-design session, and any relevant background information (backbone design methodology, required paperwork)

Introductions and Warm-up (OCT)

A facilitator will brief through video message the participants on how to perform this activity. The participants will receive a link to the OCT where they will have to fill out a template with an image that represents them (a photo, a drawing, etc), their name, role, and three surprising facts about

them that answer questions like: *Where did you grow up? What was your favourite class in high school? What do you like to do in your spare time?*

The facilitator will summarize each of the participant cards in a video and share it back to all the participants when all cards have been filled out.

Documentation and Tool Review (OCT)

The participants will be briefed by video on this activity, pre-recorded by the facilitator, explaining the activity as it follows: The participants will be split in two different groups. Each group will be assigned a name and provided with a link to a different board in the OCT. In the board the groups will be up to three document and tools examples gathered from the archival research activity with a list of inclusion gaps identified. Each of the documents and tools will have a list of questions on the board that the participants will have to answer individually. The participants will be able to fill out their answers using virtual sticky notes. If the example provided is a document, the questions are:

- What is surprising about this gap?

- Why do you think it happened?
- What do you think could be done to prevent this gap?
- Have you seen similar gaps in your workplace?

If the example provided is a tool, the questions are:

- What is surprising about this tool?
- Why do you think it was created?
- Do you use it? Or a similar tool?
- If you don't use it, what prevents you from using it?

Sharing and Feedback (video)

The facilitator will summarize all the answers in a video for all the participants to review before the next activity.

Questions and Feedback (OCT)

The facilitator will enable reopen the board and instruct the participants via pre-recorded video how to ask questions and leave feedback using the built-in commentary feature in the OCT. The facilitator will set a timeframe for this activity happen and do a summary at the end of it.

Ideation (OCT)

The participants will be working in subgroups again. The facilitator will go over each previously identified gap and ask the following questions:

- How would you describe this gap to a colleague who is not in the room?
- What would make this gap disappear?
- What could have we done differently to prevent the gap?
- Do you know of existing solutions to this problem?
- Who do you think does this gap affects most?

Sharing and Feedback (video)

The facilitator will summarize all the answers in a video for all the participants to review before the next activity.

Wrap up and close (OCT)

The facilitator will thank all participants, do a quick review and ask the following open questions for participants to answer individually:

- Which ideas stood out? Which are the most intriguing and exciting?
- What seems most challenging and difficult to achieve?
- Where do we see areas that are clear no-go's?
- What must-have's are we seeing?
- What was a challenge? What conflicts emerged?
- How did this feel for you as a participant?

8.8 Appendix H: Research Ethics Board Application Approval

File No: 101877

Approval Date: October 07, 2020

Expiry Date: October 06, 2021

Dear Dr. Michelle Wyndham-West, Maria Isabel Casanova Ledesma,

The Research Ethics Board has conducted a delegated/ full board review of your application titled 'Improving Inclusion In Digital Design Workflows'. Your application has been approved. You may begin the proposed research. This REB approval, dated October 07, 2020, is valid until: October 06, 2021. Your REB number is: 2020-67.

IMPORTANT NOTE - The standard conditions for REB approval are as follows:

a) Throughout the duration of this research project all requests for modifications, renewals, and serious adverse event reports must be submitted via the ROMEO Research Portal.

b) Any changes to the research that deviate from the approved application - including changes to faculty supervisors or project team members - must be reported to the REB using the Amendment Form available on the ROMEO Research Portal. REB approval must be issued before changes can be implemented.

c) If you have received approval for more than one year, you are required to submit an Annual Progress Report Form via the ROMEO Research Portal every year as detailed in your approval letter. The Annual Progress Report Form is a very brief form that asks about any changes or adverse that may have occurred during the conduct of your research. REB approval of the Annual Progress Report Form must be issued before research activities involving human participants may continue.

d) If your research will continue beyond October 06, 2021, you must submit a Renewal Form via the ROMEO Research Portal before September 29,

2021. REB approval must be issued before research activities involving human participants may continue.

e) If your research ends on or before October 06, 2021, you must submit a Final Report Form via the ROMEO Research Portal to close out REB approval monitoring efforts. The Final Report Form is a very brief form that asks about any changes or adverse that may have occurred during the conduct of your research.

FOR STUDENTS: Please note that all applications and events must be submitted by your Faculty Supervisor on your behalf. This action is a proxy for supervisory sign-off and lets the REB know that your Faculty Supervisor has reviewed and approved the contents of your submission.

Please note that failure to comply with these conditions and the Tri -Council Policy Statement (TCPS) 2 may result in withdrawal of approval and/or impact your ability to apply for future REB review.

8.9 Appendix I: Research Ethics Board Application Amendment Approval

File No: 101877

Approval Date: October 07, 2020

Expiry Date: October 06, 2021

Dear Dr. Michelle Wyndham-West, Maria Isabel Casanova Ledesma,

The OCAD University Research Ethics Board (REB) has reviewed your amendment to the application titled 'Improving Inclusion In Digital Design Workflows'. Your amendment has been approved. Your REB number remains: 2020-67 and your approval expires on October 06, 2021.

The standard conditions for REB approval are as follows:

a) Throughout the duration of this research project all requests for modifications, renewals, and serious adverse event reports must be submitted via the ROMEO Research Portal.

b) Any changes to the research that deviate from the approved application - including changes to faculty supervisors or project team members - must be reported to the REB using the Amendment Form available on the ROMEO Research Portal. REB approval must be issued before changes can be implemented.

c) If you have received approval for more than one year, you are required to submit an Annual Progress Report Form via the ROMEO Research Portal every year as detailed in your approval letter. The Annual Progress Report Form is a very brief form that asks about any changes or adverse that may have occurred during the conduct of your research. REB approval of the Annual Progress Report Form must be issued before research activities involving human participants may continue.

d) If your research will continue beyond October 06, 2021, you must submit a Renewal Form via the ROMEO Research Portal before September 29, 2021. REB approval must be issued before research activities involving human participants may continue.

e) If your research ends on or before October 06, 2021, you must submit a Final Report Form via the ROMEO Research Portal to close out REB approval monitoring efforts. The Final Report Form is a very brief form that asks about any changes or adverse that may have occurred during the conduct of your research.

FOR STUDENTS: Please note that all applications and events must be submitted by your Faculty Supervisor on your behalf. This action is a proxy for supervisory sign-off and lets the REB know that your Faculty Supervisor has reviewed and approved the contents of your submission.

Please note that failure to comply with these conditions and the Tri -Council Policy Statement (TCPS) 2 may result in withdrawal of approval and/or impact your ability to apply for future REB review.

If you encounter any issues when working in the Research Portal, please contact our system administrator via research@ocadu.ca.